



## SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JNTUK, Kakinada), (Recognised by AICTE, New Delhi)

Accredited by NAAC with 'A' Grade

Recognised as Scientific and Industrial Research Organisation

CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

### SCHEME OF INSTRUCTION & EXAMINATION

(Regulation R17)

#### I/IV B.TECH

(With effect from **2017-2018** Admitted Batch onwards)

Under Choice Based Credit System

#### GROUP-A (CIVIL, EEE & MECHANICAL)

#### I-SEMESTER

Code No.	Name of the Subject	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Contact Hrs/Week	Internal Marks	External Marks	Total Marks
B17 BS 1101	English – I *	3	3	1	--	4	30	70	100
B17 BS 1102	Mathematics – I *	3	3	1	--	4	30	70	100
B17 BS 1105	Engineering Chemistry	3	3	1	--	4	30	70	100
B17 ME 1101	Engineering Mechanics	3	3	1	--	4	30	70	100
B17 ME 1102	Engineering Drawing	3	1	--	3	4	30	70	100
B17 CE 1101	Environmental Studies *	2	2	1	--	3	30	70	100
B17 BS 1107	Engineering Chemistry Lab	2	--	--	3	3	50	50	100
B17 BS 1108	English Communication Skills Lab – I *	2	--	--	3	3	50	50	100
B17 BS 1109	Engineering Workshop & IT Workshop	2	--	--	3	3	50	50	100
B17 BS 1111	Inner Engineering	--	--	--	2	2	--	--	--
<b>Total</b>		<b>23</b>	<b>15</b>	<b>5</b>	<b>14</b>	<b>34</b>	<b>330</b>	<b>570</b>	<b>900</b>

\* Common to both Group - A and Group - B

Code: B17 BS 1101

**ENGLISH - I**  
(Common to all Branches)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

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**Course Objectives:**

1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
3. To develop the communication skills of the students in both the formal and informal situations.
4. To expose the students to various forms of writing in formal settings in order to build confidence in standard grammar
5. To introduce the students various types of reading comprehension practices.

**Course Outcomes: At the end of the Course, Student will be able to:**

1. Understand the rudiments of LSRW Skills, comprehension and fluency of speech.
2. Gain confidence and competency in vocabulary and grammar.
3. Listen, speak, read and write effectively in both the academic and non- academic environment.
4. Extend his/her reading skills towards literature.
5. Strengthen his/her analytical and compositional skills.

**SYLLABUS**

**Life through Language: An Effective Learning Experience**

Life through Language has a systematic structure that builds up communicative ability progressively through the chapters. It will enable the learner to manage confusion; frame question for themselves and others; develop new ideas; support ideas with evidence; express themselves with poise and clarity; and think critically. Acquisition of skill leads to confidence.

**UNIT-I**

**People and Places:-**Word search - Ask yourself-Self-assessment-I -Self-assessment-II - Sentence and its types- Describing people, places and events-Writing sentences-Self-awareness-Self-motivation, Dialogue writing.

**UNIT-II**

**Personality and Lifestyle:-** Word quiz – Verbs-Adverbs-Negotiations-Proving yourself-Meeting Carl Jung- Describing yourself- Living in the 21st century- Using your dictionary-Communication-Adaptability.

### **UNIT-III**

**Media and Environment:** - A list of 100 basic words – Nouns- Pronouns- Adjectives-News report- Magazine article- User's Manual for new iPod- A documentary on the big cat- Why we need to save our tigers: A dialogue- Global warming- Paragraph Writing-Arguing a case-Motivation- Problem solving.

### **UNIT-IV**

**Entertainment and Employment:-** One word substitutes- Parts of speech- Gerunds and infinitives- An excerpt from a short story an excerpt from a biography- A consultant interviewing employees- Your first interview- Reality TV- Writing an essay-Correcting sentences- Integrity Sense of humor.

### **UNIT-V**

**Work and Business:-** A list of 100 difficult words- Articles, Quantifiers- Punctuation - Open letter to the Prime Minister Business dilemmas: An email exchange- A review of *IPL: The Inside Story*, Mark Zuckerberg: World's Youngest Billionaire- A conversation about a business idea- Pair work: Setting up a new business- Recession- Formal letters-Emails- Reports- Professionalism-Ethics, Fill in the blanks.

### **Text Book:**

1. *Life through Language: A Holistic Approach to Language Learning*. Board of Editors, Pearson Publishers, India. 2013.

### **Reference Books:**

1. Basic Vocabulary. Edgar Thorpe, Showick Thorpe. Pearson P. 2008.
2. Quick Solutions to Common Errors in English, Angela Bunt. MacMillan P. 2008.
3. Know Your English (Volume 1&2), by Dr. S. Upendra, Universities Press, India 2012
4. Business Communication Strategies. Mathukutty Monippally. Tata Mc Grahill P. 2009.

**MATHEMATICS - I**  
(Common to all Branches)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

1. The course is designed to equip the students with the necessary mathematical skills and techniques that is essential for an engineering course.
2. The skills derived from the course will help the student form a necessary base to develop analytic and design concepts.
3. Learn about linear first order and higher order ordinary differential equations and their applications.
4. Acquire knowledge of Laplace transform, partial differentiation and their applications.
5. Learn certain first order and higher order partial differential equations.

**Course Outcomes: At the end of the Course, Student will be able to:**

1. Solve linear ordinary differential equations of first order and first degree. Also will be able to apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
2. Solve linear ordinary differential equations of second order and higher order. Also will be able to apply the knowledge in simple applications such as LCR circuits and Simple harmonic motion.
3. Determine Laplace transform and inverse Laplace transform of various functions.
4. Use Laplace transforms to solve a linear ODE.
5. Calculate total derivative, Jacobian and maxima/minima of functions of two variables.
6. Form partial differential equations and solve some standard types of first order PDEs. Find complimentary function and particular integral of linear higher order homogeneous and non-homogeneous PDEs.

## SYLLABUS

**UNIT I: Differential equations of first order and first degree:**

Linear, Bernoulli, Exact, Reducible to exact types.

Applications: Newton's Law of cooling, Law of natural growth and decay, Orthogonal trajectories, Simple electrical circuits, Chemical reactions.

**UNIT II: Linear differential equations of higher order:**

Non-homogeneous equations of higher order with constant coefficients with RHS term

of the type  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , polynomials in  $x$ ,  $e^{ax}V(x)$ ,  $xV(x)$ , Method of Variation of parameters.

Applications: LCR circuit, Simple Harmonic motion.

**UNIT III: Laplace transforms:**

Laplace transforms of standard functions, transforms of  $tf(t)$ ,  $f(t)/t$ , properties, transforms of derivatives and integrals, transforms of unit step function, Dirac delta function, Inverse Laplace transforms, convolution theorem (without proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

**UNIT IV: Partial differentiation:**

Introduction, Homogeneous functions, Euler's theorem, Total derivative, Chain rule, which variable is to be treated as constant, Functional dependence, Jacobians, Taylor series for a function of two variables, Leibnitz rules for differentiation under the integral sign.

Applications: Errors and Approximations, Maxima and Minima of functions of two variables without constraints, Lagrange's method (with constraints)

**UNIT V: First order and higher order partial differential equations:**

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange linear equation and nonlinear equations of standard types (excluding Charpit's method).

Solutions of Linear homogeneous and non-homogeneous Partial differential equations with constant coefficients - RHS terms of the type  $e^{ax+by}$ ,  $\sin(ax+by)$ ,  $\cos(ax+by)$ ,  $x^m y^n$ .

**Text Books:**

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. N.P.Bali & Manish Goyal, A Text book of Engineering Mathematics, Lakshmi Publications.

**Reference Books:**

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
2. Michael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson.
3. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
4. Peter O'Neil, Advanced Engineering Mathematics, Cengage Learning.
5. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, New Delhi.

**ENGINEERING CHEMISTRY**  
(Common to CIV, EEE & ME)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

Knowledge of basic concepts of chemistry for engineering students will help them as professional engineers later in design and material selection as well as utilizing the available resources.

**Course Objectives:**

1. To understand the physical and mechanical properties of Polymers/Plastics/elastomers helps in selecting suitable materials for different purpose.
2. To create awareness on fuels as a source of energy for industries like thermal power stations, steel industry, fertilizer industry etc.
3. To understand the concepts of galvanic cells and corrosion with theories like electro chemical theory.
4. To understand the importance of water.
5. To understand about the materials which are used in major industries like steel and metallurgical manufacturing industries, construction and electrical equipment manufacturing industries.

**Course Outcomes:**

1. At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
2. Fuels which are used commonly and their economics, advantages and limitations are discussed.
3. Students gained Knowledge reasons for corrosion and some methods of corrosion control.
4. Students understands the impurities present in raw water, problems associated with them and how to avoid them.
5. Similarly students understand liquid crystals and semi conductors. Students can gain the building materials , solar materials, lubricants and energy storage devices.

## SYLLABUS

**UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:**

Polymerization Definition, Types of Polymerization, Mechanism of addition polymerization, Plastics as engineering materials, Thermoplastics and Thermosetting plastics, Compounding of plastics, Fabrication of plastics (4 techniques); Preparation, Properties and applications of Polyethylene, PVC, Bakelite, Nylon - 6,6, Bullet Proof plastics -polycarbonate and Kelvar; Fiber reinforced plastics, conducting polymers, Biodegradable Polymers - PHBV, Nylon 2, Nylon 6. Natural rubber – Vulcanization – Compounding of Rubber; Preparation, properties and applications of Buna – S; Buna – N;

**UNIT-II :Fuel Technology& Lubricants:**

Fuels: - Introduction – Classification of fuels, Calorific value – HCV and LCV, Determination of Calorific value by bomb calorimeter; Proximate and ultimate analysis of coal, coke: manufacture of coke by Otto – Hoffmann’s by-product coke oven process; Refining of Petroleum, Knocking-octane number of gasoline, cetane number of diesel oil. Synthetic Petrol; LPG , CNG.

Lubricants:- Definition, Mechanism of Lubrication, Properties of Lubricants (Definition and significance)

**UNIT-III: Electrochemical cells and Corrosion:**

Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells- Hydrogen – Oxygen cell, Lithium battery Theories of corrosion (i) dry Corrosion (ii) wet corrosion. Types of corrosion - differential aeration corrosion, pitting corrosion, galvanic corrosion, stress corrosion, Factors influencing corrosion, Protection from corrosion- material selection & design, cathodic protection, Protective coatings- metallic coatings – Galvanizing, Tinning, Electroplating; Electroless plating ; Paints.

**UNIT-IV: Water technology:**

Sources of water – Hardness of water – Estimation of hardness of water by EDTA method; Boiler troubles – sludge and scale formation, Boiler corrosion, caustic embrittlement, Priming and foaming; Softening of water by Lime – Soda Process, Zeolite Process, Ion – Exchange Process; Municipal water treatment; Desalination of sea water by Electrodialysis and Reverse osmosis methods.

**UNIT-V: Chemistry of Engineering Materials& Advanced Engineering materials**

Cement:- Manufacture of Portland cement, setting and hardening of cement, Deterioration of cement concrete.

Refractories: - Definition, Characteristics, classification, Properties and failure of refractories.

Solar Energy: - Construction and working of Photovoltaic cell, applications.

Solid State Materials: Crystal imperfections, Semi Conductors, Classification and chemistry of semi conductors: Intrinsic semiconductors; Extrinsic semiconductors; Defect semiconductors, Compound Semiconductors and Organic Semiconductors.

Liquid Crystals: - Definition – Classification with examples – Applications

**Text Books:**

1. Engineering Chemistry by Jain and Jain, Dhanpat Rai publishing co.
2. Engineering Chemistry by Willy India Pvt Ltd.
3. Engineering Chemistry by Dr.K.Anji Reddy and Dr.M.S.R.Reddy; Silicon Publications.

**Reference Books:**

1. Engineering Chemistry by Shikha Agarwal; Cambridge University Press,2015 edition.
2. A text of Engineering Chemistry by S.S.Dara; S.Chand & Co Ltd.

**ENGINEERING MECHANICS**  
(Common to CIV, EEE & ME)

**Lecture : 3 Periods**  
**Tutorial : 1 Period.**  
**Exam : 3 Hrs.**

**Int.Marks : 30**  
**Ext. Marks : 70**  
**Credits : 3**

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**Course Objectives:**

1. To impart the basic concepts of Engineering Mechanics and the principles of various force systems under static and dynamic conditions.
2. Comprehensive, theory based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline.
3. Application of established engineering methods to complex engineering problem solving.
4. The course is the key prerequisite course to sequences of courses dealing with mechanics of machines, stress analysis and design of mechanical systems.

**Course Outcomes:**

Students will be able to

1. Determine the resultant of the given force systems.
2. Analyze force systems using equations of equilibrium.
3. Determine centroid, center of gravity and moment of inertia of areas and bodies.
4. Analyze trusses and simple beams.
5. Distinguish between kinematics and kinetics.
6. Apply the work energy and impulse momentum methods of various engineering problems.

**SYLLABUS**

**UNIT-I**

**Basic Concepts:**

Scalar and vector quantities- Representation of vectors- Free vector force, Specification of force- Effect of force on rigid body- Free body diagram. Concurrent Forces in a plane: Principles of statics-Resolution and Composition of forces in a plane-Equilibrium of concurrent forces in a plane- Method of projections- Equilibrium of three forces in a plane Method of moments. Parallel Force system in a plane.

**UNIT-II**

**Centroid & Moment of Inertia:** Centroid & M.I – Area & Mass M.I – Radius of Gyration, Parallel axis– Perpendicular axis theorem – Simple Problems.

**UNIT-III**

**General Case of Forces in a Plane:** Resultant and equilibrium of general case of forces in a plane, Statically determinate plane trusses-Method of joints and Method of sections.

**Friction** – Coulombs laws of dry friction – Limiting friction, Problems on Wedge friction, Belt Friction-problems.



#### **UNIT-IV**

**Dynamics of Particles** - Rectilinear Motion – Kinematics, D'Alembert's principle, Kinetics – Work & Energy – Impulse Moment, Direct Central Impact – coefficient of restitution.

**Curvilinear Motion** – Kinematics, Projectile Motion, Moment of momentum, Work & Energy in Curvilinear motion.

#### **UNIT-V**

**Dynamics of Rigid Bodies** - Rigid body rotation – Kinematics - Kinetics – Work & Energy in Rigid body rotation, Plane Motion – Kinematics – Instantaneous center of rotation, Kinetics - Work-Energy principle in plane motion.

#### **Text Book:**

1. Engineering Mechanics by S.Timoshenko and D.HYoung McGraw-Hill.

#### **Reference Books:**

1. Engineering Mechanics, Vol.1 & 2 by J.L. Meriems and L.G. Kraige.
2. Engineering Mechanics by Singer.
3. Engineering Mechanics by K.L. Kumar, Tata Mc-Graw Hill.
4. Engineering mechanics by Bhavikatti, New age international.

**ENGINEERING DRAWING**  
(Common to CIV, EEE & ME)

<b>Lecture</b>	<b>: 1 Period</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Practice</b>	<b>: 3 Periods</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

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**Course Objectives:**

1. To highlight the significance of universal language of engineers.
2. To impart basic knowledge and skills required to prepare engineering drawings.
3. To impart knowledge and skills required to draw projections of solids in different contexts.
4. To visualize and represent the pictorial views with proper dimensioning and scaling.

**Course Outcomes:**

Students will be able to

1. Apply principles of drawing to represent dimensions of an object.
2. Construct polygons and engineering curves.
3. Draw projections of points, lines, planes and solids.
4. Represent the object in 3D view through isometric views.
5. Convert the isometric view to orthographic view and vice versa.

**SYLLABUS**

**UNIT I**

**Polygons:** Constructing regular polygons by general methods, inscribing and describing polygons on circles.

**Curves:** Parabola, Ellipse and Hyperbola by general methods, cycloids, involutes, tangents & normals for the curves.

**UNIT II**

**Orthographic Projections:** Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of lines, lines parallel either to one of the reference planes (HP,VP or PP)

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces- HT, VT

**UNIT III**

Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

**UNIT IV**

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

## **UNIT V**

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

### **Text Books:**

1. Engineering Drawing by N.D. Butt, Chariot Publications.
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers

### **Reference Books:**

1. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers.
2. Engineering Graphics for Degree by K.C. John, PHI Publishers.
3. Engineering Graphics by PI Varghese, McGrawHill Publishers.
4. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

**ENVIRONMENTAL STUDIES**  
(Common to all Branches)

**Lecture : 2 Periods**  
**Tutorial : 1 Period.**  
**Exam : 3 Hrs.**

**Int.Marks : 30**  
**Ext. Marks : 70**  
**Credits : 2**

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**Course Objectives:**

1. Developing an awareness and sensitivity to the total environment and its related problems.
2. Motivating students for active participation in environmental protection and improvement.
3. Developing skills for active identification and development of solutions to environmental problems
4. Evaluation of environment programmes in terms of social, economic, ecological and aesthetic factors.
5. Creating a “CONCERN AND RESPECT FOR THE ENVIRONMENT”.

**Course Outcomes:**

1. To bring awareness among the students about the nature and natural ecosystems
2. Sustainable utilization of natural resources like water, land, energy and air
3. Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation
4. Safe guard against industrial accidents particularly nuclear accidents
5. Constitutional provisions for the protection of natural resources

**SYLLABUS**

**UNIT – I**

**Global Environmental Crisis:**

Environmental Studies - Definition, Scope and importance, Need for public awareness. Global Environmental Crisis

**Ecosystems:**

Basic Concepts - Structure and Functions of Ecosystems: Producers, Consumers and Decomposers. Types of Ecosystems: Forest Ecosystems, Grassland Ecosystems Desert Ecosystems and Aquatic Ecosystems

**UNIT-II**

**Biodiversity:**

Introduction to Biodiversity, Values of Bio-diversity, Bio-geographical classification of India, India as a Mega-diversity habitat, Threats to biodiversity, Hotspots of Biodiversity, Conservation of Biodiversity: In-situ and Ex-situ conservation of Biodiversity.

### UNIT-III

#### **Environmental and Natural Resources Management:**

**Land Resources:** Land degradation, soil erosion and desertification, Effects of modern agriculture. **Forest Resources:** Use and over exploitation-Mining and Dams-their effects on forest and tribal people. **Water resources:** Use and over utilization of surface and ground water, Floods, droughts, conflict over water, water logging and salinity, dams – benefits and problems. **Energy Resources:** Renewable and non-renewable energy sources, use of alternate energy sources-impact of energy use on environment.

### UNIT-IV

#### **Environmental Pollution:**

Causes, Effects and Control measures of - Air pollution, Water pollution, Soil pollution, Marine Pollution, Thermal pollution, Noise pollution, Nuclear Hazards; Climate change and Global warming, Acid rain and Ozone layer depletion. Solid Waste Management: Composting, Vermiculture, Urban and Industrial Wastes, Recycling and Reuse.

#### **Environmental Problems in India:**

Drinking water, Sanitation and Public health, Population growth and Environment; Water Scarcity and Ground Water Depletion; Rain water harvesting, Cloud seeding and Watershed management.

### UNIT-V

#### **Institutions and Governance:**

Regulations by Government- Environmental Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act. Environmental Impact Assessment (EIA)

#### **Case Studies:**

Chipko Movement, Narmada Bachao Andolan, Silent Valley Project, Mathura Refinery and Taj Mahal, Industrialization of Patancheru, Nuclear reactor at Nagarjuna Sager, Tehri Dam, Ralegaon Siddhi (Anna Hazare), Kolleru lake – Aquaculture, Fluorosis in Andhra Pradesh & Telangana.

#### **Field Work:**

Visit to a local area to document and mapping environmental assets. Visits to Industries, Water Treatment Plants, Effluent Treatment Plants.

#### **Text Books:**

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
2. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
3. Environmental Studies, Dr. M. Sita Rama Reddy, Dr. K. Anji Reddy, Silicon Publications, ASR Nagar, Bhimavaram
4. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai

#### **Reference Books:**

1. Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014

**ENGINEERING CHEMISTRY LAB**  
(Common to CIV, EEE & ME)

**Lab : 3 Periods**  
**Exam : 3 Hrs.**

**Int.Marks : 50**  
**Ext. Marks : 50**  
**Credits : 2**

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**Course Objectives:**

1. To investigate and understand Physical behavior in the laboratory using scientific reasoning and logic and interpret the result of simple experiments and demonstration of chemical Principle and also evaluate the impact of chemical discoveries on how we view the world.
2. Effectively communicate experimental results and solutions to application problems through oral and written reports.
3. Understand the basic concepts, definitions, characteristics and phenomena.
4. Recognize the classical ideas and chemical phenomena and also define and analyse the concepts.

**Course Outcomes:**

1. An understanding of Professional and develop confidence on recent trends.
2. Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipments.
3. Acquire ability to apply knowledge of chemistry.
4. Exposed to the real time working environment.
5. Demonstrate the ability to learn Principles, design and conduct experiments.
6. Ability to work on laboratory and multidisciplinary tasks.

**LIST OF EXPERIMENTS**

**Introduction to chemistry Laboratory**

1. Estimation of HCl using standard Sodium Hydroxide.
2. Determination of total hardness of water by EDTA method.
3. Estimation of Ferrous Iron by  $\text{KMnO}_4$ .
4. Estimation of oxalic acid by  $\text{KMnO}_4$
5. Estimation of Mohr's salt by  $\text{K}_2\text{Cr}_2\text{O}_7$
6. Estimation of Dissolved oxygen by Winkler's method.
7. Determination of pH by pH meter and universal indicator method.
8. Conductometric titration of strong acid Vs strong base
9. Conductometric titration of strong acid Vs weak base.
10. Potentiometric titration of strong acid Vs strong base
11. Potentiometric titration of strong acid Vs weak base
12. Preparation of Phenol formaldehyde resin.
13. Determination of saponification value of oils
14. Determination of pour and cloud points of lubricating oil.
15. Determination Acid value of oil.

**Text Books:**

1. Engineering Chemistry Lab Manual Prepared by Chemistry Faculty of S.R.K.R.Engineering College.

**Reference Books:**

1. Laboratory manual on Engineering Chemistry by Dr.Sudha Rani ;Dhanpat Rai Publishing Company.
2. Engineering Chemistry Laboratory manual – I & II by Dr. K.Anji Reddy; Tulip Publications.

**ENGLISH COMMUNICATION SKILLS LAB- I**  
(Common to All Branches)

**Lab : 3 Periods**  
**Exam : 3 Hrs.**

**Int.Marks : 50**  
**Ext. Marks : 50**  
**Credits : 2**

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**Course Objectives:**

1. To enable the students to learn through practice the communication skills of listening, speaking, reading and writing.
2. To make students recognize the sounds of English through Audio- Visual aids.
3. To familiarize the students with stress and intonation.
4. To help the students build their confidence in speaking skills.

**Course Outcomes:**

1. A study of the communicative items in the laboratory will help the students become successful in the competitive world.
2. Students improve their speaking skills in real contexts.
3. Students learn standard pronunciation and practice it daily discourse.
4. Students give up their communicative barriers.

**SYLLABUS**

- ❖ WHY study Spoken English?
- ❖ Making Inquiries on the phone, thanking and responding to Thanks - Practice work.
- ❖ Responding to Requests and asking for Directions - Practice work.
- ❖ Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
- ❖ Apologising, Advising, Suggesting, Agreeing and Disagreeing - Practice work.
- ❖ Letters and Sounds-Practice work.
- ❖ The Sounds of English-Practice Work
- ❖ Pronunciation
- ❖ Stress and Intonation-Practice work.

**Lab Manual:**

1. **'INTERACT: English Lab Manual for Undergraduate Students'** Published by Orient Blackswan Pvt Ltd.



## **Reference Books:**

1. Strengthen your communication skills by Dr M Hari Prasad, Dr Salivendra Raju and Dr G Suvarna Lakshmi, Maruti Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. Unlock, Listening and speaking skills 2, Cambridge University Press
4. Spring Board to Success, Orient BlackSwan
5. A Practical Course in effective english speaking skills, PHI
6. Word power made handy, Dr shalini verma, Schand Company
7. Let us hear them speak, Jayashree Mohanraj, Sage texts
8. Professional Communication, Aruna Koneru, Mc Grawhill Education
9. Cornerstone, Developing soft skills, Pearson Education.

**ENGINEERING WORKSHOP & IT WORKSHOP**  
(Common to CIV, EEE & ME)

Lab : 3 Periods  
Exam : 3 Hrs.

Int.Marks : 50  
Ext. Marks : 50  
Credits : 2

**PART-A ENGINEERING WORKSHOP**

**Course Objective:**

To impart hands-on practice on basic engineering trades and skills.

**Course Outcomes:**

Student will be able to

1. Use various tools to prepare basic carpentry and fitting joints.
2. Prepare jobs of various shapes using black smithy.
3. Make basic house wire connections.
4. Fabricate simple components using tin smithy.

**SYLLABUS**

<b>Carpentry</b>	<b>Fitting</b>
<ol style="list-style-type: none"> <li>1. T-Lap Joint</li> <li>2. Cross Lap Joint</li> <li>3. Dovetail Joint</li> <li>4. Mortise and Tenon Joint</li> </ol>	<ol style="list-style-type: none"> <li>1. Vee Fit</li> <li>2. Square Fit</li> <li>3. Half Round Fit</li> <li>4. Dovetail Fit</li> </ol>
<b>Black Smithy</b>	<b>Tin Smithy</b>
<ol style="list-style-type: none"> <li>1. Round rod to Square</li> <li>2. S-Hook</li> <li>3. Round Rod to Flat Ring</li> <li>4. Round Rod to Square headed bolt</li> </ol>	<ol style="list-style-type: none"> <li>1. Taper Tray</li> <li>2. Square Box without lid</li> <li>3. Open Scoop</li> <li>4. Funnel</li> </ol>
<b>House Wiring</b>	
<ol style="list-style-type: none"> <li>1. Parallel / Series Connection of three bulbs</li> <li>2. Stair Case wiring</li> <li>3. Florescent Lamp Fitting</li> <li>4. Measurement of Earth Resistance</li> </ol>	

**Note: At least two exercises to be done from each trade.**

**Reference:**

1. Elements of workshop technology, Vol.1 by S. K. and H. K. Choudary.

## **PART B: IT WORKSHOP:**

### **Course Objectives:**

1. Understand the basic components and peripherals of a computer.
2. To become familiar in configuring a system.
3. Learn the usage of productivity tools.
4. Acquire knowledge about the netiquette and cyber hygiene.
5. Get hands on experience in trouble shooting a system

### **Course Outcomes:**

At the end of the course the students can able to

1. Assemble and disassemble the systems
2. Use the Microsoft office tools
3. Install various software
4. Know about various search engines
5. Trouble shoot various Hardware and Software problems
6. Use MATLAB and LATEX softwares

### **LIST OF EXCERCISES**

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. Operating System Installation-Install Operating Systems like Windows, Linux along with necessary Device Drivers.
3. MS-Office / Open Office
  - a) Word - Formatting, Page Borders, Reviewing, Equations, symbols.
  - b) Spread Sheet - organize data, usage of formula, graphs, charts.
  - c) Power point - features of power point, guidelines for preparing an effective presentation.
  - d) Access- creation of database, validate data.
4. Network Configuration & Software Installation-Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. Internet and World Wide Web-Search Engines, Types of search engines, netiquette, cyber hygiene.
6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.
7. MATLAB- basic commands, subroutines, graph plotting.
8. LATEX-basic formatting, handling equations and images.

### **Reference Books:**

1. Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, K.L. James, Eastern Economy Edition.
2. Microsoft Office 2007: Introductory Concepts and Techniques, Windows XP Edition By Gary B. Shelly, Misty E. Vermaat and Thomas J. Cashman (2007, Paperback).
3. LATEX- User's Guide and Reference manual, Leslie Lamport, Pearson, LPE, 2/e.
4. Getting Started with MATLAB: A Quick Introduction for Scientists and ngineers, Rudrathap, Oxford University Press, 2002.
5. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
6. The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dreamtech.
7. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
8. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education.

**INNER ENGINEERING**  
**(Common to CIV, EEE & ME)**

**Practice : 2 Periods**

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**Course Objectives:**

Student should learn:

1. Human values and tools to lead a happy, stress-free life.
2. Yoga asanas, Pranayama, Sudarshan Kriya & Meditation
3. At-least two creative arts out of photography, sketching, craft-making, singing, clay molding, upcycling etc.
4. Concentration pranayama, Ego bursting process.
5. To take up responsibility for society and teach classes of their choice to school children.
6. About good food habits for good health.

**Course Outcomes:**

Student should be capable of

1. To improve his concentration levels and improve his public speaking abilities.
2. To balance his academic and non-academic activities (Work Life Balance).
3. To widen his vision and increase his breadth of perspective in his journey of 4 years.
4. To improve his communications skills, leadership, teamwork and decision-making abilities.
5. To inculcate creativity & innovation, planning & organizing as part of their life.
6. Taking responsibility for themselves and people around them.
7. To make their journey more fun and enjoyable.

**SYLLABUS**

**UNIT-I**

YES!+ Workshop:

Yoga Postures – Seven Layers To our Existence – Puzzles – Sources Of Energy – Live in the present Moment – Importance of Breath – Ujjai Breath – Pranayama – Sudarshana Kriya.

**UNIT-II**

YES!+ Workshop:

Yoga Postures ( Suryanamaskars) – Giving 100% in everything – Time management – Happiness point – Opposite Values – Pranayama – Sudarshan kriya

### **UNIT-III**

YES!+ Workshop:

Yoga Postures – Knowledge points (Acceptance, opinions discretion and handling mistakes) – Eye Gazing Process – Dance – Life Story process – Sudarshana Kriya (short) – Eternal life – Ego Bursting – Relationships – Parents – Studies – Compliments/Praising process.

### **UNIT-IV**

Creative Arts:

Photography – Sketching – Handy-crafts – Clay molding – Singing – Upcycling – Communing with nature – Creative writing.

### **UNIT -V**

Service:

Leadership in action – Contributing to society – Take up Responsibility –Empowerment – Public Speaking – Art of Teaching.

### **Reference Books:**

1. Discourse on Patanjali Yoga Sutras by H.H Sri SriRavishankar
2. Human values and professional ethics byRRGaur,RSangal,GPBagaria
3. The Art of Photography by AL Judge
4. Hand made in India : Crafts of India by Ranjan Aditi

**(Note:** It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)

**SCHEME OF INSTRUCTION & EXAMINATION**  
(Regulation R17)  
**I/IV B.TECH**  
(With effect from **2017-2018** Admitted Batch onwards)  
Under Choice Based Credit System

**GROUP-A ( CIVIL, EEE & MECHANICAL)**  
**II-SEMESTER**

Code No.	Name of the Subject	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Contact Hrs/Week	Internal Marks	External Marks	Total Marks
B17 BS 1201	English – II *	3	3	1	--	4	30	70	100
B17 BS 1202	Mathematics – II	3	3	1	--	4	30	70	100
B17 BS 1203	Mathematics – III*	3	3	1	--	4	30	70	100
B17 BS 1204	Engineering Physics	3	3	1	--	4	30	70	100
B17 CS 1201	Computer Programming Using C	3	3	1	--	4	30	70	100
# DS 1	Department Subject	3	3	1	--	4	30	70	100
B17 BS 1206	Engineering Physics Lab	2	--	--	3	3	50	50	100
B17 BS 1208	English Communication Skills Lab – II *	2	--	--	3	3	50	50	100
B17 CS 1204	C Programming Lab	2	--	--	3	3	50	50	100
B17 BS 1210	Engineering Physics Virtual Labs-Assignments	--	--	--	2	2	--	--	--
B17 BS 1211	NCC	--	--	--	2	2	--	--	--
<b>Total</b>		<b>24</b>	<b>18</b>	<b>6</b>	<b>13</b>	<b>37</b>	<b>330</b>	<b>570</b>	<b>900</b>

\* Common to both Group - A and Group - B

<b>#DS 1</b>	CIVIL	B17 CE 1201	Building Materials and Construction
	EEE	B17 EE 1201	Circuit Theory
	MECHANICAL	B17 EE 1202	Basic Electrical and Electronics Engineering

**ENGLISH - II**  
(Common to all Branches)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

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**Course Objectives:**

1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
3. To develop spoken and written forms of the students in both formal and informal situations.
4. To enrich the vocabulary of the students through the usage of the lexis in appropriate contexts.
5. To expose them to the correct structural patterns of English.

**Course Outcomes: At the end of the Course, Student will be able to:**

1. To comprehend the speech of people belonging to different backgrounds and regions.
2. Understand the importance of speaking and writing for personal and professional communication and practice it in real contexts.
3. To express fluently and accurately in social discourse.
4. Participate in group activities like role-plays, discussions and debates.
5. Identify the discourse features, and improve intensive and extensive reading skills.

**SYLLABUS**

**UNIT I:**

- A. Detailed-Text: Unit 1: ' The Greatest Resource- Education'
- B. Non-Detailed Text: Lesson 1: ' A P J Abdul Kalam' from The Great Indian Scientists.

**UNIT II:**

- A. Detailed-Text: Unit 2: ' A Dilemma'
- B. Non-Detailed Text: Lesson 2:'C V Raman' from The Great Indian Scientists.

**UNIT III:**

- A. Detailed-Text: Unit 3: 'Cultural Shock': Adjustments to new Cultural Environments
- B. Non-Detailed Text: Lesson 3:'Homi Jehangir Bhabha' from The Great Indian Scientists.

**UNIT IV:**

- A. Detailed-Text: Unit 4: 'The Lottery'
- B. Non-Detailed Text: Lesson 4: 'Jagadish Chandra Bose' from The Great Indian Scientists.

**UNIT V:**

- A. Detailed-Text: Unit 5: ' The Chief Software Architect'
- B. Non-Detailed Text: Lesson 5: ' Prafulla Chandra Ray' from The Great Indian Scientists

**Detailed Textbook:**

1. English Encounters Published By Maruthi Publishers.

**Non-Detailed Text Book:**

1. The Great Indian Scientists Published by Cengage learning.



**MATHEMATICS – II**  
(Common to CIV, EEE & ME)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student form a necessary base to develop analytic and design concepts.
3. Understand some basic numerical methods to solve algebraic and transcendental equations.
4. Learn interpolation methods for equally spaced and unequally spaced data points. Learn methods for numerical evaluation of integrals and for solving first order ODEs.
5. Learn concepts of a Fourier series and Fourier transform.

**Course Outcomes: At the end of the Course, Student will be able to:**

1. Find a real root of algebraic and transcendental equations using different methods.
2. Know the relation between the finite difference operators. Determine interpolation polynomial for a given data.
3. Evaluate numerically certain definite integrals applying Trapezoidal and Simpson's rules.
4. Solve a first order ordinary differential equation by Euler and RK methods.
5. Find Fourier series of a given function satisfying Dirichlet conditions. Find half range cosine and sine series for appropriate functions.
6. Find Fourier transforms Fourier cosine and sine transforms of appropriate functions and evaluate certain integrals using inverse transforms and Fourier integral.

**SYLLABUS****UNIT I: Solution of Algebraic and Transcendental Equations:**

Introduction, Bisection method, Method of false position, Iteration method, Newton- Raphson method (One variable and simultaneous Equations).

**UNIT II: Interpolation:**

Introduction, Errors in polynomial interpolation, Finite differences, Forward differences, Backward differences, Central differences and Symbolic relations between the operators, Differences of a polynomial, Newton's formulae for interpolation, Interpolation with unequal intervals, Lagrange's interpolation formula.

**UNIT III: Numerical Integration and solution of Ordinary Differential equations:**

Trapezoidal rule, Simpson's  $1/3^{\text{rd}}$  and  $3/8^{\text{th}}$  rules, Solution of ordinary differential equations by Taylor series method, Picard's method of successive approximations, Euler's method, Runge-Kutta methods (second order and fourth order).

**UNIT IV: Fourier Series:**

Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half-range sine and cosine series, Parseval's formula.

**UNIT V: Fourier Transforms:**

Fourier integral theorem (without proof), Complex form of Fourier integral, Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms, properties, inverse transforms, Parseval's identities, Finite Fourier transforms.

**Text Books:**

1. B.S.Grewal, Higher Engineering Mathematics, 43<sup>rd</sup> Edition, Khanna Publishers.
2. N.P.Bali & Manish Goyal, A Text book of Engineering Mathematics, Lakshmi Publications.

**Reference Books:**

1. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
2. V.Ravindranath and P. Vijayalakshmi, Mathematical Methods, Himalaya Publishing House.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 10<sup>th</sup> Edition, Wiley-India.
4. David Kincaid, Ward Cheney, Numerical Analysis-Mathematics of Scientific Computing, 3<sup>rd</sup> Edition, Universities Press.
5. Srimanta Pal, Subodh C. Bhunia, Engineering Mathematics, Oxford University Press.
6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, New Delhi.

**MATHEMATICS - III**  
(Common to all Branches)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

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**Course Objectives:**

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student form a necessary base to develop analytic and design concepts.
3. Understand important concepts of Linear algebra including solution of linear simultaneous equations, eigen values and eigen vectors.
4. Learn Beta, Gamma functions and how to evaluate double and triple integrals.
5. Learn fundamental concepts of vector calculus that help understand other Engineering courses.

**Course Outcomes: At the end of the Course, student will be able to:**

1. Determine rank, and solve a system of linear simultaneous equations numerically using various matrix methods.
2. Determine Eigen values and Eigen vectors of a given matrix, Reduce a Quadratic form to its canonical form and classify.
3. Evaluate double integrals over a region and triple integral over a volume.
4. Use the knowledge of Beta and Gamma functions in evaluation of different integrals.
5. Find gradient of a scalar function, divergence and curl of a vector function. Use vector identities for solving problems.
6. Evaluate line, surface and volume integrals by the use of Green's, Stokes' and Gauss divergence theorems.

**SYLLABUS****UNIT I: Linear systems of equations:**

Rank, Echelon form, Normal form, Solution of linear systems, Gauss elimination, Gauss-Jordan, Jacobi and Gauss-Seidel methods.  
Applications: Finding the current in electrical circuits.

**UNIT II: Eigen values - Eigen vectors and Quadratic forms:**

Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix by using Cayley-Hamilton theorem, Diagonalization, Quadratic forms, Reduction of a Quadratic form to Canonical form, Rank, Positive, Negative, Semi-Definite and indefinite forms of a Quadratic form, Index and Signature of a Quadratic form.  
Applications: Free vibration of a two-mass system.

**UNIT III: Multiple integrals:**

Double and triple integrals, Change of variables, Change of order of integration. Application to finding Areas, Moment of Inertia and Volumes.  
Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Application to evaluation of improper integrals. The error function and the complimentary error function.

**UNIT IV: Vector Differentiation:**

Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal and irrotational vector fields, second order operators, vector identities.

**UNIT V: Vector Integration:**

Line integral, Work done, Potential function; Area, Surface and volume integrals, Flux, Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems.

**Text Books:**

1. B.S.Grewal, Higher Engineering Mathematics, 43<sup>rd</sup> Edition, Khanna Publishers.
2. N.P.Bali & Manish Goyal, Engineering Mathematics, Lakshmi Publications.

**Reference Books:**

1. Michael Greenberg, Advanced Engineering Mathematics, 9<sup>th</sup> edition, Pearson edn.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10<sup>th</sup> Edition, Wiley-India.
3. Peter O'Neil, Advanced Engineering Mathematics, 7<sup>th</sup> edition, Cengage Learning.
4. D.W. Jordan and T. Smith, Mathematical Techniques, Oxford University Press.
5. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, New Delhi.

**ENGINEERING PHYSICS**  
(Common to CIV, EEE & ME)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

To re-orient Physics curriculum to the needs of the circuitual and non circuitual branches of Engineering / Technology courses offered by SRKREC(A) Bhimavaram that serves to understand the general and branch specific basic topics and introduce the related advanced technologies to the stake holders.

1. To impart the knowledge of physical optics phenomena like Interference and Diffraction required to understand the design and working of optical instruments with high resolution.
2. To understand the concept of coherence and generation of high intensity light sources and propagation of light waves in fibers for technological applications.
3. To study and analyze the behavior of electric and magnetic fields and their mutual interaction, and to understand the science of ultrasonics.
4. To understand the basic concepts of Quantum mechanics to know the behavior of fundamental particles in materials and to understand the basic nature of materials in general and classify them.
5. To study the structure property relationship of crystalline solids and understand basics of nanotechnology.

**Course Outcomes:** At the end of the course the students-

1. Learn the basic concepts of interference and diffraction of light and its applications.
2. Understand the science of producing high intensity light beams for technological applications and also understand the propagation of light waves in optical fibers in various applications.
3. Understand the inter relationship of electric and magnetic fields and learn ultrasonic's as a tool for technological applications
4. Learn the behavior of particles at the very microscopic level by using wave nature of particles and understand the behavior of materials and be able to classify them using the band theory of solids.
5. Learn the basics of structures of solid materials and nano material preparation Techniques/methods.

## SYLLABUS

**UNIT I: Interference and Diffraction**

Principle of superposition-coherence-interference in thin films (reflected system) – Wedge shaped film-Newton's rings-Michelson's interferometer. Fraunhofer's diffraction at single slit, Diffraction grating-Resolving power of a grating.

**UNIT- II: Lasers and Optical Fibers**

Introduction, Spontaneous emission and Stimulated emission – Einstein's relation – Requirements of Laser device- Ruby laser- He-Ne gas laser- Characteristics of laser- Applications.

Description of optical fiber, Principle of light propagation- Optical fiber –Acceptance angle-Numerical aperture of optical fiber- Modes of propagation- Classification of fibers- Applications of fiber.

### **UNIT- III: Electro Magnetic Fields and Ultrasonics**

Concept of Electromagnetic induction , Faraday's law, Lenz's law, Electric fields due to time varying magnetic fields, Magnetic fields due to time varying electric fields, Displacement current, Modified Ampere's law, Maxwell's equations and their significance (without derivation).

Definition of Ultrasonics-Methods of Producing Ultrasonics- Detection of Ultrasonics- Applications of Ultrasonics.

### **UNIT- IV: Quantum Mechanics and Band Theory of Solids**

Introduction, de Broglie matter waves- properties-Experimental confirmation, wave function-significance- Schrodinger's time dependent and time independent wave equations- Eigen values and functions, Particle in a box.

Band theory of Solids- Introduction- Kronig Penney model (Qualitative)- Energy bands of crystalline solids- Distinction between Conductors, Semi conductors and insulators.

### **UNIT-V: Crystallography and Nano Materials**

Basis and Lattice, Crystal systems, Bravais lattice, Unit cell Coordination number – Packing fraction for SC ,FCC, and BCC lattices, Miller indices- Diffraction of X rays from crystals- Bragg's law.

Introduction to Nanomaterials – Synthesis methods : Condensation, ball milling, sol-gel, chemical vapour deposition methods, properties and applications.

#### **Text Books:**

1. Physics by Resnick & Halliday. Wiley - Eastern (India) Ltd.
2. Engineering Physics By M.N. Avadhanulu & PG Kshirasagar, S.Chand & Co.
3. Engineering Physics by V. Rajendran, Mc Graw Hill Education (India) Pvt.Ltd.

#### **Reference Books:**

1. Engineering Physics by MR Srinivasan, New International Publishers.
2. Solid State Physics – A.J. Dekkar, MacMillan (India) Ltd.
3. Engineering Physics by Gaur Gupta, Dhanpat Rai Publications, Meerut, India.
4. Engineering Physics by P k Palanisamy, Scitech Publications (India) Pvt.Ltd

(Note: Assignment Marks of **Engineering Physics** are to be considered from the Internal marks of **Engineering Physics-- Virtual Labs – Assignments B17 BS 1210**)

**COMPUTER PROGRAMMING USING C**  
(Common to CIV, EEE & ME)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

Formulating algorithmic solutions to problems and implementing algorithms in C

1. Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux
2. understanding branching, iteration and data representation using arrays
3. Modular programming and recursive solution formulation
4. Understanding pointers and dynamic memory allocation
5. Understanding miscellaneous aspects of C
6. Comprehension of file operations

**Course Outcomes:**

1. Understand the basic terminology used in computer programming
2. Write, compile and debug programs in C language.
3. Use different data types in a computer program.
4. Design programs involving decision structures, loops and functions.
5. Explain the difference between call by value and call by reference
6. Understand the dynamics of memory by the use of pointers
7. Use different data structures and create/update basic data files.

## SYLLABUS

**UNIT I:**

**Unit objective: Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux**

**Introduction:** Computer systems, Hardware and Software Concepts.

**Problem Solving:** Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and highlevel languages, Creating and Running Programs: Writing, Editing(vi/emacs editor), Compiling( gcc), Linking and Executing in under Linux.

**BASICS OF C:** Structure of a c program, identifiers, basic data types and sizes. Constants, Variables, Arithmetic , relational and logical operators, increment and decrement operators, conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, Sample Programs.

**UNIT II:**

**Unit objective: understanding branching, iteration and data representation using arrays**

**SELECTION – MAKING DECISION: TWO WAY SELECTION:** if-else, null else, nested if,examples, Multi-way selection: switch, else-if, examples.

**ITERATIVE:** loops- while, do-while and for statements , break, continue, initialization and updating, event and counter controlled loops, Looping applications: Summation, powers, smallest and largest.

**ARRAYS:** Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix. **STRINGS: concepts, c strings.**

### **UNIT III:**

**Objective: Modular programming and recursive solution formulation**

**FUNCTIONS- MODULAR PROGRAMMING:** functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs, Passing 1-D arrays, 2-D arrays to functions.

### **UNIT IV:**

**Objective: Understanding pointers and dynamic memory allocation**

**POINTERS:** pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

### **UNIT V:**

**Objective: Understanding miscellaneous aspects of C**

**ENUMERATED, STRUCTURE AND UNION TYPES:** Derived types- structures declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, program applications

**BIT-WISE OPERATORS: logical, shift, rotation, masks.**

**Objective: Comprehension of file operations**

**FILEHANDLING:** Input and output- concept of a file, text files and binary files, Formatted I/O, File I/O operations, example programs

### **Text Books:**

1. Problem Solving and Program Design in C, Hanly, Koffman, 7<sup>th</sup>ed, PERSON
2. Programming in C, Second Edition PradipDey and Manas Ghosh, OXFORD Higher Education
3. Programming in C, A practical approach Ajay Mittal PEARSON
4. The C programming Language by Dennis Richie and Brian Kernighan
5. Programming in C, B. L. Juneja, Anith Seth, Cengage Learning.

### **Reference Books:**

1. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE
2. Programming with C, Bichkar, Universities Press
3. Programming in C, ReemaThareja, OXFORD
4. C by Example, Noel Kalicharan, Cambridge



**BUILDING MATERIALS AND CONSTRUCTION**  
(For CIVIL)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

1. To promote development, production, standardization and large-scale application of cost-effective innovative building materials and construction technologies in housing and building sector.
2. To develop and promote methodologies and technologies related to different Building constructions
3. To promote new building materials and components through technical support and encouraging entrepreneurs to set up production units.
4. To provide standard scientific and technical services to professionals, construction agencies and entrepreneurs in selection, evaluation and design engineering materials.

**Course Outcomes:**

1. Define and classify various stones, clay products used in construction sector.
2. Find various types of wood their conversion and relevant BIS testing procedures to be carried out to ascertain the quality of building materials.
3. Identify the major ingredients of construction materials like lime, cement, aggregate and their use in the construction industry.
4. Select different materials for finishing's and various constructions pertaining to masonry works and foundations.
5. Develop the conceptual knowledge of various supports in building construction.

## SYLLABUS

**UNIT I: STONES, BRICKS AND CLAY PRODUCTS**

**Stones:** Classification of stones, Properties of building stones, Stone quarrying, precautions in blasting  
**Bricks:** Classification of Bricks, Manufacture of Bricks, general qualities of Bricks as per IS code, tests for good bricks as per IS code, including field tests.  
**Clay Products:** Tiles-types, manufacturing and their uses, Earth-wares, Terra-cotta, stone ware, Porcelain.

**UNIT II: WOOD, WOOD BASED PRODUCTS**

**Wood:** cross section details of trees, their general properties, characteristics of good timber defects in timber, mechanical properties of timber, seasoning and its importance, Decay of timber,  
**Wood based Products:** Veneers, Plywood and its types, Manufacturing of plywood, plywood grades as per IS code, Laminated wood, merits of plywood and laminated wood, Lamin Boards, Block boards, Batten board, Particle boards

### **UNIT III: LIME, CEMENT & AGGREGATES**

**Lime:** Various ingredients of lime, Constituents of lime stone, classification of lime ,  
**Cement:** Natural and artificial cements, types of artificial cements and their uses, Wet and dry process of manufacturing ordinary Portland cement (OPC), composition of cement, Various field and Laboratory tests on OPC as per IS code, Storage of cement. **Aggregates:** Classification of aggregate – Coarse and fine aggregates, Particle shape and Texture, Specific gravity, Bulk density, porosity and Absorption, Moisture content of Aggregate – Bulking of sand, Sieve analysis.

### **UNIT IV: FINISHINGS, MASONRY AND FOUNDATIONS**

**Finishings: Paints and Varnishes:** Constituents and characteristics of paints, types of paint and their uses, painting defects, causes and remedies. Constituents of varnishes, types of varnish and their uses, Pointing and Plastering. **Masonry:** Different types of Stone Masonry- Plan, Elevation, Sections of stone Masonry works- Brick Masonry- Different Types of Bonds- Plan, Elevation and section of Brick Bonds upto Two-Brick wall thickness- Partition walls- Different types of Block Masonry- Hollow concrete Blocks- FAL-G Blocks, Hollow Clay Blocks. **Foundations:** Types- strip, isolated, strap, combined footings, Raft-Mat- flat slab and Beam raft, box type raft.

### **UNIT V: ROOFING, FORM WORK & SCAFFOLDING**

**Roofing:** Mangalore tiled roof, RCC roof, Madras terrace roof, Hollow tiled roof, Asbestos cement, Fibre glass, Aluminum G.I. Sheet roofing's. **Form work, Scaffolding:** form work- types of formwork, centering- scaffolding- types of scaffolding. Trusses: Types- King post and queen post trusses and their uses. Stair cases: Various types of stair cases- dog legged, quarter landing, spiral stairs etc.

#### **Text Books:**

1. Engineering Materials by Rangawala. Charotar Publications
2. Building Materials by S.K.Duggal, New Age International Publications.
3. Building Materials by B.C. Punmia, Laxmi Publications private ltd.
4. Building Construction by B.C. Punmia, Laxmi Publications (p) ltd.

#### **Reference Books:**

1. Building Materials by S.S. Bhavikatti, Vices publications House private ltd.
2. Building Construction by S.S. Bhavikatti, Vices publications House private ltd.
3. Building Materials by M.L.Gambhir, Tata McGraw Hill Publishing Co. Ltd. New Delhi.
4. Building Materials by P.C.Vergheese, PHI learning (P) ltd.
5. Building construction by P.C.Vergheese, PHI Learning (P) Ltd.

**CIRCUIT THEORY**  
(For EEE)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

1. To study the concepts of passive elements, types of sources and various network reduction techniques.
2. To understand the applications of network topology to electrical circuits.
3. To study the concept of magnetic coupled circuits.
4. To understand the behavior of RLC networks for sinusoidal excitations and to understand the concept of resonance.
5. To understand the concepts of 3-phase circuits.

**Course Outcomes:**

Students are able to solve

1. Various electrical networks in presence of active and passive elements.
2. Electrical networks with network topology concepts.
3. Magnetic circuit with various dot conventions.
4. R, L, C network with sinusoidal excitation.
5. Three phase AC circuits.

**SYLLABUS**

**UNIT-I: Introduction to Electrical Circuits:**

Passive components and their V-I relations. Sources (dependent and independent) -Kirchhoff's laws, Network reduction techniques (series, parallel, series - parallel, star-to-delta and delta-to-star transformation). Source transformation technique, nodal analysis and mesh analysis.

**UNIT-II: Network topology:**

Definitions of Graph and Tree, Basic cutset and tieset matrices for planar networks, Loop and nodal methods of analysis of networks with dependent and independent voltage and current sources, Duality and Dual networks.

**UNIT-III: Magnetic Circuits:**

Basic definition of MMF, flux and reluctance. Analogy between electrical and magnetic circuits. Faraday's laws of electromagnetic induction Concept of self and mutual inductance. Dot convention-coefficient of coupling and composite magnetic circuit. Analysis of series and parallel magnetic circuits.

**UNIT-IV: Single Phase A.C Systems:**

Periodic waveforms (determination of rms, average value and form factor). Concept of phase angle and phase difference – Waveforms and phasor diagrams for lagging, leading networks. Complex and polar forms of representations, steady state analysis of R, L and C circuits. Power Factor and its significance - Real, Reactive, Apparent and Complex power. Node and mesh analysis of AC networks, Series and parallel resonance. Numerical problems.

**UNIT-V: Three Phase Circuits:**

Advantages of Three Phase Circuits, Balanced and Unbalanced systems, Relation between Line and Phase Quantities in Star and delta connected circuits, Analysis of Balanced & Unbalanced Three Phase Circuits.

**Text Books:**

1. Engineering Circuit Analysis By W.H. Hayt Jr ,J.E. Kemmerly,S.M.Durbin  
8<sup>th</sup> Ed.,Mc.Graw Hill.
2. Network Analysis: Van Valkenburg; Prentice-Hall of India Private Ltd
3. Basic Electrical Engineering by V.K Mehta & Rohit Mehta- 2006 Edition  
S.Chand & Company

**Reference Books:**

1. Circuit Theory Analysis and Synthesis., 7<sup>th</sup> Edition 2014 by Abhijit Chakrabarthy,Dhanpat Rai&Co.
2. Fundamentals of Electric circuits by Charles k Alexander & M N O Sadiku 5<sup>th</sup>Ed., Mc.Graw Hill.
3. Circuits & Networks by Sudhakar & Syam Mohan, 4<sup>th</sup> edition, 2010 Mcgraw Hill.

**BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**  
(For ME)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

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**Course Objectives:**

1. To learn the basic principles of electrical and magnetic circuits and analyze the networks
2. To understand the principle of operation and construction details of DC machines.
3. To understand the principle of operation and construction details of Transformers.
4. To understand the principle of operation and construction details of three phase Induction motor and Alternators.
5. To study the operation of PN junction diode, Half -wave Bridge rectifiers, PNP, NPN Transistors and various Amplifiers.

**Course Outcomes:**

1. Able to analyze the various Electrical networks and understand the basics of Magnetic Circuits
2. Able to understand the operation of DC generators,3-Point starter and conduct the Swinburne's test.
3. Able to analyze the Performance of Transformers.
4. Able to explain the operation of three phase induction motors and alternator.
5. Able to analyze the operation of Half-wave and Full-wave rectifiers and single stage CE amplifier.

**SYLLABUS**

**UNIT I: Electrical and Magnetic Circuits:**

Basic definitions, Types of network elements, Ohm's Law, Kirchhoff's Laws, Series and parallel Circuits and star-delta and delta-star transformations-simple problems. Magnetic flux, MMF, Reluctance, Faraday's laws, Lenz's law, statically induced EMF, dynamically induced EMF.

**UNIT-II: DC Machines:**

Principle of operation of DC generator- EMF equation-Types of DC Generators-DC motor Types-Torque equation-Applications-Swinburne's Test, Speed control methods.

**UNIT-III: Transformers:**

Principle of operation of Single phase Transformers- EMF equation-losses-OC and SC Tests-Efficiency and Regulation.

**UNIT-IV: AC Machines:**

Principle of operation of Three phase Induction motor-Slip-Torque characteristics-Efficiency-applications- Principle of operation of Alternator-EMF equation, Regulation of alternator by synchronous Impedance method.

**UNIT-V: Diodes-Rectifiers and Transistors:**

PN junction diode-Forward bias and reverse bias operation, V-I characteristics-Diode applications (Half wave, Full wave and bridge rectifier), Zener diode.

PNP and NPN junction Transistors, Transistor as an amplifier, single stage CE amplifier, Frequency response of CE amplifier.

**Text Books:**

1. Electrical Technology by Surinder Pal Bali, Pearson Publications. January 1, 2013
2. Electronic Devices and Circuits, R.L Boylestad and Louis Nashelsky, 9th Edition, PEI/PHI 2006.
3. Principles of Electrical Engineering and Electronics, V.K mehta, Published December 1st 2006 by S. Chand & Company Ltd.
4. Principles of Electronics Engineering, V.K mehta, Rohit Mehta, S. Chand Publications. Revised Edition 2012

**Reference Books:**

1. Basic Electrical Engineering, by J.B Gupta, K Kataria and Sons; Reprint 2013 edition.
2. Fundamentals of Electrical Engineering and Electronics, by Theraja B.L, S Chand Multicolor edition (1 December 2006)

**ENGINEERING PHYSICS LAB  
(Common to CIV, EEE & ME)**

**Lab : 3 Periods**  
**Exam : 3 Hrs.**

**Int.Marks : 50**  
**Ext. Marks : 50**  
**Credits : 2**

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**Course Objectives:**

Training the field oriented Engineering graduates to handle instruments and their design methods to improve the accuracy of measurements.

1. To impart hands-on experience to the students entering engineering/Technology education about handling sophisticated equipment/ instruments.
2. To make the students understand the theoretical aspects of various phenomena experimentally.

**Course Outcomes:**

Physics lab curriculum gives fundamental understanding of design of an instrument with targeted accuracy for physical measurements.

1. Students get hands on experience in setting up experiments and using the instruments/equipment individually.
2. Get introduced to using new/ advanced technologies and understand their significance.

**LIST OF EXPERIMENTS**  
**(Any 10 of the following listed experiments)**

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration-Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of vibrations in stretched strings – Sonometer.
8. Determination of velocity of sound – Volume Resonator.
9. L- C- R Series Resonance Circuit.
10. Study of I/V Characteristics of Semiconductor diode.
11. I/V characteristics of Zener diode.
12. Characteristics of Thermistor – Temperature Coefficients.
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
14. Energy Band gap of a Semiconductor p - n junction.
15. Hall Effect in semiconductors.
16. Time constant of CR circuit.
17. Determination of wavelength of laser source using diffraction grating.
18. Determination of Young's modulus by method of single cantilever oscillations.
19. Determination of lattice constant – lattice dimensions kit.
20. Determination of Planck's constant using photocell.
21. Determination of surface tension of liquid by capillary rise method.

**Reference Book:**

1. Advanced Practical Physics –Vol 1 & 2 By S.Venkata Raman, S.Chand & Co.

**ENGLISH COMMUNICATION SKILLS LAB- II**  
(Common to All Branches)

**Lab : 3 Periods**  
**Exam : 3 Hrs.**

**Int.Marks : 50**  
**Ext. Marks : 50**  
**Credits : 2**

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**Course Objectives:**

1. To enable the students to learn demonstratively the communication skills of listening, speaking, reading and writing.
2. To enable the students participate in group interactions.
3. To improve the presentation skills of the students.
4. To help the students gain their confidence in attending the interviews.

**Course Outcomes:**

1. A study of the communicative items in the laboratory will help the students become successful in the competitive world.
2. Students enhance their presentation skills.
3. Students participate in group discussions and improve their team skills.
4. Students confidently face the interviews.

**SYLLABUS**

- ❖ WHY study Spoken English?
- ❖ Making Inquiries on the phone, thanking and responding to Thanks - Practice work.
- ❖ Responding to Requests and asking for Directions - Practice work.
- ❖ Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
- ❖ Apologising, Advising, Suggesting, Agreeing and Disagreeing - Practice work.
- ❖ Letters and Sounds-Practice work.
- ❖ The Sounds of English-Practice Work
- ❖ Pronunciation
- ❖ Stress and Intonation-Practice work.

**Lab Manual:**

1. **'INTERACT:** English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt Ltd.



**Reference Books:**

1. Strengthen your communication skills by Dr M Hari Prasad, Dr Salivendra Raju and Dr G Suvarna Lakshmi, Maruti Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. Unlock, Listening and speaking skills 2, Cambridge University Press
4. Spring Board to Success, Orient BlackSwan
5. A Practical Course in effective english speaking skills, PHI
6. Word power made handy, Dr shalini verma, Schand Company
7. Let us hear them speak, Jayashree Mohanraj, Sage texts
8. Professional Communication, Aruna Koneru, Mc Grawhill Education
9. Cornerstone, Developing soft skills, Pearson Education.

**C PROGRAMMING LAB**  
(Common to CIV, EEE & ME)

**Lab : 3 Periods**  
**Exam : 3 Hrs.**

**Int.Marks : 50**  
**Ext. Marks : 50**  
**Credits : 2**

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**Course Objectives:**

1. Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming.
2. Acquire knowledge about the basic concept of writing a program.
3. Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
4. Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
5. Role of Functions involving the idea of modularity.

**Course Outcomes:**

1. Apply and practice logical ability to solve the problems.
2. Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
3. Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
4. Understand and apply the in-built functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
6. Document and present the algorithms, flowcharts and programs in form of user manuals.
7. Identification of various computer components, Installation of software

**List of Programs**

**Exercise - 1 Basics**

- a) What is an OS Command, Familiarization of Editors - vi, Emacs
- b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
- c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers  
From Command line

**Exercise - 2 Basic Math**

- a) Write a C Program to Simulate 3 Laws at Motion
- b) Write a C Program to convert Celsius to Fahrenheit and vice versa

### **Exercise - 3 Control Flow - I**

- a) Write a C Program to Find Whether the Given Year is a Leap Year or not.
- b) Write a C Program to Add Digits & Multiplication of a number

### **Exercise – 4 Control Flow - II**

- a) Write a C Program to Find Whether the Given Number is
  - i) Prime Number
  - ii) Armstrong Number
- b) Write a C program to print Floyd Triangle
- c) Write a C Program to print Pascal Triangle.

### **Exercise – 5 Functions**

- a) Write a C Program demonstrating of parameter passing in Functions and returning values.
- b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

### **Exercise – 6 Control Flow – III)**

- a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch...case
- b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

### **Exercise – 7 Functions - Continued**

Write a C Program to compute the values of  $\sin x$  and  $\cos x$  and  $e^x$  values using Series expansion. (use factorial function)

### **Exercise – 8 Arrays**

Demonstration of arrays

- a) Search-Linear.
- b) Sorting-Bubble, Selection.
- c) Operations on Matrix.

### **Exercises - 9 Structures**

- a) Write a C Program to Store Information of a Movie Using Structure
- b) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
- c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

### **Exercise - 10 Arrays and Pointers**

- a) Write a C Program to Access Elements of an Array Using Pointer
- b) Write a C Program to find the sum of numbers with arrays and pointers.

### **Exercise – 11** Dynamic Memory Allocations

- a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.
- b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.

Understand the difference between the above two programs

### **Exercise – 12** Strings

- a) Implementation of string manipulation operations **with** library function.
  - i) copy
  - ii) concatenate
  - iii) length
  - iv) compare
- b) Implementation of string manipulation operations **without** library function.
  - i) copy
  - ii) concatenate
  - iii) length
  - iv) compare

### **Exercise -13** Files

- a) Write a C programming code to open a file and to print its contents onscreen.
- b) Write a C program to copy files

### **Exercise - 14** Files Continued

- a) Write a C program merges two files and stores their contents in another file.
- b) Write a C program to delete a file.

### **Note:**

- a) All the Programs must be executed in the Linux Environment. (Mandatory)
- b) The Lab record must be a print of the LATEX (.tex) Format.

**ENGINEERING PHYSICS - VIRTUAL LABS – ASSIGNMENTS**  
(Common to CIV, EEE & ME)

**Lab : 2 Periods**

**Int.Marks: 5**

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**Course Objective:** Training Engineering students to prepare a technical document and improving their writing skills.

**Course Outcome:** Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.

**List of Experiments**

1. Hall Effect
2. Crystal Structure
3. Hysteresis
4. Brewster's angle
5. Magnetic Levitation / SQUID
6. Numerical Aperture of Optical fiber
7. Photoelectric Effect
8. Simple Harmonic Motion
9. Damped Harmonic Motion
10. LASER – Beam Divergence and Spot size
11. B-H curve
12. Michelson's interferometer
13. Black body radiation

**URL:** [www.vlab.co.in](http://www.vlab.co.in)

(Note: Internal Marks of **Engineering Physics - Virtual Labs – Assignments** are to be considered as Assignment marks in the Internal Marks of **Engineering Physics- B17 BS 1204**)

**Code: B17 BS 1211**

**NCC  
(Common to CIV, EEE & ME)**

**Practice : 2 Periods**

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The NCC- National Integration and Awareness- Drill- Personality Development Life Skills- Leadership- Disaster Management-Social Awareness and Community Development- Health and Hygiene- Environment Awareness and Conservation.

**(Note:** It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)



ESTD: 1980

## SAGI RAMA KRISHNAM RAJU ENGINEERING COLLEGE (AUTONOMOUS)

(Affiliated to JNTUK, Kakinada), (Recognised by AICTE, New Delhi)

Accredited by NAAC with 'A' Grade

Recognised as Scientific and Industrial Research Organisation

CHINNA AMIRAM (P.O):: BHIMAVARAM :: W.G.Dt., A.P., INDIA :: PIN: 534 204

### SCHEME OF INSTRUCTION & EXAMINATION

(Regulation R17)

**I/IV B.TECH**

(With effect from **2017-2018** Admitted Batch onwards)

Under Choice Based Credit System

**GROUP-B ( CSE, ECE & IT)**

**I-SEMESTER**

Code No.	Name of the Subject	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Contact Hrs/ Week	Internal Marks	External Marks	Total Marks
B17 BS 1101	English – I*	3	3	1	--	4	30	70	100
B17 BS 1102	Mathematics – I*	3	3	1	--	4	30	70	100
B17 BS 1103	Mathematics-II	3	3	1	--	4	30	70	100
B17 BS 1104	Engineering Physics	3	3	1	--	4	30	70	100
B17 CS 1101	Computer Programming Using C	3	3	1	--	4	30	70	100
B17 CE 1101	Environmental Studies *	2	2	1	--	3	30	70	100
B17 BS 1106	Engineering Physics Lab	2	--	--	3	3	50	50	100
B17 BS 1108	English Communication Skills Lab – I *	2	--	--	3	3	50	50	100
# DL1	Department Lab	2	--	--	3	3	50	50	100
B17 BS 1110	Engineering Physics Virtual Labs-Assignments	--	--	--	2	2	--	--	--
B17 BS 1112	NCC	--	--	--	2	2	--	--	--
<b>Total</b>		<b>23</b>	<b>17</b>	<b>6</b>	<b>13</b>	<b>36</b>	<b>330</b>	<b>570</b>	<b>900</b>

\* Common to both Group - A and Group - B

<b>#DL 1</b>	CSE & IT	B17 CS 1102	C Programming Lab & Hardware Fundamentals
	ECE	B17 CS 1103	C Programming Lab

Code: B17 BS 1101

**ENGLISH - I**  
(Common to all Branches)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

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**Course Objectives:**

1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
3. To develop the communication skills of the students in both the formal and informal situations.
4. To expose the students to various forms of writing in formal settings in order to build confidence in standard grammar
5. To introduce the students various types of reading comprehension practices.

**Course Outcomes: At the end of the Course, Student will be able to:**

1. Understand the rudiments of LSRW Skills, comprehension and fluency of speech.
2. Gain confidence and competency in vocabulary and grammar.
3. Listen, speak, read and write effectively in both the academic and non- academic environment.
4. Extend his/her reading skills towards literature.
5. Strengthen his/her analytical and compositional skills.

**SYLLABUS**

**Life through Language: An Effective Learning Experience**

Life through Language has a systematic structure that builds up communicative ability progressively through the chapters. It will enable the learner to manage confusion; frame question for themselves and others; develop new ideas; support ideas with evidence; express themselves with poise and clarity; and think critically. Acquisition of skill leads to confidence.

**UNIT-I**

**People and Places:-**Word search - Ask yourself-Self-assessment-I -Self-assessment-II - Sentence and its types- Describing people, places and events-Writing sentences-Self-awareness-Self-motivation, Dialogue writing.

**UNIT-II**

**Personality and Lifestyle:-** Word quiz – Verbs-Adverbs-Negotiations-Proving yourself-Meeting Carl Jung- Describing yourself- Living in the 21st century- Using your dictionary-Communication-Adaptability.



### **UNIT-III**

**Media and Environment:** - A list of 100 basic words – Nouns- Pronouns- Adjectives-News report- Magazine article- User’s Manual for new iPod- A documentary on the big cat- Why we need to save our tigers: A dialogue- Global warming- Paragraph Writing-Arguing a case- Motivation- Problem solving.

### **UNIT-IV**

**Entertainment and Employment:-** One word substitutes- Parts of speech- Gerunds and infinitives- An excerpt from a short story an excerpt from a biography- A consultant interviewing employees- Your first interview- Reality TV- Writing an essay-Correcting sentences- Integrity Sense of humor.

### **UNIT-V**

**Work and Business:-** A list of 100 difficult words- Articles, Quantifiers- Punctuation - Open letter to the Prime Minister Business dilemmas: An email exchange- A review of *IPL: The Inside Story*, Mark Zuckerberg: World’s Youngest Billionaire- A conversation about a business idea- Pair work: Setting up a new business- Recession- Formal letters-Emails- Reports- Professionalism-Ethics, Fill in the blanks.

### **Text Book:**

1. *Life through Language: A Holistic Approach to Language Learning*. Board of Editors, Pearson Publishers, India. 2013.

### **Reference Books:**

1. Basic Vocabulary. Edgar Thorpe, Showick Thorpe. Pearson P. 2008.
2. Quick Solutions to Common Errors in English, Angela Bunt. MacMillan P. 2008.
3. Know Your English (Volume 1&2), by Dr. S. Upendra, Universities Press, India 2012
4. Business Communication Strategies. Mathukutty Monippally. Tata Mc Grahill P. 2009.

**MATHEMATICS - I**  
(Common to all Branches)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

1. The course is designed to equip the students with the necessary mathematical skills and techniques that is essential for an engineering course.
2. The skills derived from the course will help the student form a necessary base to develop analytic and design concepts.
3. Learn about linear first order and higher order ordinary differential equations and their applications.
4. Acquire knowledge of Laplace transform, partial differentiation and their applications.
5. Learn certain first order and higher order partial differential equations.

**Course Outcomes: At the end of the Course, Student will be able to:**

1. Solve linear ordinary differential equations of first order and first degree. Also will be able to apply the knowledge in simple applications such as Newton's law of cooling, orthogonal trajectories and simple electrical circuits.
2. Solve linear ordinary differential equations of second order and higher order. Also will be able to apply the knowledge in simple applications such as LCR circuits and Simple harmonic motion.
3. Determine Laplace transform and inverse Laplace transform of various functions.
4. Use Laplace transforms to solve a linear ODE.
5. Calculate total derivative, Jacobian and maxima/minima of functions of two variables.
6. Form partial differential equations and solve some standard types of first order PDEs. Find complimentary function and particular integral of linear higher order homogeneous and non-homogeneous PDEs.

## SYLLABUS

**UNIT I: Differential equations of first order and first degree:**

Linear, Bernoulli, Exact, Reducible to exact types.

Applications: Newton's Law of cooling, Law of natural growth and decay, Orthogonal trajectories, Simple electrical circuits, Chemical reactions.

**UNIT II: Linear differential equations of higher order:**

Non-homogeneous equations of higher order with constant coefficients with RHS term

of the type  $e^{ax}$ ,  $\sin ax$ ,  $\cos ax$ , polynomials in  $x$ ,  $e^{ax}V(x)$ ,  $xV(x)$ , Method of Variation of parameters.

Applications: LCR circuit, Simple Harmonic motion.

**UNIT III: Laplace transforms:**

Laplace transforms of standard functions, transforms of  $tf(t)$ ,  $f(t)/t$ , properties, transforms of derivatives and integrals, transforms of unit step function, Dirac delta function, Inverse Laplace transforms, convolution theorem (without proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

**UNIT IV: Partial differentiation:**

Introduction, Homogeneous functions, Euler's theorem, Total derivative, Chain rule, which variable is to be treated as constant, Functional dependence, Jacobians, Taylor series for a function of two variables, Leibnitz rules for differentiation under the integral sign.

Applications: Errors and Approximations, Maxima and Minima of functions of two variables without constraints, Lagrange's method (with constraints)

**UNIT V: First order and higher order partial differential equations:**

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, solutions of first order Lagrange linear equation and nonlinear equations of standard types (excluding Charpit's method).

Solutions of Linear homogeneous and non-homogeneous Partial differential equations with constant coefficients - RHS terms of the type  $e^{ax+by}$ ,  $\sin(ax+by)$ ,  $\cos(ax+by)$ ,  $x^m y^n$ .

**Text Books:**

1. B.S.Grewal, Higher Engineering Mathematics, 43rd Edition, Khanna Publishers.
2. N.P.Bali & Manish Goyal, A Text book of Engineering Mathematics, Lakshmi Publications.

**Reference Books:**

1. Erwin Kreyszig, Advanced Engineering Mathematics, 10th Edition, Wiley-India.
2. Michael Greenberg, Advanced Engineering Mathematics, 9th edition, Pearson.
3. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
4. Peter O'Neil, Advanced Engineering Mathematics, Cengage Learning.
5. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, New Delhi.

**MATHEMATICS – II**  
(Common to CSE, ECE& IT)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student form a necessary base to develop analytic and design concepts.
3. Understand some basic numerical methods to solve algebraic and transcendental equations.
4. Learn interpolation methods for equally spaced and unequally spaced data points. Learn methods for numerical evaluation of integrals and for solving first order ODEs.
5. Learn concepts of a Fourier series and Fourier transform.

**Course Outcomes: At the end of the Course, Student will be able to:**

1. Find a real root of algebraic and transcendental equations using different methods.
2. Know the relation between the finite difference operators. Determine interpolation polynomial for a given data.
3. Evaluate numerically certain definite integrals applying Trapezoidal and Simpson's rules.
4. Solve a first order ordinary differential equation by Euler and RK methods.
5. Find Fourier series of a given function satisfying Dirichlet conditions. Find half range cosine and sine series for appropriate functions.
6. Find Fourier transforms, Fourier cosine and sine transforms of appropriate functions and evaluate certain integrals using inverse transforms and Fourier integral.

**SYLLABUS**

**UNIT I: Solution of Algebraic and Transcendental Equations:**

Introduction, Bisection method, Method of false position, Iteration method, Newton- Raphson method (One variable and simultaneous Equations).

**UNIT II: Interpolation:**

Introduction, Errors in polynomial interpolation, Finite differences, Forward differences, Backward differences, Central differences and Symbolic relations between the operators, Differences of a polynomial, Newton's formulae for interpolation, Interpolation with unequal intervals, Lagrange's interpolation formula.

**UNIT III: Numerical Integration and solution of Ordinary Differential equations:**

Trapezoidal rule, Simpson's  $1/3^{\text{rd}}$  and  $3/8^{\text{th}}$  rules, Solution of ordinary differential equations by Taylor series method, Picard's method of successive approximations, Euler's method, Runge-Kutta methods (second order and fourth order).

**UNIT IV: Fourier Series:**

Introduction, Periodic functions, Fourier series of a periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half-range sine and cosine series, Parseval's formula.

**UNIT V: Fourier Transforms:**

Fourier integral theorem (without proof), Complex form of Fourier integral, Fourier sine and cosine integrals, Fourier transform, Fourier sine and cosine transforms, properties, inverse transforms, Parseval's identities, Finite Fourier transforms.

**Text Books:**

1. B.S.Grewal, Higher Engineering Mathematics, 43<sup>rd</sup> Edition, Khanna Publishers.
2. N.P.Bali & Manish Goyal, A Text book of Engineering Mathematics, Lakshmi Publications.

**Reference Books:**

1. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press.
2. V.Ravindranath and P. Vijayalakshmi, Mathematical Methods, Himalaya Publishing House.
3. Erwin Kreyszig, Advanced Engineering Mathematics, 10<sup>th</sup> Edition, Wiley-India.
4. David Kincaid, Ward Cheney, Numerical Analysis-Mathematics of Scientific Computing, 3<sup>rd</sup> Edition, Universities Press.
5. Srimanta Pal, Subodh C. Bhunia, Engineering Mathematics, Oxford University Press.
6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, New Delhi.

**ENGINEERING PHYSICS**  
(Common to CSE, ECE& IT)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

To re-orient Physics curriculum to the needs of the circuitual and non circuitual branches of Engineering / Technology courses offered by SRKREC(A) Bhimavaram that serves to understand the general and branch specific basic topics and introduce the related advanced technologies to the stake holders.

1. To impart the knowledge of physical optics phenomena like Interference and Diffraction required to understand the design and working of optical instruments with high resolution.
2. To understand the concept of coherence and generation of high intensity light sources and propagation of light waves in fibers for technological applications.
3. To study and analyze the behavior of electric and magnetic fields and their mutual interaction, and to understand the science of ultrasonics.
4. To understand the basic concepts of Quantum mechanics to know the behavior of fundamental particles in materials and to understand the basic nature of materials in general and classify them.
5. To study the structure property relationship of crystalline solids and understand basics of nanotechnology.

**Course Outcomes:** At the end of the course the students-

1. Learn the basic concepts of interference and diffraction of light and its applications.
2. Understand the science of producing high intensity light beams for technological applications and also understand the propagation of light waves in optical fibers in various applications.
3. Understand the inter relationship of electric and magnetic fields and learn ultrasonic's as a tool for technological applications
4. Learn the behavior of particles at the very microscopic level by using wave nature of particles and understand the behavior of materials and be able to classify them using the band theory of solids.
5. Learn the basics of structures of solid materials and nano material preparation Techniques/methods.

## SYLLABUS

**UNIT I: Interference and Diffraction**

Principle of superposition-coherence-interference in thin films (reflected system) – Wedge shaped film-Newton's rings-Michelson's interferometer. Fraunhofer's diffraction at single slit, Diffraction grating-Resolving power of a grating.

**UNIT- II: Lasers and Optical Fibers**

Introduction, Spontaneous emission and Stimulated emission – Einstein's relation – Requirements of Laser device- Ruby laser- He-Ne gas laser- Characteristics of laser- Applications.

Description of optical fiber, Principle of light propagation- Optical fiber –Acceptance angle-Numerical aperture of optical fiber- Modes of propagation- Classification of fibers- Applications of fiber.

### **UNIT- III: Electro Magnetic Fields and Ultrasonics**

Concept of Electromagnetic induction , Faraday's law, Lenz's law, Electric fields due to time varying magnetic fields, Magnetic fields due to time varying electric fields, Displacement current, Modified Ampere's law, Maxwell's equations and their significance (without derivation).

Definition of Ultrasonics-Methods of Producing Ultrasonics- Detection of Ultrasonics- Applications of Ultrasonics.

### **UNIT- IV: Quantum Mechanics and Band Theory of Solids**

Introduction, de Broglie matter waves- properties-Experimental confirmation, wave function-significance- Schrodinger's time dependent and time independent wave equations- Eigen values and functions, Particle in a box.

Band theory of Solids- Introduction- Kronig Penney model (Qualitative)- Energy bands of crystalline solids- Distinction between Conductors, Semi conductors and insulators.

### **UNIT-V: Crystallography and Nano Materials**

Basis and Lattice, Crystal systems, Bravais lattice, Unit cell Coordination number – Packing fraction for SC ,FCC, and BCC lattices, Miller indices- Diffraction of X rays from crystals- Bragg's law.

Introduction to Nanomaterials – Synthesis methods : Condensation, ball milling, sol-gel, chemical vapour deposition methods, properties and applications.

#### **Text Books:**

1. Physics by Resnick & Halliday. Wiley - Eastern (India) Ltd.
2. Engineering Physics By M.N. Avadhanulu & PG Kshirasagar, S.Chand & Co.
3. Engineering Physics by V. Rajendran, Mc Graw Hill Education (India) Pvt.Ltd.

#### **Reference Books:**

1. Engineering Physics by MR Srinivasan, New International Publishers.
2. Solid State Physics – A.J. Dekkar, MacMillan (India) Ltd.
3. Engineering Physics by Gaur Gupta, Dhanpat Rai Publications, Meerut, India.
4. Engineering Physics by P k Palanisamy, Scitech Publications (India) Pvt.Ltd

(Note: Assignment Marks of **Engineering Physics** are to be considered from the Internal marks of **Engineering Physics-- Virtual Labs – Assignments B17 BS 1110**)

**COMPUTER PROGRAMMING USING C**  
(Common to CSE, ECE & IT)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

Formulating algorithmic solutions to problems and implementing algorithms in C

1. Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux
2. understanding branching, iteration and data representation using arrays
3. Modular programming and recursive solution formulation
4. Understanding pointers and dynamic memory allocation
5. Understanding miscellaneous aspects of C
6. Comprehension of file operations

**Course Outcomes:**

1. Understand the basic terminology used in computer programming
2. Write, compile and debug programs in C language.
3. Use different data types in a computer program.
4. Design programs involving decision structures, loops and functions.
5. Explain the difference between call by value and call by reference
6. Understand the dynamics of memory by the use of pointers
7. Use different data structures and create/update basic data files.

## SYLLABUS

**UNIT I:**

**Unit objective: Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux**

**Introduction:** Computer systems, Hardware and Software Concepts.

**Problem Solving:** Algorithm / Pseudo code, flowchart, program development steps, computer languages: machine, symbolic and highlevel languages, Creating and Running Programs: Writing, Editing(vi/emacs editor), Compiling( gcc), Linking and Executing in under Linux.

**BASICS OF C:** Structure of a c program, identifiers, basic data types and sizes. Constants, Variables, Arithmetic , relational and logical operators, increment and decrement operators, conditional operator, assignment operator, expressions, type conversions, Conditional Expressions, precedence and order of evaluation, Sample Programs.

**UNIT II:**

**Unit objective: understanding branching, iteration and data representation using arrays**

**SELECTION – MAKING DECISION: TWO WAY SELECTION:** if-else, null else, nested if,examples, Multi-way selection: switch, else-if, examples.

**ITERATIVE:** loops- while, do-while and for statements , break, continue, initialization and updating, event and counter controlled loops, Looping applications: Summation, powers, smallest and largest.



**ARRAYS:** Arrays- concepts, declaration, definition, accessing elements, storing elements, Strings and String Manipulations, 1-D arrays, 2-D arrays and character arrays, string manipulations, Multidimensional arrays, array applications: Matrix operations, checking the symmetricity of a Matrix. **STRINGS: concepts, c strings.**

### **UNIT III:**

**Objective: Modular programming and recursive solution formulation**

**FUNCTIONS- MODULAR PROGRAMMING:** functions, basics, parameter passing, storage classes extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, Recursive solutions for fibonacci series, towers of Hanoi, header files, C Preprocessor, example c programs, Passing 1-D arrays, 2-D arrays to functions.

### **UNIT IV:**

**Objective: Understanding pointers and dynamic memory allocation**

**POINTERS:** pointers- concepts, initialization of pointer variables, pointers and function arguments, passing by address- dangling memory, address arithmetic, character pointers and functions, pointers to pointers, pointers and multi-dimensional arrays, dynamic memory management functions, command line arguments

### **UNIT V:**

**Objective: Understanding miscellaneous aspects of C**

**ENUMERATED, STRUCTURE AND UNION TYPES:** Derived types- structures declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields, program applications

**BIT-WISE OPERATORS: logical, shift, rotation, masks.**

**Objective: Comprehension of file operations**

**FILEHANDLING:** Input and output- concept of a file, text files and binary files, Formatted I/O, File I/O operations, example programs

### **Text Books:**

1. Problem Solving and Program Design in C, Hanly, Koffman, 7<sup>th</sup>ed, PERSON
2. Programming in C, Second Edition PradipDey and Manas Ghosh, OXFORD Higher Education
3. Programming in C, A practical approach Ajay Mittal PEARSON
4. The C programming Language by Dennis Richie and Brian Kernighan
5. Programming in C, B. L. Juneja, Anith Seth, Cengage Learning.

### **Reference Books:**

1. C Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE
2. Programming with C, Bichkar, Universities Press
3. Programming in C, ReemaThareja, OXFORD
4. C by Example, Noel Kalicharan, Cambridge

**ENVIRONMENTAL STUDIES**  
(Common to all Branches)

<b>Lecture</b>	<b>: 2 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 2</b>

**Course Objectives:**

1. Developing an awareness and sensitivity to the total environment and its related problems.
2. Motivating students for active participation in environmental protection and improvement.
3. Developing skills for active identification and development of solutions to environmental problems
4. Evaluation of environment programmes in terms of social, economic, ecological and aesthetic factors.
5. Creating a “CONCERN AND RESPECT FOR THE ENVIRONMENT”.

**Course Outcomes:**

1. To bring awareness among the students about the nature and natural ecosystems
2. Sustainable utilization of natural resources like water, land, energy and air
3. Resource pollution and over exploitation of land, water, air and catastrophic (events) impacts of climate change, global warming, ozone layer depletion, marine, radioactive pollution etc to inculcate the students about environmental awareness and safe transfer of our mother earth and its natural resources to the next generation
4. Safe guard against industrial accidents particularly nuclear accidents
5. Constitutional provisions for the protection of natural resources

## SYLLABUS

**UNIT – I****Global Environmental Crisis:**

Environmental Studies - Definition, Scope and importance, Need for public awareness. Global Environmental Crisis

**Ecosystems:**

Basic Concepts - Structure and Functions of Ecosystems: Producers, Consumers and Decomposers. Types of Ecosystems: Forest Ecosystems, Grassland Ecosystems Desert Ecosystems and Aquatic Ecosystems

**UNIT-II****Biodiversity:**

Introduction to Biodiversity, Values of Bio-diversity, Bio-geographical classification of India, India as a Mega-diversity habitat, Threats to biodiversity, Hotspots of Biodiversity, Conservation of Biodiversity: In-situ and Ex-situ conservation of Biodiversity.

### **UNIT-III**

#### **Environmental and Natural Resources Management:**

**Land Resources:** Land degradation, soil erosion and desertification, Effects of modern agriculture. **Forest Resources:** Use and over exploitation-Mining and Dams-their effects on forest and tribal people. **Water resources:** Use and over utilization of surface and ground water, Floods, droughts, conflict over water, water logging and salinity, dams – benefits and problems. **Energy Resources:** Renewable and non-renewable energy sources, use of alternate energy sources-impact of energy use on environment.

### **UNIT-IV**

#### **Environmental Pollution:**

Causes, Effects and Control measures of - Air pollution, Water pollution, Soil pollution, Marine Pollution, Thermal pollution, Noise pollution, Nuclear Hazards; Climate change and Global warming, Acid rain and Ozone layer depletion. Solid Waste Management: Composting, Vermiculture, Urban and Industrial Wastes, Recycling and Reuse.

#### **Environmental Problems in India:**

Drinking water, Sanitation and Public health, Population growth and Environment; Water Scarcity and Ground Water Depletion; Rain water harvesting, Cloud seeding and Watershed management.

### **UNIT-V**

#### **Institutions and Governance:**

Regulations by Government- Environmental Protection Act, Air (Prevention & Control of Pollution) Act, Water (Prevention and control of Pollution) Act, Wildlife Protection Act, Forest Conservation Act. Environmental Impact Assessment (EIA)

#### **Case Studies:**

Chipko Movement, Narmada Bachao Andolan, Silent Valley Project, Mathura Refinery and Taj Mahal, Industrialization of Patancheru, Nuclear reactor at Nagarjuna Sager, Tehri Dam, Ralegaon Siddhi (Anna Hazare), Kolleru lake – Aquaculture, Fluorosis in Andhra Pradesh & Telangana.

#### **Field Work:**

Visit to a local area to document and mapping environmental assets. Visits to Industries, Water Treatment Plants, Effluent Treatment Plants.

#### **Text Books:**

1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada
2. Environmental Studies, R. Rajagopalan, 2nd Edition, 2011, Oxford University Press.
3. Environmental Studies, Dr. M. Sita Rama Reddy, Dr. K. Anji Reddy, Silicon Publications, ASR Nagar, Bhimavaram
4. Environmental Studies, P. N. Palanisamy, P. Manikandan, A. Geetha, and K. Manjula Rani; Pearson Education, Chennai.

#### **Reference Books:**

1. Text Book of Environmental Studies, Deeshita Dave & P. Udaya Bhaskar, Cengage Learning.
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
3. Environmental Studies, Benny Joseph, Tata McGraw Hill Co, New Delhi
4. Perspectives in Environment Studies, Anubha Kaushik, C P Kaushik, New Age International Publishers, 2014

**ENGINEERING PHYSICS LAB**  
(Common to CSE, ECE& IT)

**Lab** : 3 Periods  
**Exam** : 3 Hrs.

**Int. Marks** : 50  
**Ext. Marks** : 50  
**Credits** : 2

**Course Objectives:**

Training the field oriented Engineering graduates to handle instruments and their design methods to improve the accuracy of measurements.

1. To impart hands-on experience to the students entering engineering/Technology education about handling sophisticated equipment/ instruments.
2. To make the students understand the theoretical aspects of various phenomena experimentally.

**Course Outcomes:**

Physics lab curriculum gives fundamental understanding of design of an instrument with targeted accuracy for physical measurements.

1. Students get hands on experience in setting up experiments and using the instruments/equipment individually.
2. Get introduced to using new/ advanced technologies and understand their significance.

**LIST OF EXPERIMENTS**

(Any 10 of the following listed experiments)

1. Determination of wavelength of a source-Diffraction Grating-Normal incidence.
2. Newton's rings – Radius of Curvature of Plano - Convex Lens.
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
5. Determination of Acceleration due to Gravity and Radius of Gyration-Compound Pendulum.
6. Melde's experiment – Transverse and Longitudinal modes.
7. Verification of laws of vibrations in stretched strings – Sonometer.
8. Determination of velocity of sound – Volume Resonator.
9. L- C- R Series Resonance Circuit.
10. Study of I/V Characteristics of Semiconductor diode.
11. I/V characteristics of Zener diode.
12. Characteristics of Thermistor – Temperature Coefficients.
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee's apparatus.
14. Energy Band gap of a Semiconductor p - n junction.
15. Hall Effect in semiconductors.
16. Time constant of CR circuit.
17. Determination of wavelength of laser source using diffraction grating.
18. Determination of Young's modulus by method of single cantilever oscillations.
19. Determination of lattice constant – lattice dimensions kit.
20. Determination of Planck's constant using photocell.
21. Determination of surface tension of liquid by capillary rise method.

**Reference Book:**

1. Advanced Practical Physics –Vol 1 & 2 By S.Venkata Raman, S.Chand & Co.

**ENGLISH COMMUNICATIONSKILS LAB- I**  
(Common to All Branches)

<b>Lab</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 50</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Ext. Marks</b>	<b>: 50</b>
		<b>Credits</b>	<b>: 2</b>

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**Course Objectives:**

1. To enable the students to learn through practice the communication skills of listening, speaking, reading and writing.
2. To make students recognize the sounds of English through Audio- Visual aids.
3. To familiarize the students with stress and intonation.
4. To help the students build their confidence in speaking skills.

**Course Outcomes:**

1. A study of the communicative items in the laboratory will help the students become successful in the competitive world.
2. Students improve their speaking skills in real contexts.
3. Students learn standard pronunciation and practice it daily discourse.
4. Students give up their communicative barriers.

**SYLLABUS**

- ❖ WHY study Spoken English?
- ❖ Making Inquiries on the phone, thanking and responding to Thanks - Practice work.
- ❖ Responding to Requests and asking for Directions - Practice work.
- ❖ Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
- ❖ Apologising, Advising, Suggesting, Agreeing and Disagreeing - Practice work.
- ❖ Letters and Sounds-Practice work.
- ❖ The Sounds of English-Practice Work
- ❖ Pronunciation
- ❖ Stress and Intonation-Practice work.

**Lab Manual:**

1. **'INTERACT:** English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt Ltd.

## Reference Books:

1. Strengthen your communication skills by Dr M Hari Prasad, Dr Salivendra Raju and Dr G Suvarna Lakshmi, Maruti Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. Unlock, Listening and speaking skills 2, Cambridge University Press
4. Spring Board to Success, Orient BlackSwan
5. A Practical Course in effective english speaking skills, PHI
6. Word power made handy, Dr shalini verma, Schand Company
7. Let us hear them speak, Jayashree Mohanraj, Sage texts
8. Professional Communication, Aruna Koneru, Mc Grawhill Education
9. Cornerstone, Developing soft skills, Pearson Education.

**C PROGRAMMING LAB& HARDWARE FUNDAMENTALS**  
(Common to CSE & IT)

<b>Lab</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 50</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Ext. Marks</b>	<b>: 50</b>
		<b>Credits</b>	<b>: 2</b>

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**Course Objectives:**

1. Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming.
2. Acquire knowledge about the basic concept of writing a program.
3. Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
4. Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
5. Role of Functions involving the idea of modularity.

**Course Outcomes:**

1. Apply and practice logical ability to solve the problems.
2. Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
3. Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
4. Understand and apply the in-built functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
6. Document and present the algorithms, flowcharts and programs in form of user manuals.
7. Identification of various computer components, Installation of software

**List of Programs****Exercise - 1 Basics**

- a) What is an OS Command, Familiarization of Editors - vi, Emacs
- b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
- c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line

**Exercise - 2 Basic Math**

- a) Write a C Program to Simulate 3 Laws at Motion
- b) Write a C Program to convert Celsius to Fahrenheit and vice versa

### **Exercise - 3 Control Flow - I**

- a) Write a C Program to Find Whether the Given Year is a Leap Year or not.
- b) Write a C Program to Add Digits & Multiplication of a number

### **Exercise – 4 Control Flow - II**

- a) Write a C Program to Find Whether the Given Number is
  - i) Prime Number
  - ii) Armstrong Number
- b) Write a C program to print Floyd Triangle
- c) Write a C Program to print Pascal Triangle.

### **Exercise – 5 Functions**

- a) Write a C Program demonstrating of parameter passing in Functions and returning values.
- b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

### **Exercise – 6 Control Flow – III**

- a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch...case
- b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

### **Exercise – 7 Functions - Continued**

- a) Write a C Program to compute the values of  $\sin x$  and  $\cos x$  and  $e^x$  values using Series expansion. (use factorial function)

### **Exercise – 8 Arrays**

Demonstration of arrays

- a) Search-Linear.
- b) Sorting-Bubble, Selection.
- c) Operations on Matrix.

### **Exercises - 9 Structures**

- a) Write a C Program to Store Information of a Movie Using Structure
- b) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
- c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

### **Exercise - 10 Arrays and Pointers**

- a) Write a C Program to Access Elements of an Array Using Pointer
- b) Write a C Program to find the sum of numbers with arrays and pointers.



### **Exercise – 11 Dynamic Memory Allocations**

- a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.
- b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.

Understand the difference between the above two programs

### **Exercise – 12 Strings**

- a) Implementation of string manipulation operations **with** library function.
  - i) copy
  - ii) concatenate
  - iii) length
  - iv) compare
- b) Implementation of string manipulation operations **without** library function.
  - i) copy
  - ii) concatenate
  - iii) length
  - iv) compare

### **Exercise -13 Files**

- a) Write a C programming code to open a file and to print its contents onscreen.
- b) Write a C program to copy files

### **Exercise - 14 Files Continued**

- a) Write a C program merges two files and stores their contents in another file.
- b) Write a C program to delete a file.

### **Exercise - 15**

- a) System Assembling, Disassembling and identification of Parts / Peripherals.
- b) Operating System Installation-Install Operating Systems like Windows, Linux along with necessary Device Drivers.

### **Exercise - 16**

- a) MS-Office / Open Office
  - i. Word - Formatting, Page Borders, Reviewing, Equations, symbols
  - ii. Spread Sheet-Organize data, usage of formula, graphs, charts.
  - iii. Powerpoint - features of power point, guidelines for preparing an effective presentation.
- b) Network Configuration & Software Installation-Configuring TCP/IP, Proxy, and firewall settings. Installing application software, system software & tools.

### **Note:**

- a) All the Programs must be executed in the Linux Environment. (Mandatory)
- b) The Lab record must be a print of the LATEX (.tex) Format.

**C PROGRAMMING LAB**  
(For ECE)

**Lab : 3 Periods**  
**Exam : 3 Hrs.**

**Int.Marks : 50**  
**Ext. Marks : 50**  
**Credits : 2**

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**Course Objectives:**

1. Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures and File programming.
2. Acquire knowledge about the basic concept of writing a program.
3. Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.
4. Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.
5. Role of Functions involving the idea of modularity.

**Course Outcomes:**

1. Apply and practice logical ability to solve the problems.
2. Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment.
3. Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs.
4. Understand and apply the in-built functions and customized functions for solving the problems.
5. Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
6. Document and present the algorithms, flowcharts and programs in form of user manuals.
7. Identification of various computer components, Installation of software

**Programming**

**Exercise - 1 Basics**

- a) What is an OS Command, Familiarization of Editors - vi, Emacs
- b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
- c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers  
From Command line

**Exercise - 2 Basic Math**

- a) Write a C Program to Simulate 3 Laws at Motion
- b) Write a C Program to convert Celsius to Fahrenheit and vice versa

**Exercise - 3 Control Flow - I**

- a) Write a C Program to Find Whether the Given Year is a Leap Year or not.
- b) Write a C Program to Add Digits & Multiplication of a number

#### **Exercise – 4 Control Flow - II**

- a) Write a C Program to Find Whether the Given Number is
  - i. Prime Number
  - ii. Armstrong Number
- b) Write a C program to print Floyd Triangle
- c) Write a C Program to print Pascal Triangle.

#### **Exercise – 5 Functions**

- a) Write a C Program demonstrating of parameter passing in Functions and returning values.
- b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion.

#### **Exercise – 6 Control Flow – III)**

- a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch...case
- b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

#### **Exercise – 7 Functions - Continued**

- a) Write a C Program to compute the values of  $\sin x$  and  $\cos x$  and  $e^x$  values using Series expansion. (use factorial function)

#### **Exercise – 8 Arrays**

Demonstration of arrays

- a) Search-Linear.
- b) Sorting-Bubble, Selection.
- c) Operations on Matrix.

#### **Exercises - 9 Structures**

- a) Write a C Program to Store Information of a Movie Using Structure
- b) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation
- c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

#### **Exercise - 10 Arrays and Pointers**

- a) Write a C Program to Access Elements of an Array Using Pointer
- b) Write a C Program to find the sum of numbers with arrays and pointers.

#### **Exercise – 11 Dynamic Memory Allocations**

- a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.
  - b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.
- Understand the difference between the above two programs.

### **Exercise – 12 Strings**

- a) Implementation of string manipulation operations **with** library function.
  - i) copy
  - ii) concatenate
  - iii) length
  - iv) compare
- b) Implementation of string manipulation operations **without** library function.
  - i) copy
  - ii) concatenate
  - iii) length
  - iv) compare

### **Exercise -13 Files**

- a) Write a C programming code to open a file and to print its contents onscreen.
- b) Write a C program to copy files

### **Exercise - 14 Files Continued**

- a) Write a C program that merges two files and stores their contents in another file.
- b) Write a C program to delete a file.

### **Note:**

- a) All the Programs must be executed in the Linux Environment. (Mandatory)
- b) The Lab record must be a print of the LATEX (.tex) Format.

**ENGINEERING PHYSICS - VIRTUAL LABS – ASSIGNMENTS**  
(Common to CSE, ECE & IT)

**Lab : 2 Periods**

**Int.Marks: 5**

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**Course Objective:** Training Engineering students to prepare a technical document and improving their writing skills.

**Course Outcome:** Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a /technical/mini-project/ experimental report with scientific temper.

**LIST OF EXPERIMENTS**

1. Hall Effect
2. Crystal Structure
3. Hysteresis
4. Brewster's angle
5. Magnetic Levitation / SQUID
6. Numerical Aperture of Optical fiber
7. Photoelectric Effect
8. Simple Harmonic Motion
9. Damped Harmonic Motion
10. LASER – Beam Divergence and Spot size
11. B-H curve
12. Michelson's interferometer
13. Black body radiation

**URL:** [www.vlab.co.in](http://www.vlab.co.in)

(Note: Internal Marks of **Engineering Physics - Virtual Labs – Assignments** are to be considered as Assignment marks in the Internal Marks of **Engineering Physics- B17 BS 1104**)

**NCC**  
**(Common to CSE, ECE & IT)**

**Practice : 2 Periods**

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The NCC- National Integration and Awareness- Drill- Personality Development Life Skills- Leadership- Disaster Management-Social Awareness and Community Development- Health and Hygiene- Environment Awareness and Conservation.

( **Note:** It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)

**SCHEME OF INSTRUCTION & EXAMINATION**  
(Regulation R17)

**I/IV B.TECH**  
(With effect from **2017-2018** Admitted Batch onwards)  
Under Choice Based Credit System

**GROUP-B ( CSE, ECE & IT)**  
**II-SEMESTER**

Code No.	Name of the Subject	Credits	Lecture Hrs	Tutorial Hrs	Lab Hrs	Contact Hrs/Week	Internal Marks	External Marks	Total Marks
B17 BS 1201	English – II*	3	3	1	--	4	30	70	100
B17 BS 1203	Mathematics – III*	3	3	1	--	4	30	70	100
B17 BS 1205	Engineering Chemistry	3	3	1	--	4	30	70	100
B17 ME 1201	Engineering Drawing	3	1	--	3	4	30	70	100
# DS 2	Department Subject	3	3	1	--	4	30	70	100
# DS 3	Department Subject	3	3	1	--	4	30	70	100
B17 BS 1207	Engineering Chemistry Lab	2	--	--	3	3	50	50	100
B17 BS 1208	English Communication Skills Lab – II*	2	--	--	3	3	50	50	100
# DL2	Department Lab	2	--	--	3	3	50	50	100
B17 BS 1212	Inner Engineering	--	--	--	2	2	--	--	--
<b>Total</b>		<b>24</b>	<b>16</b>	<b>5</b>	<b>14</b>	<b>35</b>	<b>330</b>	<b>570</b>	<b>900</b>

\* Common to both Group - A and Group - B

# DS 2	CSE & IT	B17 CS 1202	Object Oriented Programming Through C++
	ECE	B17 CS 1203	Data Structures
#DS 3	CSE & IT	B17 EC 1201	Elements of Electronics Engineering
	ECE	B17 EE 1203	Elements of Electrical Engineering
#DL2	CSE & IT	B17 CS 1205	Object Oriented Programming Lab
	ECE	B17 BS 1209	Engineering Workshop & IT Workshop

**ENGLISH - II**  
(Common to all Branches)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

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**Course Objectives:**

1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
3. To develop spoken and written forms of the students in both formal and informal situations.
4. To enrich the vocabulary of the students through the usage of the lexis in appropriate contexts.
5. To expose them to the correct structural patterns of English.

**Course Outcomes: At the end of the Course, Student will be able to:**

1. To comprehend the speech of people belonging to different backgrounds and regions.
2. Understand the importance of speaking and writing for personal and professional communication and practice it in real contexts.
3. To express fluently and accurately in social discourse.
4. Participate in group activities like role-plays, discussions and debates.
5. Identify the discourse features, and improve intensive and extensive reading skills.

**SYLLABUS**

**UNIT I:**

- A. Detailed-Text: Unit 1: ' The Greatest Resource- Education'
- B. Non-Detailed Text: Lesson 1: ' A P J Abdul Kalam' from The Great Indian Scientists.

**UNIT II:**

- A. Detailed-Text: Unit 2: ' A Dilemma'
- B. Non-Detailed Text: Lesson 2:'C V Raman' from The Great Indian Scientists.

**UNIT III:**

- A. Detailed-Text: Unit 3: 'Cultural Shock': Adjustments to new Cultural Environments
- B. Non-Detailed Text: Lesson 3:'Homi Jehangir Bhabha' from The Great Indian Scientists.

**UNIT IV:**

- A. Detailed-Text: Unit 4: 'The Lottery'
- B. Non-Detailed Text: Lesson 4: 'Jagadish Chandra Bose' from The Great Indian Scientists.

**UNIT V:**

- A. Detailed-Text: Unit 5: ' The Chief Software Architect'
- B. Non-Detailed Text: Lesson 5: ' Prafulla Chandra Ray' from The Great Indian Scientists



**Detailed Textbook:**

1. English Encounters Published By Maruthi Publishers.

**Non-Detailed Text Book:**

1. The Great Indian Scientists Published by Cengage learning.

**MATHEMATICS - III**  
(Common to all Branches)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student form a necessary base to develop analytic and design concepts.
3. Understand important concepts of Linear algebra including solution of linear simultaneous equations, eigen values and eigen vectors.
4. Learn Beta, Gamma functions and how to evaluate double and triple integrals.
5. Learn fundamental concepts of vector calculus that help understand other Engineering courses.

**Course Outcomes: At the end of the Course, student will be able to:**

1. Determine rank, and solve a system of linear simultaneous equations numerically using various matrix methods.
2. Determine Eigen values and Eigen vectors of a given matrix, Reduce a Quadratic form to its canonical form and classify.
3. Evaluate double integrals over a region and triple integral over a volume.
4. Use the knowledge of Beta and Gamma functions in evaluation of different integrals.
5. Find gradient of a scalar function, divergence and curl of a vector function. Use vector identities for solving problems.
6. Evaluate line, surface and volume integrals by the use of Green's, Stokes' and Gauss divergence theorems.

## SYLLABUS

**UNIT I: Linear systems of equations:**

Rank, Echelon form, Normal form, Solution of linear systems, Gauss elimination, Gauss-Jordan, Jacobi and Gauss-Seidel methods.  
Applications: Finding the current in electrical circuits.

**UNIT II: Eigen values - Eigen vectors and Quadratic forms:**

Eigen values, Eigen vectors, Properties, Cayley-Hamilton theorem, Inverse and powers of a matrix by using Cayley-Hamilton theorem, Diagonalization, Quadratic forms, Reduction of a Quadratic form to Canonical form, Rank, Positive, Negative, Semi-Definite and indefinite forms of a Quadratic form, Index and Signature of a Quadratic form.  
Applications: Free vibration of a two-mass system.

**UNIT III: Multiple integrals:**

Double and triple integrals, Change of variables, Change of order of integration. Application to finding Areas, Moment of Inertia and Volumes.  
Beta and Gamma functions, Properties, Relation between Beta and Gamma functions, Application to evaluation of improper integrals. The error function and the complimentary error function.

**UNIT IV: Vector Differentiation:**

Gradient, directional derivative, Divergence, Curl, Incompressible flow, solenoidal and irrotational vector fields, second order operators, vector identities.

**UNIT V: Vector Integration:**

Line integral, Work done, Potential function; Area, Surface and volume integrals, Flux, Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related Problems.

**Text Books:**

1. B.S.Grewal, Higher Engineering Mathematics, 43<sup>rd</sup> Edition, Khanna Publishers.
2. N.P.Bali & Manish Goyal, Engineering Mathematics, Lakshmi Publications.

**Reference Books:**

1. Michael Greenberg, Advanced Engineering Mathematics, 9<sup>th</sup> edition, Pearson edn.
2. Erwin Kreyszig, Advanced Engineering Mathematics, 10<sup>th</sup> Edition, Wiley-India.
3. Peter O'Neil, Advanced Engineering Mathematics, 7<sup>th</sup> edition, Cengage Learning.
4. D.W. Jordan and T. Smith, Mathematical Techniques, Oxford University Press.
5. Srimanta Pal, Subodh C.Bhunia, Engineering Mathematics, Oxford University Press.
6. Dass H.K., Rajnish Verma. Er., Higher Engineering Mathematics, S. Chand Co. Pvt. Ltd, New Delhi.

**ENGINEERING CHEMISTRY**  
(Common to CSE, ECE & IT)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

Knowledge of basic concepts of chemistry for engineering students will help them as professional engineers later in design and material selection as well as utilizing the available resources.

**Course Objectives:**

1. To understand the physical and mechanical properties of Polymers/Plastics/elastomers helps in selecting suitable materials for different purpose.
2. To create awareness on fuels as a source of energy for industries like thermal power stations, steel industry, fertilizer industry etc.
3. To understand the concepts of galvanic cells and corrosion with theories like electro chemical theory.
4. To understand the importance of water.
5. To understand about the materials which are used in major industries like steel and metallurgical manufacturing industries, construction and electrical equipment manufacturing industries.

**Course Outcomes:**

1. At the end of the course the students learn the advantages and limitations of plastic materials and their use in design.
2. Fuels which are used commonly and their economics, advantages and limitations are discussed.
3. Students gained Knowledge reasons for corrosion and some methods of corrosion control.
4. Students understands the impurities present in raw water, problems associated with them and how to avoid them.
5. Similarly students understand liquid crystals and semi conductors. Students can gain the building materials , solar materials, lubricants and energy storage devices.

## SYLLABUS

**UNIT-I: High Polymers and Plastics; Rubbers & Elastomers:**

Polymerization Definition, Types of Polymerization, Mechanism of addition polymerization, Plastics as engineering materials, Thermoplastics and Thermosetting plastics, Compounding of plastics, Fabrication of plastics (4 techniques); Preparation, Properties and applications of Polyethylene, PVC, Bakelite, Nylon - 6,6, Bullet Proof plastics -polycarbonate and Kelvar; Fiber reinforced plastics, conducting polymers, Biodegradable Polymers - PHBV, Nylon 2, Nylon 6. Natural rubber – Vulcanization – Compounding of Rubber; Preparation, properties and applications of Buna – S; Buna – N;

**UNIT-II :Fuel Technology& Lubricants:**

Fuels: - Introduction – Classification of fuels, Calorific value – HCV and LCV, Determination of Calorific value by bomb calorimeter; Proximate and ultimate analysis of coal, coke: manufacture of coke by Otto – Hoffmann’s by-product coke oven process; Refining of Petroleum, Knocking-octane number of gasoline, cetane number of diesel oil. Synthetic Petrol; LPG , CNG.

Lubricants:- Definition, Mechanism of Lubrication, Properties of Lubricants (Definition and significance)

**UNIT-III: Electrochemical cells and Corrosion:**

Galvanic cell, single electrode potential, Calomel electrode; Modern batteries: - Lead – Acid battery; Fuel cells- Hydrogen – Oxygen cell, Lithium battery Theories of corrosion (i) dry Corrosion (ii) wet corrosion. Types of corrosion - differential aeration corrosion, pitting corrosion, galvanic corrosion, stress corrosion, Factors influencing corrosion, Protection from corrosion-material selection & design, cathodic protection, Protective coatings- metallic coatings – Galvanizing, Tinning, Electroplating; Electroless plating ; Paints.

**UNIT-IV: Water technology:**

Sources of water – Hardness of water – Estimation of hardness of water by EDTA method; Boiler troubles – sludge and scale formation, Boiler corrosion, caustic embrittlement, Priming and foaming; Softening of water by Lime – Soda Process, Zeolite Process, Ion – Exchange Process; Municipal water treatment; Desalination of sea water by Electrodialysis and Reverse osmosis methods.

**UNIT-V :Chemistry of Engineering Materials& Advanced Engineering materials**

Cement:- Manufacture of Portland cement, setting and hardening of cement, Deterioration of cement concrete.

Refractories: - Definition, Characteristics, classification, Properties and failure of refractories.

Solar Energy: - Construction and working of Photovoltaic cell, applications.

Solid State Materials: Crystal imperfections, Semi Conductors, Classification and chemistry of semi conductors: Intrinsic semiconductors; Extrinsic semiconductors; Defect semiconductors, Compound Semiconductors and Organic Semiconductors.

Liquid Crystals: - Definition – Classification with examples – Applications

**Text Books:**

1. Engineering Chemistry by Jain and Jain, Dhanpat Rai publishing co.
2. Engineering Chemistry by Willy India Pvt Ltd.
3. Engineering Chemistry by Dr.K.Anji Reddy and Dr.M.S.R.Reddy; Silicon Publications.

**Reference Books:**

1. Engineering Chemistry by Shikha Agarwal; Cambridge University Press,2015 edition.
2. A text of Engineering Chemistry by S.S.Dara; S.Chand & Co Ltd.

**ENGINEERING DRAWING**  
(Common to CSE, ECE & IT)

<b>Lecture</b>	<b>: 1 Period.</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Practice</b>	<b>: 3 Periods.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3Hrs.</b>	<b>Credits</b>	<b>: 3</b>

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**Course Objectives:**

1. To highlight the significance of universal language of engineers.
2. To impart basic knowledge and skills required to prepare engineering drawings.
3. To impart knowledge and skills required to draw projections of solids in different contexts.
4. To visualize and represent the pictorial views with proper dimensioning and scaling.

**Course Outcomes:**

Students will be able to

1. Apply principles of drawing to represent dimensions of an object.
2. Construct polygons and engineering curves.
3. Draw projections of points, lines, planes and solids.
4. Represent the object in 3D view through isometric views.
5. Convert the isometric view to orthographic view and vice versa.

**SYLLABUS**

**UNIT I**

**Polygons:** Constructing regular polygons by general methods, inscribing and describing polygons on circles.

**Curves:** Parabola, Ellipse and Hyperbola by general methods, cycloids, involutes, tangents & normals for the curves.

**UNIT II**

**Orthographic Projections:** Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of lines, lines parallel either to one of the reference planes (HP, VP or PP)

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces- HT, VT

**UNIT III**

Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.

**UNIT IV**

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

## **UNIT V**

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

### **Text Books:**

1. Engineering Drawing by N.D. Butt, Chariot Publications.
2. Engineering Drawing by Agarwal & Agarwal, Tata McGraw Hill Publishers

### **Reference Books:**

1. Engineering Drawing by K.L.Narayana & P. Kannaiah, Scitech Publishers.
2. Engineering Graphics for Degree by K.C. John, PHI Publishers.
3. Engineering Graphics by PI Varghese, McGrawHill Publishers.
4. Engineering Drawing + AutoCad – K Venugopal, V. Prabhu Raja, New Age

**OBJECT-ORIENTED PROGRAMMING THROUGH C++**  
(Common to CSE & IT)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int. Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

1. This course is designed to provide a comprehensive study of the C++ programming language. students are able to write efficient, maintainable and portable code to design algorithmic solutions to problems.
2. Expertise in object oriented principles and their implementation in C++
3. To acquire an understanding of basic object-oriented concepts and the issues involved in effective class design.
4. To Write C++ programs that use arrays, structures, pointers, object oriented concepts such as information hiding, constructors, destructors, inheritance.

**Course Outcomes:**

1. Write, compile and debug programs in C++ language. Use different data types in a computer program.
2. Design programs involving decision structures, loops and functions.
3. Explain classes and abstract classes and objects, abstraction and encapsulation, inheritance, polymorphism, constructors, access control and overloading.
4. Solve a given application problem by going through the basic steps of program specifications, analysis, design, implementation and testing within the context of the object-oriented paradigm.

## SYLLABUS

**UNIT-I: Introduction to C++, Classes and Objects.**

Difference between C and C++, Disadvantage of Conventional Programming, Basic Concepts of Object Oriented Programming, Advantage of OOP, Object Oriented Languages, Functions in C++, Operators in C++. **Classes and Objects:** Declaring Objects, Access Specifiers and their Scope, Static data members, static member functions, arrays of objects, local classes, Nested classes.

**UNIT-II: Constructors, Destructors and Operator Overloading.**

**Constructors and Destructors:** Introduction- Constructors and Destructor- types of constructors, Constructors with default Arguments, Dynamic initialization of objects, Dynamic constructors. **Operator Overloading** Introduction, Overloading Unary Operators and Binary Operators, Overloading Unary Operators and Binary Operators using friend function, Overloading Assignment Operator (=), Overloading insertion(<<) and extraction(>>) operators, Manipulation of Strings using Operators, Rules for Overloading Operators, Type Conversions.

**UNIT-III: Inheritance , Pointers, Virtual Functions and Polymorphism.**

**Inheritance:** Reusability, Types of Inheritance, Virtual Base Classes, Abstract Classes, Advantages of Inheritance, Disadvantages of Inheritance, and constructors in derived classes. **Pointers Introduction:** Pointers to Objects, “this” Pointer, Pointers to Derived Classes, including Polymorphisms and Virtual Functions, Rules for Virtual Functions, pure virtual functions.



#### **UNIT-IV: Manipulating Strings, Managing console I/O operations and Exception Handling.**

**Strings:** Creating String Objects, Manipulating String Objects, Relational operations, String Characteristics, Accessing Characters in Strings. **C++ Stream** Classes, Unformatted I/O operations, Formatted I/O operations, managing output with Manipulators, **Exception Handling:** Principles of Exception Handling, Exception Handling Mechanism, throwing and catching Mechanism.

#### **UNIT-V: Generic Programming with Templates, Standard Template Library and Files.**

Generic Programming with Templates, Need for Templates, Definition of class Templates, Normal Function Templates, Over Loading of Template Function-Bubble Sort Using Function Templates, Difference between Templates and Macros, Overview of **Standard Template Library**, STL Programming Model, Containers, Algorithms, Iterators, Vectors, Lists, Maps. **FILES:** Introduction, File Stream Classes, File Operations, File Pointers and Manipulators, Sequential Access Files, Random File Access Operation, Detecting End-of File, Command-Line Arguments.

#### **Text Books:**

1. A complete Guide to programming in C++, Ulla Kirch-Prinz, Peter Prinz, Jones and Bartlett Publishers (2002).
2. Programming in C++, 2<sup>nd</sup> Edition ,Ashok N Kamthane, and Pearson.
3. Object Oriented Programming C++, 4th Edition, Joyce Farrell, Cengage Learning.

#### **Reference Books:**

1. C++ Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE
2. The Complete Reference C++, 4<sup>th</sup> Edition, Herbert Schildt, TMH.
3. Programming solving with C++,9<sup>th</sup> Edition Walter Savitch.
4. Object Oriented Programming in C++, 4th Edition, Robert Lafore

**DATA STRUCTURES**  
(For ECE)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

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**Course Objectives:**

1. To be familiar with basic techniques handling problems with Data structures
2. Solve problems using data structures such as linear lists, stacks, queues, hash tables
3. Create and traverse different types of trees and graphs.
4. To practice different searching algorithms.

**Course Outcomes:**

Students will be able to

1. Apply advanced data structure strategies for exploring complex data structures.
2. Compare and contrast various data structures and design techniques in the area of Performance.
3. Implement all data structures like stacks, queues, trees, lists and graphs and compare their performance and tradeoffs.
4. Implement different operations on trees.
5. Apply graphs to real time applications.
6. Perform sorting using different algorithms.

**SYLLABUS**

**UNIT-I**

**Arrays and Structures**

Array as an Abstract Data Type, Polynomial Abstract Data Type, Introduction to Sparse Matrix, Sparse Matrix Abstract Data Type, Representation of Multidimensional Arrays, Structures and Unions, Internal Implementation of Structures, Self-Referential Structures.

**Recursion, Simple Searching and Sorting Techniques**

Recursive functions, Introduction to Searching, Sequential Search, Binary Search, Interpolation Search, Selection Sort, Bubble Sort, Insertion Sort, Quick Sort, Introduction to Merge Sort, Iterative Merge Sort, Recursive Merge Sort, Heap sort.

**UNIT-II**

**Stacks and Queues**

Stack Abstract Data Type, Queue Abstract Data Type, Stacks and Queues using arrays, , Introduction to Evaluation of Expressions, Evaluating Postfix Expressions, Infix to Postfix and Prefix conversion, Multiple Stacks and Queues, Circular Queues using arrays.

### **UNIT-III**

#### **Linked Lists**

Pointers, Dynamically Allocated Storage using pointers, Singly Linked Lists, Dynamically Linked Stacks and Queues, Polynomials, Representing Polynomials as Singly Linked Lists, Adding Polynomials, Erasing Polynomials, Polynomials as Circularly Linked Lists, Additional List Operations, Operations for Singly Linked Lists, Operations for Doubly Linked Lists, Radix Sort.

### **UNIT-IV**

#### **Trees**

Representation of Trees, Binary Trees Abstract Data Type, Properties of Binary Trees, Binary Tree Representations, Binary Tree Traversals, Additional Binary Tree Operations, Threaded Binary Trees, Heap Abstract Data Type, Priority Queues, Insertion into a max heap, Deletion from a max heap, Heap Sort, Introduction to Binary Search Trees, Searching a Binary Search Tree, Inserting an Element into a Binary Search Tree, Deleting an Element from a Binary Search Tree, Height of a Binary Search Tree, Counting Binary Trees.

### **UNIT-V**

#### **Graphs**

Graph Abstract Data Type, Definitions, Graph Representations, Elementary Graph Operations, Depth First Search, Breadth First Search, Connected Components, Spanning Trees, Minimum Cost Spanning Trees, Prim's and Kruskal's Algorithms, Shortest Paths and Transitive Closure, Single Source All Destination - Dijkstra's Algorithm, All Pairs Shortest Paths - Floyd's Algorithm, Transitive Closure using Warshall's Algorithm.

#### **Text Books:**

1. Fundamentals of Data Structures in C, 2<sup>nd</sup> edition, Horowitz, Sahni and Anderson-Freed, Universities Press, 2008.

#### **Reference Books:**

1. Data Structures using C by Aaron M. Tenenbaum, Y. Langsam and M.J. Augenstein, Pearson Education, 2009.
2. Data Structures with C by Seymour Lipschutz, Schaum Outline series, 2010.
3. Data Structures using C by R. Krishna Moorthy G. Indirani Kumaravel, TMH, New Delhi, 2008.

**ELEMENTS OF ELECTRONICS ENGINEERING**  
(Common to CSE & IT)

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

1. To give the exposure to the students on semiconductor physics of the intrinsic and extrinsic semiconductors and basics of P-N junction diode.
2. To give the exposure to the students on the basics of special purpose diodes like Zener diode, photo diode, LED, and tunnel diode and rectifier circuits using diodes.
3. To give the exposure to the students on basics of BJT, and transistor circuit configurations.
4. To give exposure to the students on transistor biasing and thermal stabilization.
5. To give exposure to the students on the basics of JFET, MOSFET and FET biasing.

**Course Outcomes:**

After completion of the course the students will be able to

1. Understand the basic concepts of transport of charge carriers in semiconductors, drift and diffusion currents, physical structure, operation, V-I characteristics of semiconductor diode.
2. Understand the basic concepts of special types of diodes like Zener Diode, LED, Photo Diode and tunnel diode, rectifier circuits with and without filters.
3. Understand the physical structure, operation, input and output characteristics of BJT in CE, CB, CC circuit configurations.
4. Understand the basic concepts of transistor biasing and thermal stabilization.
5. Understand the physical structure, operation, characteristics and circuit models of JFET's and MOSFET's.

## SYLLABUS

**UNIT I: Semiconductors and P-N junction diode:**

Intrinsic and extrinsic semiconductors, charge densities in semiconductors, Drift and Diffusion currents, Hall Effect, Mass action law. Basic operation and V-I Characteristics of semiconductor diode, Diode current equation, Avalanche breakdown and Zener breakdown phenomenon.

**UNIT II: Special Diodes and Diode Rectifiers:**

Zener Diode, LED, Photo Diode and tunnel diode, Half wave and Full wave Rectifiers- with and without filters, Bridge Rectifier, Expressions - Ripple factor, Efficiency, Capacitor filters

**UNIT III: Bipolar Junction Transistor:**

Introduction, construction, basic operation of npn and pnp transistors, Transistor circuit configurations- CE, CB, CC- Input and output Characteristics in various configurations. h-parameter model for transistor amplifier. (*Introductory Treatment only*).

**UNIT IV: Transistor Biasing and Thermal Stabilization:**

Transistor Biasing, Thermal runaway, stabilization, Different methods of Biasing-Fixed Bias, collector feedback bias, self-bias, Bias compensation.

**UNIT V: Field Effect Transistors:** Junction field Effect Transistors (JFET)- JFET characteristics, JFET Parameters, Small Signal model of FET, Depletion and Enhancement type MOSFET's.

**Text Books:**

1. Electronic Device and Circuits by SanjeevGuptha, Dhanpatrai&Co.Pvt.Ltd.
2. Electronic Device and Circuits by K.Satya Prasad, VGS.

**Reference Books:**

1. Integrated Electronics- Millman&Halkias, TMH.

**ELEMENTS OF ELECTRICAL ENGINEERING  
(For ECE)**

<b>Lecture</b>	<b>: 3 Periods</b>	<b>Int.Marks</b>	<b>: 30</b>
<b>Tutorial</b>	<b>: 1 Period.</b>	<b>Ext. Marks</b>	<b>: 70</b>
<b>Exam</b>	<b>: 3 Hrs.</b>	<b>Credits</b>	<b>: 3</b>

**Course Objectives:**

1. To learn the fundamentals of electrical and magnetic circuits
2. To understand the principle of operation and construction details of DC machines.
3. To understand the principle of operation of Transformers.
4. To understand the principle of operation and construction details of three phase Induction motor
5. To understand the principle of operation of synchronous generator and different measuring instruments

**Course Outcomes:**

1. Able to understand the basics of Magnetic Circuits and Kirchhoff's laws.
2. Able to understand the operation of DC Machines and to conduct different Tests
3. Able to analyze the Performance of Transformers.
4. Able to explain the operation of three phase induction motor.
5. Able to analyze the operation of alternator and different measuring instruments.

## SYLLABUS

**UNIT I: Electrical and Magnetic Circuits:**

Basic definitions, Types of network elements, Ohm's Law, Kirchhoff's Laws, Series and parallel Circuits and star-delta and delta-star transformations-simple problems. Magnetic flux, MMF, Reluctance, Faraday's laws, Lenz's law, statically induced EMF, dynamically induced EMF.

**UNIT – II: DC Machines:**

Principle of operation of DC Generator - EMF equation – Construction-Types of DC generator-OCC of DC Generator-DC motor types - Torque equation –Losses-Efficiency-speed control methods- applications

**UNIT – III: Transformers:**

Principle of operation of single phase transformer - EMF equation - equivalent circuit –losses - efficiency and regulation- Open circuit and Short circuit tests.

**UNIT – IV: Induction Motors:**

Construction-Principle of operation of induction motor-slip- rotor frequency, slip - torque characteristics - Power flow diagram-Efficiency-Applications

### **UNIT – V: Synchronous Generator and Measuring Instruments:**

Construction-Principle of operation of alternator-EMF equation of alternator- Regulation by Synchronous impedance method.

Classification –Deflecting, controlling, damping Torque, ammeter, voltmeter, wattmeter, MI, MC instruments-Energy meter

#### **Text Books:**

1. Electrical Machinery By Dr.P.S Bhimbra,Khanna Publications, January 2011
2. Electrical Technology by Surinder Pal Bali, Pearson Publications. January 1, 2013
3. Principles of Electrical Engineering, V.K mehta, Rohit Mehta, S. Chand Publications. Revised Edition 2012
4. A Course in Electronic Measurements and Instrumentation by A.K. Sawhney Dhanpat Rai & Co. (P) Limited; 2014 edition (2015)

#### **Reference Books:**

1. Basic Electrical Engineering, by J.B Gupta, K Kataria and Sons; Reprint 2013 edition.
2. Fundamentals of Electrical Engineering and Electronics, by Theraja B.L, S Chand Multicolor edition (1 December 2006)
3. A Course in Electronics and Electrical Measurements and Instrumentation by J.B. Gupta S K Kataria and Sons; Reprint 2013 edition (2013)

**ENGINEERING CHEMISTRY LAB**  
(Common to CSE,ECE& IT)

**Lab : 3 Periods**  
**Exam : 3Hrs.**

**Int.Marks : 50**  
**Ext. Marks : 50**  
**Credits : 2**

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**Course Objectives:**

1. To investigate and understand Physical behavior in the laboratory using scientific reasoning and logic and interpret the result of simple experiments and demonstration of chemical Principle and also evaluate the impact of chemical discoveries on how we view the world.
2. Effectively communicate experimental results and solutions to application problems through oral and written reports.
3. Understand the basic concepts, definitions, characteristics and phenomena.
4. Recognize the classical ideas and chemical phenomena and also define and analyse the concepts.

**Course Outcomes:**

1. An understanding of Professional and develop confidence on recent trends.
2. Able to gain technical knowledge of measuring, operating and testing of chemical instruments and equipments.
3. Acquire ability to apply knowledge of chemistry.
4. Exposed to the real time working environment.
5. Demonstrate the ability to learn Principles, design and conduct experiments.
6. Ability to work on laboratory and multidisciplinary tasks.

**List of Experiments**

**Introduction to chemistry Laboratory**

1. Estimation of HCl using standard Sodium Hydroxide.
2. Determination of total hardness of water by EDTA method.
3. Estimation of Ferrous Iron by  $\text{KMnO}_4$ .
4. Estimation of oxalic acid by  $\text{KMnO}_4$
5. Estimation of Mohr's salt by  $\text{K}_2\text{Cr}_2\text{O}_7$
6. Estimation of Dissolved oxygen by Winkler's method.
7. Determination of pH by pH meter and universal indicator method.
8. Conductometric titration of strong acid Vs strong base
9. Conductometric titration of strong acid Vs weak base.
10. Potentiometric titration of strong acid Vs strong base
11. Potentiometric titration of strong acid Vs weak base
12. Preparation of Phenol formaldehyde resin.
13. Determination of saponification value of oils
14. Determination of pour and cloud points of lubricating oil.
15. Determination Acid value of oil.



**Text Books:**

1. Engineering Chemistry Lab Manual Prepared by Chemistry Faculty of S.R.K.R.Engineering College.

**Reference Books:**

1. Laboratory manual on Engineering Chemistry by Dr.Sudha Rani ;Dhanpat Rai Publishing Company.
2. Engineering Chemistry Laboratory manual – I & II by Dr. K.Anji Reddy; Tulip Publications.

ENGLISH COMMUNICATION SKILLS LAB- II  
(Common to All Branches)

Lab : 3 Periods  
Exam : 3Hrs.

Int.Marks : 50  
Ext. Marks : 50  
Credits : 2

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**Course Objectives:**

1. To enable the students to learn demonstratively the communication skills of listening, speaking, reading and writing.
2. To enable the students participate in group interactions.
3. To improve the presentation skills of the students.
4. To help the students gain their confidence in attending the interviews.

**Course Outcomes:**

1. A study of the communicative items in the laboratory will help the students become successful in the competitive world.
2. Students enhance their presentation skills.
3. Students participate in group discussions and improve their team skills.
4. Students confidently face the interviews.

**SYLLABUS**

- ❖ Debating & Practice.
- ❖ Group Discussions & Practice.
- ❖ Presentation Skills & Practice
- ❖ Interview Skills & Practice
- ❖ Email
- ❖ Curriculum Vitae & Practice
- ❖ Idiomatic Expressions
- ❖ Common Errors in English & Practice

**LAB MANUAL:**

1. **‘INTERACT: English Lab Manual for Undergraduate Students’** Published by Orient Blackswan Pvt Ltd.

**Reference Books:**

1. Strengthen your communication skills by Dr M Hari Prasad, Dr Salivendra Raju and Dr G Suvarna Lakshmi, Maruti Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. Unlock, Listening and speaking skills 2, Cambridge University Press
4. Spring Board to Success, Orient BlackSwan
5. A Practical Course in effective english speaking skills, PHI
6. Word power made handy, Dr shalini verma, Schand Company
7. Let us hear them speak, Jayashree Mohanraj, Sage texts
8. Professional Communication, Aruna Koneru, Mc Grawhill Education
9. Cornerstone, Developing soft skills, Pearson Education

**OBJECT ORIENTED PROGRAMMING LAB**  
(Common to CSE & IT)

**Lab : 3 Periods**

**Exam : 3Hrs.**

**Int.Marks : 50**

**Ext. Marks : 50**

**Credits : 2**

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**Course Objectives:**

1. To strengthen their problem solving ability by applying the characteristics of an object-oriented approach.
2. To introduce object oriented concepts in C++ and Java.

**Course Outcomes:**

1. Explain what constitutes an object-oriented approach to programming and identify potential benefits of object-oriented programming over other approaches.
2. Apply an object-oriented approach to developing applications of varying complexities.

**LIST OF PROGRAMS**

1. Write a Programme that computes the simple interest and compound interest payable on principal amount (in Rs.) of loan borrowed by the customer from a bank for a given period of time (in years) at specific rate of interest. Further determine whether the bank will benefit by charging simple interest or compound interest
2. Write a Programme to calculate the fare for the passengers traveling in a bus. When a Passenger enters the bus, the conductor asks "What distance will you travel?" On knowing distance from passenger (as an approximate integer), the conductor mentions the fare to the passenger according to following criteria.
3. Write a C++ Program to illustrate Enumeration and Function Overloading
4. Write a C++ Program to illustrate Scope and Storage class
5. Implementation of ADT such as Stack and Queues
6. Write a C++ Program to illustrate the use of Constructors and Destructors and Constructor Overloading
7. Write a Program to illustrate Static member and methods
8. Write a Program to illustrate Bit fields
9. Write a Program to overload as binary operator, friend and member function
10. Write a Program to overload unary operator in Postfix and Prefix form as member and friend function
11. Write a C++ Program to illustrate Iterators and Containers
12. Write a C++ Program to illustrate function templates
13. Write a C++ Program to illustrate template class
14. Write C++ Programs and incorporating various forms of Inheritance
15. Write a C++ Program to illustrate Virtual functions
16. To write a C++ program to find the sum for the given variables using function with default arguments.
17. To write a C++ program to find the value of a number raised to its power that demonstrates a function using call by value.
18. To write a C++ program and to implement the concept of Call by Address
19. To write a program in C++ to prepare a student Record using class and object

20. To implement the concept of unary operator overloading by creating a C++ program.
21. Write a C++ program for swapping two values using function templates
22. Write a C++ program to implement a file handling concept using sequential access.

**Reference Books:**

1. C++ Programming, A Problem Solving Approach, Forouzan, Gilberg, Prasad, CENGAGE
2. Programming in C++, 2<sup>nd</sup> Edition, Ashok N Kamthane, and Pearson.
3. Programming solving with C++, 9<sup>th</sup> Edition Walter Savitch.

**ENGINEERING WORKSHOP & IT WORKSHOP  
(For ECE)**

**Lab : 3 Periods**  
**Exam : 3Hrs.**

**Int.Marks : 50**  
**Ext. Marks : 50**  
**Credits : 2**

**PART-A ENGINEERING WORKSHOP**

**Course Objective:**

To impart hands-on practice on basic engineering trades and skills.

**Course Outcomes:**

Student will be able to

1. Use various tools to prepare basic carpentry and fitting joints.
2. Prepare jobs of various shapes using black smithy.
3. Make basic house wire connections.
4. Fabricate simple components using tin smithy.

**SYLLABUS**

<b>Carpentry</b>	<b>Fitting</b>
<ol style="list-style-type: none"> <li>1. T-Lap Joint</li> <li>2. Cross Lap Joint</li> <li>3. Dovetail Joint</li> <li>4. Mortise and Tenon Joint</li> </ol>	<ol style="list-style-type: none"> <li>1. Vee Fit</li> <li>2. Square Fit</li> <li>3. Half Round Fit</li> <li>4. Dovetail Fit</li> </ol>
<b>Black Smithy</b>	<b>Tin Smithy</b>
<ol style="list-style-type: none"> <li>1. Round rod to Square</li> <li>2. S-Hook</li> <li>3. Round Rod to Flat Ring</li> <li>4. Round Rod to Square headed bolt</li> </ol>	<ol style="list-style-type: none"> <li>1. Taper Tray</li> <li>2. Square Box without lid</li> <li>3. Open Scoop</li> <li>4. Funnel</li> </ol>
<b>House Wiring</b>	
<ol style="list-style-type: none"> <li>1. Parallel / Series Connection of three bulbs</li> <li>2. Stair Case wiring</li> <li>3. Florescent Lamp Fitting</li> <li>4. Measurement of Earth Resistance</li> </ol>	

**Note: At least two exercises to be done from each trade.**

**Reference:**

1. Elements of workshop technology, Vol.1 by S. K. and H. K. Choudary.

## **PART B: IT WORKSHOP:**

### **Course Objectives:**

1. Understand the basic components and peripherals of a computer.
2. To become familiar in configuring a system.
3. Learn the usage of productivity tools.
4. Acquire knowledge about the netiquette and cyber hygiene.
5. Get hands on experience in trouble shooting a system

### **Course Outcomes:**

At the end of the course the students can able to

1. Assemble and disassemble the systems
2. Use the Microsoft office tools
3. Install various software
4. Know about various search engines
5. Trouble shoot various Hardware and Software problems
6. Use MATLAB and LATEX software

### **LIST OF EXCERCISES**

1. System Assembling, Disassembling and identification of Parts / Peripherals
2. Operating System Installation-Install Operating Systems like Windows, Linux along with necessary Device Drivers.
3. MS-Office / Open Office
  - a) Word - Formatting, Page Borders, Reviewing, Equations, symbols.
  - b) Spread Sheet - organize data, usage of formula, graphs, charts.
  - c) Power point - features of power point, guidelines for preparing an effective presentation.
  - d) Access- creation of database, validate data.
4. Network Configuration & Software Installation-Configuring TCP/IP, proxy and firewall settings. Installing application software, system software & tools.
5. Internet and World Wide Web-Search Engines, Types of search engines, netiquette, cyber hygiene.
6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.
7. MATLAB- basic commands, subroutines, graph plotting.
8. LATEX-basic formatting, handling equations and images.

### **Reference Books:**

1. Computer Hardware, Installation, Interfacing, Troubleshooting and Maintenance, K.L. James, Eastern Economy Edition.
2. Microsoft Office 2007: Introductory Concepts and Techniques, Windows XP Edition By Gary B. Shelly, Misty E. Vermaat and Thomas J. Cashman (2007, Paperback).
3. LATEX- User's Guide and Reference manual, Leslie Lamport, Pearson, LPE, 2/e.
4. Getting Started with MATLAB: A Quick Introduction for Scientists and engineers, Rudraprathap, Oxford University Press, 2002.
5. Scott Mueller's Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
6. The Complete Computer upgrade and repair book, 3/e, Cheryl A Schmidt, Dreamtech.
7. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
8. Introduction to Information Technology, IITL Education Solutions limited, Pearson Education.

**INNER ENGINEERING**  
**(Common to CSE, ECE & IT)**

**Practice : 2 Periods**

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**Course Objectives:**

Student should learn:

1. Human values and tools to lead a happy, stress-free life.
2. Yoga asanas, Pranayama, Sudarshan Kriya & Meditation
3. At-least two creative arts out of photography, sketching, craft-making, singing, clay molding, upcycling etc.
4. Concentration pranayama, Ego bursting process.
5. To take up responsibility for society and teach classes of their choice to school children.
6. About good food habits for good health.

**Course Outcomes:**

Student should be capable of

1. To improve his concentration levels and improve his public speaking abilities.
2. To balance his academic and non-academic activities (Work Life Balance).
3. To widen his vision and increase his breadth of perspective in his journey of 4 years.
4. To improve his communications skills, leadership, teamwork and decision-making abilities.
5. To inculcate creativity & innovation, planning & organizing as part of their life.
6. Taking responsibility for themselves and people around them.
7. To make their journey more fun and enjoyable.

**SYLLABUS**

**Unit-I**

YES!+ Workshop:

Yoga Postures – Seven Layers To our Existence – Puzzles – Sources Of Energy – Live in the present Moment – Importance of Breath – Ujjai Breath – Pranayama – Sudarshana Kriya.

**Unit-II**

YES!+ Workshop:

Yoga Postures ( Suryanamaskars) – Giving 100% in everything – Time management – Happiness point – Opposite Values – Pranayama – Sudarshan kriya



### **Unit-III**

YES!+ Workshop:

Yoga Postures – Knowledge points (Acceptance, opinions discretion and handling mistakes) – Eye Gazing Process – Dance – Life Story process – Sudarshana Kriya (short) – Eternal life – Ego Bursting – Relationships – Parents – Studies – Compliments/Praising process.

### **Unit-IV**

Creative Arts:

Photography – Sketching – Handy-crafts – Clay molding – Singing – Upcycling – Communing with nature – Creative writing.

### **Unit -V**

Service:

Leadership in action – Contributing to society – Take up Responsibility –Empowerment – Public Speaking – Art of Teaching.

### **REFERENCE BOOKS:**

1. Discourse on Patanjali Yoga Sutras by H.H Sri SriRavishankar
2. Human values and professional ethics byRRGaur,RSangal,GPBagaria
3. The Art of Photography by AL Judge
4. Hand made in India : Crafts of India by Ranjan Aditi

(**Note:** It is an uncredited course. It will not be included in the Grade Memo / Certificate. The Certificate will be issued based on the performance and attendance. This course attendance will be counted in the semester overall attendance.)