

**COURSE STRUCTURE AND SYLLABI**  
**(I, II SEMESTERS)**  
**(Choice Based Credit System)**

**B. TECH.**  
**CIVIL ENGINEERING**

2015 – 2016



**GAYATRI VIDYA PARISHAD**  
**COLLEGE OF ENGINEERING**  
(AUTONOMOUS)

Accredited by NAAC with A Grade with a CGPA of 3.47/4.00

Affiliated to JNTUK-Kakinada

MADHURAWADA, VISAKHAPATNAM – 530 048

## *Vision and Mission of the Institution*

### *Vision*

*To evolve into and sustain as a Centre of Excellence in Technological Education and Research with a holistic approach.*

### *Mission*

*To produce high quality engineering graduates with the requisite theoretical and practical knowledge and social awareness to be able to contribute effectively to the progress of the society through their chosen field of endeavor.*

*To undertake Research & Development, and extension activities in the fields of Science and Engineering in areas of relevance for immediate application as well as for strengthening or establishing fundamental knowledge.*

## *Vision and Mission of the department*

### *Vision*

*To provide excellent Civil Engineering Education which makes significant contribution to the economic development of the State, Region and Nation.*

### *Mission*

*To produce nationally-competitive undergraduate students for a successful career in Civil Engineering by imparting quality education*

*To provide advanced skills and knowledge in state-of-the-art research and design in sub-areas of Civil Engineering and to prepare students to pursue higher studies to seek a professional career or entrepreneurship*

*To inculcate in the students the importance of social service, through educational and professional activities, so that they become useful to the society*

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***COURSE  
STRUCTURE  
I&II SEMESTERS***

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**CIVIL ENGINEERING**  
**COURSE STRUCTURE FOR B.TECH., I, II SEMESTERS**

<b>I SEMESTER</b>					
<b>Course code</b>	<b>Course</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
15BM1101	Mathematics-I	3	1	0	4
15CE1101	Surveying	3	0	0	3
15ME1101	Engineering Mechanics	3	1	0	4
15BC1101	Chemistry	3	0	0	3
	<b>Engineering Science Elective</b>	3	0	0	3
15BC1103	Chemistry Lab	0	0	3	2
15ME1102	Engineering drawing	1	0	3	3
15CE1102	Surveying Lab	0	0	3	2
<b>Total</b>		<b>16</b>	<b>2</b>	<b>9</b>	<b>24</b>

<b>II SEMESTER</b>					
<b>Course code</b>	<b>Course</b>	<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
15HE1101	English	3	0	0	3
15BM1102	Mathematics-II	3	1	0	4
15CT1102	Computer Programming through C	3	0	0	3
15BP1101	Physics	3	0	0	3
15CE1103	Building materials and Construction	3	1	0	4
15HE1102	English Language Lab	0	0	3	2
15CT1103	Computer Programming Lab	0	0	3	2
15MT1101	Engineering workshop	0	0	3	2
15BP1102	Physics Lab	0	0	3	2
<b>Total</b>		<b>15</b>	<b>2</b>	<b>12</b>	<b>25</b>

**Engineering Science Elective:**

Basic Electrical Engineering (15EE1142)

Elements of EE& ME (15EM1101)

Electronics Engineering (15EC1141)

Principles of Chemical Engineering (15CH1101)

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***SYLLABI FOR  
I-SEMESTER***

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## MATHEMATICS - I

(Common to all Branches)

**Course Code:** 15BM1101

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

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

- CO1: Develop the ability to solve linear differential equations of higher order and use the knowledge gain to certain engineering problems
- CO2: Appraise the Laplace transform technique and use it to solve various engineering problems.
- CO3: Apply the techniques of multivariable differential calculus to determine extrema and series expansions etc. of functions of several variables.
- CO4: Extend the concept of integration to two and three dimensions and support it through applications in engineering mechanics.
- CO5: Generalize calculus to vector functions and interpret vector integral theorems.

### Unit-I

**(10 Lectures)**

**Ordinary Differential Equations:** Linear differential equations of higher order with constant coefficients, Method of Variation of parameters, Linear differential equations with variable coefficients (Cauchy's homogeneous linear equation only).

**Applications of Linear differential equations:** Orthogonal trajectories, Models on R-L-C circuits, Newton's law of cooling.

(13.1-13.7, 13.8(1), 13.9(1), 12.3, 12.5, 12.6)

### Unit-II

**(10 Lectures)**

**Laplace transforms:** Laplace transform of elementary functions, properties, Transforms of periodic functions, Transforms of derivatives and integrals, Multiplication by  $t^n$ , division by  $t$ , evolution of integrals by Laplace transforms.

**Inverse transform:** Introduction, Finding inverse transforms by the method of partial fractions, other methods of finding Inverse Transform, Convolution theorem, Unit step function, and Unit impulse function.

**Application of Laplace transforms:** Initial and Boundary Value Problems.

(21.1-21.5, 21.7-21.15, 21.17, 21.18)

### **Unit-III (10 Lectures)**

**Partial Differentiation:** Total derivative, change of variables, Jacobians, Taylor's theorem for functions of two variables.

**Applications of Partial Differentiation:** Maxima and Minima of functions of two variables, Lagrange method of undetermined multipliers.

(5.5 –5.7, 5.9, 5.11, 5.12)

### **Unit -IV (10 Lectures)**

**Multiple Integrals:** Introduction to Non-Cartesian Coordinates, Double integrals, Change of order of integration, Double integral in polar coordinates, Triple integrals, Change of variables in double integrals, Change of variables in triple integrals. Simple Applications of Multiple Integrals: Area enclosed by plane curves.

(7.1- 7.5, 7.7)

### **Unit -V (10 Lectures)**

**Vector Differentiation:** Differentiation of vectors, scalar and Vector point functions. Gradient of a scalar field and directional derivatives - Divergence and curl of a Vector field and its physical interpretation.

**Vector Integration:** Line integral, Circulation, work done, surface and volume integrals, Vector integral theorems: Green's, Stoke's and Gauss Divergence theorems (without proofs) and related problems.

(8.1, 8.4- 8.7, 8.10-8.17)

### **TEXT BOOK:**

1. Dr.B.S.Grewal "*Higher Engineering Mathematics*", 42<sup>nd</sup> Edition, Khanna Publishers, 2012.

**REFERENCE BOOKS:**

1. Kreyszig E, “*Advanced Engineering Mathematics*”, 8<sup>th</sup> Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, “*Advanced Engineering Mathematics*”, 2<sup>nd</sup> Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O’Neil, “*Advanced Engineering Mathematics*”, 7<sup>th</sup> Edition, Cengage Learning, 2011.



## SURVEYING

**Course Code:** 15CE1101

L	T	P	C
3	0	0	3

### Course Outcomes:

At the end of the course the student will be able to:

- CO1: Describe the principles and classification of surveying, Calculate horizontal and angular measurements.
- CO2: Measure levels and draw contours.
- CO3: Assess areas of irregular boundaries, volumes of borrow pits, embankments and capacity of reservoirs.
- CO4: Describe the various components of Theodolite. Prepare theodolite traversing including closing error and trigonometric levelling.
- CO5: Learn applications of Total Station surveying.

### UNIT-I

**(10 Lectures)**

#### INTRODUCTION:

Definition of Surveying, Overview of plane surveying (chain and compass), Objectives, Principles and Classifications.

#### DISTANCES AND DIRECTION:

Distance measurement conventions and methods; use of chain and tape, Electronic distance measurements, Meridians, Azimuths and bearings, declination, computation of angle.

### UNIT-II

**(10 Lectures)**

#### LEVELLING AND CONTOURING:

**Levelling:** Introduction and Terminology, Temporary adjustments, methods of levelling, plotting of L.S & C.S.

**Contouring:** Uses of contours, Methods of conducting contour surveys and their plotting. Contour gradient-Uses of contour maps.

**UNIT-III (10 Lectures)****AREAS AND VOLUMES:**

Area from field notes, Computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes. Determination of the capacity of reservoir. Volume of borrow pits.

**UNIT-IV (10 Lectures)****THEODOLITE:**

Types of theodolites-Temporary Adjustments of theodolite, Measurement of horizontal angle -Method of repetition and reiteration, Measurement of vertical angle – Uses of theodolite-Errors of a theodolite, Trigonometrical Levelling, Traversing.

**UNIT-V (10 Lectures)****TOTALSTATION:**

Introduction to Total Station instrument and its components. Brief description of important operations, Applications of Total Station, Advantages and Disadvantages of Total Station surveying.

**TEXT BOOKS:**

1. B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, “*Surveying*” (Vol-1&2), 18th Edition by Laxmi Publications (P) Ltd., New Delhi, 2011.
2. Duggal S K, “*Surveying*” (Vol – 1&2), 10th Edition, Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2004.
3. R Subramanian, “*Surveying and Levelling*”, 2nd Edition, Oxford University Press, New Delhi, 2012.

**REFERENCES:**

1. Arthur R Benton and Philip J Taety, “*Elements of Plane Surveying*” 8th Edition, McGraw Hill-2000, 2010.
2. Arora K R “*Surveying*” (Vol 1, 2 & 3) 9th Edition, Standard Book House, Delhi, 2008.
3. Chandra A M, “*Plane Surveying*”, New age International Pvt. Ltd., Publishers, New Delhi, 2009.

## ENGINEERING MECHANICS

(Common to all Branches)

**Course Code:** 15ME1101

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

### Course Outcomes:

At the end of the course, a student will be able to

- CO1: Convert a given physical problem (by drawing the Free Body Diagrams) into a suitable force system and find i) the resultant force (if any) or, ii) the unknown reactions.
- CO2: Solve problems involving static and kinetic friction.
- CO3: Locate the centroid of a given plane area and find its area and area moment of inertia.
- CO4: Compute the mass moment of inertia of a body, calculate the displacement, velocity and acceleration of a particle subjected to rectilinear or curvilinear translation.
- CO5: Compute the motion of and torques on a body subjected to fixed axis rotation; apply work-energy principle to particles and connected systems.

### UNIT-I

**(13 Lectures)**

**RESULTANT OF FORCE SYSTEMS:** Parallelogram law, forces and components, resultant of coplanar concurrent forces, components of forces in space, moment of force, principle of moments, coplanar applications, couples, resultant of any force system (coplanar concurrent cases only).

Equilibrium of force systems: Free body diagram, equations of equilibrium, equilibrium of planar systems.

Analysis of structures- method of joints, method of sections

### UNIT-II

**(7 Lectures)**

**FRICTION:** Theory of friction, angle of friction, laws of friction, static friction, kinetic friction, friction in bodies moving up or down on an inclined plane, wedge friction.

**UNIT-III****(10 Lectures)**

**CENTROID AND CENTER OF GRAVITY:** Center of gravity of flat plate, centroids of areas and lines, importance of centroids of areas and lines, importance of centroids and moments of area, centroids determined by integration, centroids of composite figures, theorems of Pappus, center of gravity of bodies.

**MOMENT OF INERTIA:** Definition of moment of inertia, polar moment of inertia, radius of gyration, parallel axis theorem, moments of inertia by integration, moments of inertia for composite areas.

**UNIT-IV****(10 Lectures)**

**MASS MOMENT OF INERTIA:** Introduction, radius of gyration, parallel axis theorem, mass moments of inertia by integration, moments of inertia of composite bodies.

**KINEMATICS AND KINETICS OF A PARTICLE:** Motion of a particle, rectilinear motion, rectangular components of curvilinear motion, normal and tangential components of acceleration, radial and transverse components, cylindrical coordinates, translation-analysis as a particle, further discussion of particle kinematics.

**UNIT-V****(10 Lectures)**

**KINEMATICS AND KINETICS OF A BODY UNDERGOING FIXED AXIS ROTATION:** Types of rigid-body motion, angular motion-fixed axis rotation, application of kinematic equations, kinetics of fixed axis rotation.

**WORK-ENERGY METHOD:** Work-energy equation for translation, interpretation and computation of work, work-energy applied to particle motion, power, efficiency, applied to fixed-axis rotation, work-energy applied to connected systems, work-energy method

**TEXT BOOK:**

1. Vijaya Kumar Reddy K and Suresh Kumar J( Adapters), “*Singer`s Engineering Mechanics : Statics and Dynamics*”, 3<sup>rd</sup> Edition (SI Units), BS Publications, Hyderabad, 2011.

**REFERENCES :**

1. Timoshenko SP and Young DH, Rao and Pytel, “*Engineering Mechanics*”, 4<sup>th</sup> Edition, McGraw Hill International Edition, 2013.
2. Hibbeler RC, “*Engineering Mechanics: Statics*“, Low-priced Edition, Pearson Education,2000.
3. Hibbeler RC, “*Engineering Mechanics: Dynamics*”, Low-priced Edition, Pearson Education,2000.
4. Tayal AK, “*Engineering Mechanics: Statics and Dynamics*”, 13<sup>th</sup> Edition, Umesh Publications, Delhi, 2005.

## CHEMISTRY

(Common to all Branches)

**Course Code:** 15BC1101

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

### Course Outcomes:

At the end of the course, students will be able to:

- CO1: Recall the principles; explain the working and design of energy storage devices.
- CO2: Extend the principles involved in corrosion to predict and prevent the corrosion in real life system.
- CO3: Classify the polymers and can apply to specific purposes.
- CO4: Analyze and determine the water quality and prescribe the remedial measures for domestic as well as industrial usage.
- CO5: Recite, explain and classify the characteristics of various engineering materials and explain their functioning

### UNIT-I:

**(10 Lectures)**

#### Electrochemical cells

Electrode potential, Nernst equation, EMF of electrochemical cell, Reference electrodes-Standard hydrogen electrode, calomel electrode. Electrochemical series, Concentration cell, Construction of glass electrode, determination of  $p^H$  of given solution using glass electrode

**Batteries**-Primary cell-Dry or Leclanche cell, alkaline battery; secondary cells (storage batteries or accumulators) – Lead-acid Accumulator, Nickel-cadmium battery, Lithium ion battery (LIB) and redox flow battery.

**Fuel cells** - hydrogen - oxygen fuel cell, phosphoric acid fuel cell, solid oxide fuel cells

**UNIT-II: (10 Lectures)****Corrosion and its control**

**Introduction** - Direct chemical corrosion and electrochemical corrosion and its mechanisms, Types of electrochemical corrosion-Differential aeration corrosion, galvanic corrosion, concentration cell corrosion, pitting corrosion and stress corrosion, Galvanic series, passivity, factors influencing corrosion.

**Corrosion control**-proper designing, cathodic protection-sacrificial anodic protection and impressed current cathodic protection, modifying the environment and use of inhibitors.

**Protective coatings**- Anodic and cathodic coatings, Hot dipping-Galvanizing and Tinning, Metal cladding, Electroplating, Electroless plating, cementation or diffusion coatings

**UNIT-III: (10 Lectures)****Polymer Technology**

Polymerization, classification, degree of polymerization, functionality and tacticity of polymer, Types of polymerization addition and condensation polymerization, Mechanism of addition polymerization. Preparation, properties and uses of polythene, PVC, Teflon, nylons-6,6, Bakelite and Silicones.

**Plastics**- Thermo plastics and thermosetting plastics, compounding of plastics.

**Elastomers**-Natural and synthetic rubbers, Manufacture, properties and applications of natural rubber-vulcanization, compounding of rubber, Synthetic rubbers-Preparation, properties and applications of Buna-S and Buna-N.

**UNIT-IV: (10 Lectures)****Water Technology**

**Introduction**-characteristics imparted by impurities, hardness of water – Temporary and permanent hardness- units, Determination of hardness by EDTA method, Disadvantages of hard water, Boiler troubles - scale and sludge, caustic embrittlement, boiler corrosion, priming and foaming. Municipal water treatment, Desalination of brackish water, Water

softening methods - lime-soda method, zeolite method and ion exchange process.

## **UNIT-V: (10 Lectures)**

### **Engineering materials**

**Fuels:** classification, characteristics of fuel, calorific value-determination of calorific value by Bomb calorimeter, Analysis of coal - Proximate and ultimate analysis of coal, Petroleum: classification based on sources of petroleum, Refining of petroleum, Knocking, octane value, cetane value, Cracking-thermal cracking and catalytic cracking-fixed bed & moving bed catalytic cracking, reforming.

**Cement:** Classification of cement, chemical composition functions of ingredients in Portland cement Manufacture of Portland cement- raw materials, setting and hardening of Portland cement.

**Lubricants-**friction, lubrication, functions of lubrication, mechanism of lubrication-thick film, thin film and extreme pressure lubrication, types of lubricants- solid, semisolid and liquid lubricants- their properties .

### **TEXT BOOKS:**

1. Jain& Jain, “*A text book of Engineering Chemistry*”, 15<sup>th</sup> edition, Dhanapat Roy publishing company, 2010
2. Sasichawla, , “*Engineering chemistry*”, 3<sup>rd</sup> edition, Dhanapat Roy publishing company, 2006

### **REFERENCE BOOKS:**

1. S.S.Dara, “*Engineering Chemistry*”, 11<sup>th</sup> edition, S.Chand & Co, 2006
2. M.M.Uppal, “*Engineering Chemistry*”, 6<sup>th</sup> edition, Khanna Publishers, 2001



## **BASIC ELECTRICAL ENGINEERING** (Engineering Science Elective)

**Course Code:** 15EE1142

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

**Course Outcomes:** At the end of the course the students will be able to:

- CO1: Analyze the properties of basic electrical elements and apply network theorems to electrical circuits.
- CO2: Analyze magnetic field circuits and solves AC networks.
- CO3: Explain the working of DC machines and transformers.
- CO4: Explain the working of Alternators and induction motors.
- CO5: Understand basic measuring instruments and electrical safety.

### **UNIT-I: (10 Lectures)**

#### **Introduction to Electrical DC Circuits and Theorems:**

Introduction, Basic definitions, Circuits elements, Ohm's law, Nodes, Branches & Loops, Kirchoff's laws, series resistors and voltage division, parallel resistors and current division (simple problems). Star-Delta conversion, source transformation, superposition, Thevenin's, Norton's, Maximum Power transfer theorems (simple problems).

### **UNIT- II: (10 Lectures)**

#### **Magnetic Circuits and AC Circuits:**

Magnetic field due to Electric current, force on current carrying conductor, comparison of electric and magnetic circuits, Electro Magnetic Induction- Faraday's laws, self and mutual inductance., Inductors in series, sinusoids, Phasors, Voltage current relationship in circuit elements, Impedance and Admittance, Average and RMS values, series ac circuits.

**UNIT-III: (10 Lectures)****DC Machines and Transformers**

**DC Machines:** Construction, emf equation, types of dc machine, Torque developed in a motor, motor characteristics, speed control, losses and efficiency (simple problems), (elementary treatment only).

**Transformers:** Working Principle, construction, ideal transformer, emf equation, phasor diagram on no-load, voltage regulation, efficiency (simple problems), Auto transformer (elementary treatment only).

**UNIT-IV: (10 Lectures)****AC Machines**

**Alternators:** Construction induced EMF, voltage regulation by Synchronous Impedance Method (simple problems).

**Induction Motor:** Construction, principle of operation, slip, rotor frequency, torque equation (simple problems) (Elementary treatment only).

**UNIT-V: (10 Lectures)****Electrical Instruments and Electrical Safety**

Classification of Instruments, Principles of operation, Essential requirements in indicating instruments, Permanent Magnet Moving Coil (PMMC) instruments, Moving Iron instruments (elementary treatment only). Fuses and circuit breakers, Earthing, Electric shock.

**TEXT BOOKS:**

1. Dr. K. Uma Rao, "*Basic Electrical Engineering*", 1<sup>st</sup> edition, Pearson, 2011.

**REFERENCES:**

1. Charles k Alexander, Mathew N.O. Sadiku, "*Fundamentals of Electric circuits*", 4<sup>th</sup> edition McGraw-Hill Companies, 2009.
2. Hughes, I Mckenzie Smith, "*Electrical & Electronic Technology*", 10<sup>th</sup> edition, Pearson, 2010.
3. D.P. Kothari & I.J. Nagrath, "*Theory and Problems of basic Electrical Engineering*", 1<sup>st</sup> edition, PHI publications, 2010.

**ELEMENTS OF EE & ME**  
(Engineering Science Elective)

**Course Code:** 15EM1101

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

**Course Outcomes:**

After completion of this subject, the students shall have knowledge about electrical circuits and equipments.

CO1: Solve different topologies of networks.

CO2: Analyze the performance characteristics of transformers on different loading conditions.

CO3: Describe and analyze the constructional features of Induction machine, Synchronous machine with their characteristics.

CO4: Identify various machine tools and welding operations.

CO5: Differentiate various I.C. Engines and power transmissions drives.

**UNIT-I: (10 Lectures)**

**FUNDAMENTALS OF ELECTRICAL ENGINEERING**

Basic circuit elements - Resistance, Inductance and capacitance - Ohm's law, Kirchhoff's laws - Faraday's law of Electromagnetic Induction. AC fundamentals- Average and effective value-Series RL and RC circuits - Active power, Reactive power, Apparent power, Power Factor - Simple problems.

**UNIT-II: (10 Lectures)**

**TRANSFORMERS**

Single phase and Three phase transformers – Operation and construction, EMF equation, losses and efficiency - Simple Problems.

**UNIT-III: (10 Lectures)****AC MACHINES**

Construction and Principle of operation of three phase and single phase induction motors - Torque slip characteristics - Applications. Principle of operation of Alternators - Types of Alternators

**UNIT-IV: (10 Lectures)****MACHINE TOOLS**

General purpose machine tools – lathe, drilling machine, shaping machine, planing machine, milling machine.

**WELDING**

Principles of welding, fundamentals of arc welding and arc cutting, gas welding and gas cutting.

**UNIT-V: (10 Lectures)****I.C.ENGINES**

Introduction, classification of I.C. engines, I.C. engine-parts and terminology, four stroke cycle engines –petrol and diesel, two stroke cycle engines – petrol and diesel, comparison between four stroke and two stroke cycle engines, comparison between petrol engine and diesel engine.

**POWER TRANSMISSION:**

Types of drives – belt drives – flat and V belts, Rope and Chain drives.

**TEXT BOOKS:**

1. V.K.Mehta and Rohit Mehta, “*Principles of Electrical Engineering*”, S.Chand Publications, Jan-2008.
2. M.S Naidu and S.Kamakshaiah, “*Electrical Technology*”, TMH Publishers, 2006.
3. K.VenuGopal & V.PrabhuRaja, “*Basic Mechanical Engineering*”, 10<sup>th</sup> Edition, Anuradha Agencies, 2011. ( UNIT IV and UNIT V)
4. R.K. Rajput, “*Basic Mechanical Engineering*”, 3<sup>rd</sup> Edition, University Science Press, 2012. (UNIT-IV )

**REFERENCES:**

1. I.J. Nagrath and D.P Kothari, "*Theory and Problems of Basic Electrical Engineering*", PHI Publications.
2. David V. Kerns, JR. J. David Irwin, "*Essentials of Electrical and Computer Engineering*"
3. Vincent Del Toro, "*Electrical Engineering Fundamentals*", 2<sup>nd</sup> Edition, PHI Publishers

## **ELECTRONICS ENGINEERING**

(Engineering Science Elective)

**Course Code:** 15EC1141

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

### **Course Outcomes:**

At the end of the course the student will be able to

- CO1: Classify different materials used for an electronic device & describe the characteristic of diode and Design power supplies using Rectifiers and Filters.
- CO2: Comprehend bipolar junction transistor characteristics for various configurations.
- CO3: Elucidate the concepts of feedback amplifiers and oscillators.
- CO4: Acquire knowledge on the basic digital electronic component
- CO5: Analyze different types of ADC & DAC.

### **UNIT –I**

**(10 Lectures)**

#### **SEMICONDUCTOR DIODE:**

Classification of materials, energy levels, intrinsic and extrinsic semiconductor, conduction in metals and semiconductors. Characteristics of PN junction diode, Applications of Diode- Switch, rectifier with and without filters.

### **UNIT –II**

**(10 Lectures)**

#### **BIPOLAR JUNCTION TRANSISTOR:**

Bipolar Junction Transistor structure , Principle of operation, Transistor (BJT) configurations CB, CE, CC, Relation between  $\alpha$ ,  $\beta$ ,  $\gamma$ . Input and output characteristics of BJT, transistor as a switch , transistor as an amplifier.

### **UNIT –III**

**(10 Lectures)**

#### **FEEDBACK AMPLIFIERS:**

Concept of feedback, advantages & disadvantages of negative feedback amplifier, feedback amplifier topologies, effect of negative feedback on input and output resistances.

**OSCILLATORS:**

Classification of oscillators, Barkhausen's criterion, RC phase shift oscillator, Hartley and Colpitt's oscillators.

**UNIT –IV****(10 Lectures)****NUMBER SYSTEMS & BOOLEAN ALGEBRA:**

Binary number systems and codes complement representation of negative numbers, Basic Logic Gates and Truth Tables, Boolean algebra, De Morgan's Theorems, Logic Circuits, Encoder, Decoder, Multiplexer, Demultiplexer.

**UNIT –V****(10 Lectures)****A/D AND D/A CONVERTERS:**

Basic Principle of Analog-to-Digital (ADC) and Digital-to-Analog (DAC) Conversion, Successive Approximation type, Dual slope ADCs, Weighted Resistor and R-2R Ladder Type DAC.

**TEXT BOOKS:**

1. J.Millman and C.C.Halkias, "*Electronics Devices and Circuits*", TMH 1998. (Units 1,2&3)
2. Morris Mano, "*Digital Design*", 3<sup>rd</sup> Edition, PHI, 2006. (Unit 4)
3. D. Roy Chowdhury, "*Linear Integrated Circuits*", 2<sup>nd</sup> Edition, New Age International (p) Ltd, 2003. (Unit 5)

**REFERENCES:**

1. B.Visweswara Rao, K.Bhaskara Murthy, K.RajaRajeswari, P.Chalam Raju Pantulu. "*Electronic Devices and Circuits*", Pearson Publications, 2nd Edition, 2009.
2. Raju GSN, "*Electronic Devices and Circuits*", 1<sup>st</sup> Edition, IK International Publishing House, 2006.
3. Lal Kishore, "*Electronic Devices & Circuits Vol. I*", 2<sup>nd</sup> Edition, BSP publications, 2005.

**PRINCIPLES OF CHEMICAL ENGINEERING**  
 (Qualitative Treatment Only)  
 (Engineering Science Elective)

**Course Code:** 15CH1101

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

**Course Outcomes:**

On successful completion of the course, the student should be able to

- CO1: Differentiate and explain the significance of each unit operation and unit process.
- CO2: Identify, relate and assess the importance of dimensionless groups.
- CO3: Describe the material balance, energy balance. Explain Humidity and saturation.
- CO4: Distinguish the types of fluids, fluid flow, the basic concepts related to heat transfer and mass transfer.
- CO5: Write about the importance and operation of chemical engineering equipment.

**UNIT-I** **(10 Lectures)**

**Introduction:** History of chemical engineering, units and dimensions, important dimensional groups dimensional analysis), unit processes, unit operations, Basic laws of heat, mass and momentum.

**UNIT-II** **(8 Lectures)**

Energy, humidity and saturation. Material balance, Energy balance: Reacting system, steps to follow in energy balance calculations.

**UNIT-III** **(10 Lectures)**

**Flow of Fluids:** Introduction, nature of fluid, viscosity, velocity profile, flow field, types of fluid motion, laminar and turbulent flow, concepts of drag.



**Mechanical Operations:** Handling and Mixing of solids, Mechanical Separations: Screening and screening equipment, filtration, centrifugal filters, sedimentation, froth floatation.

**UNIT-IV (10 Lectures)**

**Heat Transfer:** Conduction, convection: individual and overall heat transfer coefficients, radiation. Flow arrangement in heat exchangers, variation of fluid temperatures in heat exchangers. Heat transfer equipment: double pipe & Shell and tube heat exchangers. Evaporation, Single and multiple effect evaporators.

**UNIT-V (12 Lectures)**

**Mass Transfer:** Diffusion: diffusion in different phases, diffusivity, mass transfer operation: similarity between mass transfer operations, difference between the operations, concept of absorption, Vapour-Liquid Equilibrium, Relative Volatility, Distillation with reflux, Liquid- Liquid Extraction, Equipment of gas-Liquid Operations.

**TEXT BOOK:**

1. Ghosal S. K., Sanyal. S. K. and Dutta. S, “*Introduction to Chemical Engineering*”, Tata-McGraw Hill Publications, New Delhi, 1993.

**REFERENCE:**

1. McCabe W.L., Smith J.C. and Harriott P., “*Unit Operations in Chemical Engineering*”, 7th Edition, McGraw Hill, New York, 2005.

**CHEMISTRY LAB**  
(Common to all Branches)

**Course Code: 15BC1103**

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**Course Outcomes:**

At the end of the course the student shall be able to

- CO1: Demonstrate Principles involved in determination of metal ions by titrimetry
- CO2: Analyse different water quality parameters
- CO3: Explain the properties of liquid lubricants and fuels
- CO4: Understand the principles of Potentiometry to determine the metal ion
- CO5: Understand the principles of determination of ions by Spectrophotometry

Any **TWELVE** of the following experiments are to be performed during the semester.

Determination of

1. Ferrous iron.
2. Ferric iron.
3. Total hardness of water sample.
4. Carbonate and bicarbonate of water sample.
5. Dissolved oxygen.
6. Available chlorine in bleaching powder.
7. Zinc by potassium ferrocyanide.
8. Copper by EDTA method
9. Calcium by permanganate.
10. Iron-II by potentiometric method.
11. Viscosity of lubricant by viscometer.
12. Flash and fire points of lubricant.
13. Percentage residue of carbon in oils.
14. Calorific value of solid fuels.

15. Fluoride by spectrophotometric method.
16. Iron in cement by spectrophotometric method.

**REFERENCE:**

1. A.I.Vogel, “ *A text book of quantitative chemical analysis*”, 6<sup>th</sup> Edition, Pearson Education, Pvt. Ltd., 2002.

## **ENGINEERING DRAWING** (Common to all Branches)

**Course Code:** 15ME1102

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>1</b>	<b>0</b>	<b>3</b>	<b>3</b>

### **Course Outcomes:**

At the end of the course, a student will be able to

- CO1: Draw geometrical constructions, conics, and cycloidal curves
- CO2: Draw projections of points and lines
- CO3: Draw projections of planes
- CO4: Draw projection of solids
- CO5: Draw isometric views

### **LIST OF EXERCISES**

1. Introduction to engineering drawing & basics of geometrical construction
2. Construction of parabola, ellipse, hyperbola- general method
3. Cycloid, epicycloids, hypocycloid, involutes of circle and square
4. Projections of points
5. Projections of lines inclined to one plane
6. Projections of lines inclined to both the planes
7. Projections of planes inclined to one plane
8. Projections of planes inclined to both the planes
9. Projections of solids in simple positions
10. Projections of solids inclined to both the planes
11. Isometric views

### **TEXT BOOK:**

1. N.D. Bhatt and V.M. Panchal, "*Engineering Drawing*", 49<sup>th</sup> Edition, Charotar Publication House, 2008.

## SURVEYING LAB

**Course Code:** 15CE1102

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

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

CO1: Calculate the area using conventional surveying instruments.

CO2: Measure bearings of lines with a prismatic compass for open and closed traverses.

CO3: Compute level differences between different stations by dumpy level and prepare contour maps.

CO4: Operate Theodolite to find heights and distances as well as conducting trigonometric surveying.

CO5: Get knowledge on Total Station and its operation.

### LIST OF EXERCISES:

1. Measuring of an area by Chain Surveying and Plotting.
2. An exercise on Chaining and Ranging across obstacles.
3. Determination of distance between two in accessible points using compass.
4. Closed Traversing by compass & graphical adjustment.
5. Open traversing by compass and plotting.
6. Measurement of elevation difference between two points using dumpy level by Height of Instrument & Rise and fall methods (by taking atleast two change points)
7. Profile levelling – an exercise of Longitudinal Section and Cross Section and plot the profile.
8. Contouring of a small area by method of blocks / grids.
9. Measurement of horizontal angles by method of repetition by Theodolite.
10. Measurement of horizontal angles by method of reiteration by Theodolite.
11. Trigonometric levelling – determination of a given Tower / Building height with base is accessible and is in-accessible.
12. Demonstration of Total Station

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***SYLLABI FOR  
II-SEMESTER***

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**ENGLISH**  
(Common to all Branches)

**Course Code:** 15HE1101

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

**Course Outcomes:** The Students will be able to

- CO1: Read and answer questions (orally and in writing) based on passages.
- CO2: Identify and use selective vocabulary to enrich their writing.
- CO3: Discuss and evaluate textual and authentic materials
- CO4: Analyse facts, ideas and compose them as instructed.
- CO5: Write notes, summaries, and essays in descriptive and narrative modes.

**UNIT-I**

**(10 Lectures)**

1. Story of Insects
2. Bringing up Boys & Girls
3. Polonius' Advice to His son
4. Vocabulary Building: Prefixes, Suffixes, One-Word Substitutes etc.

**UNIT-II**

**(10 Lectures)**

1. Unity of Minds
2. On His Blindness
3. Cultural Variation & Change
4. Grammar: Tenses & Concord

**UNIT-III**

**(10 Lectures)**

1. Three Years She Grew in Sun and Shower
2. Advertising in the Media (Academic Encounters)
3. Grammar: Articles & Prepositions
4. Paragraph Writing; Technical Description-Process, Object

**UNIT-IV****(10 Lectures)**

1. A Special Kind of Blessing
2. Techniques of Solving Crimes
3. La Belle Dame Sans Merci
4. Précis writing & Letter Writing

**UNIT-V****(10 Lectures)**

1. I Have A Dream
2. An Introduction by Kamala Das
3. Writing: Note Taking & Note Making, Essay writing
4. Grammar: Simple, Compound & Complex Sentences

**TEXTBOOKS:**

1. Kristine Brown & Susan Hood, *“Academic Encounters: Lifeyn Society Reading, Study Skills, Writing, London”*, Cambridge University Press/ Foundation Books, 2006.
2. K DurgaBhavani, G. K. Subbarayuydu, C. Vijayasree, D. PremaKumari& Y. L. Srinivas, *“English Today: A Course in Reading and Writing”*, Foundation Books, 2005.
3. David Murdoch, The Siren’s Song, *“An Anthology of British and American Verse”*, Madras, Orient Longman, 1993.

**REFERENCES:**

1. Alec Fisher, *“Critical Thinking An Introduction”*, 4<sup>th</sup> South Asian Edition, New Delhi: CUP, 2011.
2. Bikram K. Das, KalyaniSamantray, RathNayak, SusmitaPani & Saveeta Mohanty, *“An Introduction to Professional English and Soft Skills”*, New Delhi, Foundation Books, 2009.
3. *“Regional Institute of English, English for Engineers”*, New Delhi, Foundation Books, 2006.
4. Sharon J.Gerson, Steven M.Gerson, *“Technical Writing”*, New Delhi, Pearson education, 2007.

**SUGGESTED READING:**

Stories of humor, adventure, mystery and autobiographies of eminent scientists.



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

**Course Code:** 15BM1102

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

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

- CO1: Solve the linear system of equations analytically and compute Eigen values and eigenvectors of a square matrix.
- CO2: Numerically solve linear system of equations and compute eigen values and eigenvectors of a square matrix.
- CO3: Discuss and demonstrate difference equations to discrete systems.
- CO4: Calculate Fourier series and Fourier transforms for certain functions.
- CO5: Classify and solve partial differential equations and apply it to heat flow and wave propagation problem

**Unit-I**

**(10 Lectures)**

**Matrices:** Rank, Normal form, Echelon form, Consistency and Solution of system of simultaneous linear homogeneous and non-homogeneous equations. Finding Eigen values and eigen vectors, properties, Cayley-Hamilton theorem, computing inverse and powers of a matrix by applying Cayley-Hamilton theorem, Diagonalisation of matrix.  
(2.7, 2.10, 2.13 -2.16)

**Unit-II**

**(10 Lectures)**

**Numerical Methods in Linear algebra:** Solution of linear simultaneous equations: LU decomposition, Jacobi iteration and Gauss-Seidel methods. Determination of Eigenvalues and eigen vectors by iteration ( Rayleigh's Power Method) . (28.5, 28.6(3), 28.7(1)(2), 28.9)

**Unit-III**

**(10 Lectures)**

**Difference equations and Applications:** Introduction of Difference operators (forward, backward and shift operators), Introduction to

difference equation, formation of difference equation, Linear difference equations and its complete solution. Rules for finding the complementary function and complete integral, deflection of a loaded string. (29.1, 29.4, 31.1 - 31.6, 31.8)

#### **Unit-IV (10 Lectures)**

**Fourier series:** Euler's formulae, Dirichlet's Conditions for a Fourier expansion, functions having points of discontinuities, Change of interval, even and odd functions, half range series, wave forms.

**Fourier transforms** Fourier integral theorem, Fourier transform and inverse Fourier transform, Fourier sine and cosine integrals. – Fourier sine and cosine transforms – properties.(10.1 – 10.8, 22.1 – 22.5)

#### **UNIT-V (10 Lectures)**

**Partial Differential Equations:** Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear first order (standard type) equations. Method of separation of variables

**Applications of Partial Differential Equations:** Classification of second order linear Partial Differential Equations. Solutions of wave equation, one dimensional heat equation, and two-dimensional Laplace's equation under initial and boundary conditions.

(17.1 – 17.3, 17.5, 17.6, 18.1-18.7)

#### **TEXT BOOK:**

1. Dr.B.S.Grewal "*Higher Engineering Mathematics*", 42<sup>nd</sup> Edition, Khanna Publishers, 2012.

#### **REFERENCE BOOKS:**

1. Kreyszig E, "*Advanced Engineering Mathematics*", 8<sup>th</sup> Edition, John Wiley, Singapore, 2001.
2. Greenberg M D, "*Advanced Engineering Mathematics*", 2nd Edition, Pearson Education, Singapore, Indian Print, 2003.
3. Peter V. O'Neil, "*Advanced Engineering Mathematics*", 7<sup>th</sup> Edition, Cengage Learning, 2011.

## COMPUTER PROGRAMMING THROUGH C (Common to all Branches)

**Course Code:** 15CT1102

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

### Course Outcomes:

At the end of the course, a student will be able to

CO1: Design Algorithms and draw Flowcharts.

CO2: Develop Programs using functions.

CO3: Develop Programs for Arrays and String manipulations.

CO4: Use pointers in programs.

CO5: Discuss structures, unions, files.

### UNIT-I

**(10 Lectures)**

Algorithm/ Pseudo code, Flow chart, Basic structure of C Program, Input and Output statements (printf() & scanf()), A Simple C Program, Identifiers, data types and sizes, Constants, Variables, Operators, Type Conversion, Expression Evaluation, Precedence & Associativity of operators.

**CONTROL STATEMENTS:** If, switch, for, while and do- while statements, break, continue and go to statements. Sample programs covering all the above topics.

### UNIT-II

**(10 Lectures)**

**FUNCTIONS:** Definition, Advantages, types of functions- user defined and standard library functions, categories of functions, recursion, storage classes. Sample programs covering all the above topics.

### UNIT-III

**(10 Lectures)**

**ARRAYS:** Introduction to arrays, 1 D Arrays, 2 D Arrays: Definition, Declaration, Initialization, Accessing & storing the elements, C Preprocessors.

**STRINGS:** String- Declaration, Initialization, standard library string functions, Sample programs covering all the above topics.

**UNIT-IV****(10 Lectures)**

**POINTERS:** Definition, Declaration of Pointer variables, the & and \* operators, Pointer arithmetic, Passing addresses to functions, Functions returning pointers, Pointers & Arrays: Passing array elements to functions, pointer to pointer, array of pointers, pointers and strings, Dynamic memory allocation functions, Sample programs covering all the above topics

**UNIT-V****(10 Lectures)**

**STRUCTURES & UNIONS:** Structures: Definition, Initialization, Accessing structures, nested structures, array of structures, additional features of structures, self-referential structures, unions.

**FILES:** Concept of a file, Text and Binary files, file I/O operations, Command line arguments. (Let Us C, Yashavant Kanetkar) Sample programs covering all the above topics.

**TEXT BOOKS:**

1. B.A Forouzan and R.F. Gilberg, “*Computer science, A structured programming approach using C*”, 3<sup>rd</sup> Edition, Cengage Learning.
2. Yashavant Kanetkar, “*Let Us C*”, 12<sup>th</sup> Edition, BPB Publications, 2012.
3. Yashavant Kanetkar, “*Understanding pointers in C*”, 4<sup>th</sup> Edition, BPB Publications, 2009.

**REFERENCES:**

1. N. B. Venkateswarlu, E.V. Prasad, “*C & Data Structures*”, 1<sup>st</sup> Edition, S.Chand Publications, 2010.
2. K.R.Venugopal, S.R.Prasad, “*Mastering C*”, 1<sup>st</sup> Edition, TMH, 2007.

## PHYSICS

**Course Code:** 15BP1101

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

### Course Outcomes:

At the end of the course, the student will be able to

- CO1: Interpolate the knowledge of elastic and acoustic response of materials for various applications.
- CO2: Summarize the basic theories of electrostatics and electromagnetics to solve a variety of problems.
- CO3: Convert the knowledge of basic principles of dielectrics magnetism to design electrical and storage devices
- CO4: Realize the principles of optics in designing optical devices
- CO5: Resolve the discrepancies in classical estimates through quantum principles and classify the solids.

### UNIT-I:

**(9 Lectures)**

#### **ELASTIC PROPERTIES OF MATERIALS & ARCHITECTURAL ACOUSTICS**

Introduction – classification of stress, strain and Hooke's law – poisson's ratio and relationship between modulus of elasticity – bending of beams – bending moment – Y by cantilever – uniform bending – reverberation and reverberation time – Sabine's law (quantitative treatment) – determination of absorption coefficient by reverberation time method *Factors affecting the acoustics of buildings and their remedies, Method of testing mechanical properties - hardness.*

(Sec: 1.2 to 1.5, 1.9, 1.10, 1.14, 1.15; 4.6, 4.61, 4.62, 4.7, 4.8.1, 4.10 of Text book 1 ).

### UNIT -II:

**(11 Lectures)**

#### **ELECTROSTATIC AND ELECTROMAGNETICS**

Gradient of a scalar field – divergence & curl of a vector field – *Coulombs law – Electric flux – Gauss law in electrostatics* – differential form of Gauss law, dipole – electric displacement vector, *Magnetic flux*

– *Biot-Savart Law* – Ampere’s law, magnetic scalar potential – magnetic vector potential – auxiliary field H (Ampere’s law in magnetized materials) – Displacement current density – Maxwell’s equations in free space – *Significance of Maxwell’s equations*.

(Sec: 1.2.2, 1.2.4, 1.2.5; 2.1.2, 2.2.1; 6.3.1 of Text book 2, 2.20; 3.6, 3.7, 3.12, 3.13, 3.14 of Text book 3).

### **UNIT - III:**

**(9 Lectures)**

#### **DIELECTRIC AND MAGNETIC MATERIALS**

Dielectric constant and dielectric polarization in materials – dielectric permittivity and susceptibility – types of polarizabilities – electronic polarizability derivation – internal fields (Lorentz fields) in solids, dielectric loss – dielectric strength and *dielectric breakdown*, ferroelectrics, magnetic permeability, and susceptibility, ferrites, *para magnetism* – *adiabatic demagnetization* – *dia magnetism*, *ferro magnetism and hysteresis* – storage devices and memories

(Sec: 20.8, 20.17, 20.18, 20.19, 20.20 of Text book 1, Sec: 33.2, 33.4, 33.6, 33.14, 33.14.1, 33.14.2, 33.18, 33.20, 33.21, 33.24; 34.2, 34.12 of Text book 3).

### **UNIT -IV: OPTICS & LASERS**

**(11 Lectures)**

Introduction to optics – interference phenomenon – interference through thin films in reflected light – Newton’s rings – determination of wave length of a source – Michelson interferometer – diffraction due to single slit – intensity pattern discussion – diffraction grating (Qualitative), resolving power of grating – basic principle of a LASER – induced absorption, spontaneous and stimulated emissions – Einstein’s coefficients – population inversion – *Ruby laser*, *He-Ne laser and Semiconductor laser* – *Laser Applications*.

(Sec: 6.1, 6.2, 6.7, 6.8.1, 6.8.2, 6.11, 6.11.1 to 6.11.7, 6.13, 6.14; 7.5, 7.9, 7.10; 24.2, 24.3, 24.5, 24.11.1, 24.11.3, 24.11.5, 24.13 of Text book 3).

### **UNIT - V:**

**(10 Lectures)**

#### **WAVE MECHANICS & BAND THEORY OF SOLIDS**

Introduction to wave mechanics – wave function characteristics and significance – Schrodinger’s time dependent and independent wave

equation – particle in one dimensional rigid box-Bloch theorem (Qualitative), Kronig-Penny model (Qualitative treatment)-concept of effective mass – origin of energy band formation in solids - *Classification of materials in to conductors, semi-conductors and insulators based on band theory.*

(Sec: 20.1, 20.17, 20.18, 20.22; 29.3.1, 29.3.2, 29.4, 29.6, 29.7, 29.12 of Text book 3).

*Note: Topics in italics are meant for self study*

### **TEXT BOOKS:**

1. V. Rajendran, “*Engineering Physics*”, TMH Publishing Company, 6<sup>th</sup> Reprint 2013.
2. J. Griffiths, “*Introduction to Electrodynamics*”, 3<sup>rd</sup> Edition, PHI (EEE series), 2009.
3. M.N. Avadhanulu & P.G. Kshirsagar “*A Text book of Engineering Physics*”, 10<sup>th</sup> Edition, S. Chand & Company Limited, 2013.

### **REFERENCES:**

1. A.J. Dekker, “*Electrical Engineering Materials*”, 1<sup>st</sup> Edition, Macmillan Publishers, 2007.
2. C. Kittel, “*Introduction to Solid State Physics*”, John Wiley Publishers, 2007.
3. M.N. Sadiku, “*Elements of Electromagnetics*”, 4<sup>th</sup> Edition, Oxford University Press, 2007.
4. V. Raghavan, “*Materials Science*”, 5<sup>th</sup> Edition, PHI Publishers, 2007.
5. R.K. Gaur, S.L. Gupta, “*Engineering Physics*”, 8<sup>th</sup> Edition, Dhanapat Rai Publishers, 2003.
6. P.K. Palanisamy, “*Applied Physics*”, 2<sup>nd</sup> Edition, Scitech Publishers, 2010.
7. M. R. Srinivasan, “*Engineering Physics*”, New Age Publishers, 2012.
8. S. Ramamrutham, “*Strength of Materials*” Dhanapat Rai Publishers, 2014.

## **BUILDING MATERIALS AND CONSTRUCTION**

**Course Code:** 15CE1103

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>3</b>	<b>1</b>	<b>0</b>	<b>4</b>

### **Course Outcomes:**

At the end of the course the student will be able to:

- CO1: Distinguish various types of bricks & stones used in construction and their requirement.
- CO2: Determine the principal properties of wood and its classification.
- CO3: Associate with construction of brick & stone masonry
- CO4: Explain different components & systems of buildings
- CO5: Infer the concept of water proofing, damp proofing materials and construction techniques

### **UNIT-I**

**(14 Lectures)**

#### **BRICKS & STONES:**

Properties of building stones – Relation to their structural requirements. Classification of stones – Stone quarrying – Precautions in blasting, Dressing of stone, Composition of good brick earth, Qualities of a good brick, Various methods of manufacture of bricks. Comparison between clamp burning and kiln burning, Other types of bricks including Hollow concrete blocks.

#### **FERROUS AND NON-FERROUS METALS:**

Ferrous metals: Desirable characteristics of reinforcing steel. Principles of cold working. Detailed discussion on reinforcing steel, Mechanical and Physical properties, Chemical composition. Non-Ferrous Metals: Aluminum- Brief description on properties and uses.

### **UNIT-II**

**(8 Lectures)**

#### **TIMBER:**

Timber Structure – Properties – Seasoning of timber, Classification of various types of timbers used in buildings – Defects in timber, Preservation of timber, Fire resistance of timber and Testing of timber.



**UNIT-III****(8 Lectures)****MASONRY:**

Brick masonry – Bonding of bricks, Method of laying of bricks, Inspection of brick work, Construction of half brick masonry wall, Height of walls in brick masonry and brick piers. Stone masonry – Classification of stone masonry – Random Rubble, Coursed Rubble and Ashlar masonry.

**UNIT-IV****(10 Lectures)****BUILDING COMPONENTS:**

Lintels, Arches and Vaults - Staircases – Types. Different types of flooring-Concrete, Mosaic, Terrazo floors; Different types of roofs-Pitched, Flat and Curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs - King and Queen Post Trusses. Doors & Windows – Types, Sizes and Rate.

**UNIT-V****(10 Lectures)****OTHER CONSTRUCTION PRACTICES:**

Damp Proofing and Water Proofing- Materials used- Specifications of Damp Proof Course in walls, Basic principles of water proofing of basements, Plastering, Pointing, White washing, Distempering and Painting, Form work and Scaffolding, False ceiling, fire resisting materials.

**TEXT BOOKS:**

1. S. K. Duggal, “*Building Materials*”, 2<sup>nd</sup> Edition, New Age International Publishers, 2010.
2. S.C. Rangwala, Engineering Materials, Charotar Publications, New Delhi, 2<sup>nd</sup> Edition.
3. B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, “*Building Construction*” - Laxmi Publications (P) Ltd., New Delhi.
4. P.C. Varghese, “*Building Construction*”, Prentice-Hall of India Private Ltd, 3<sup>rd</sup> Edition, New Delhi.

**REFERENCES:**

1. R.Chudly, “*Construction Technology*”,(Volumes I and II), 2<sup>nd</sup> Edition, Longman, UK, 1987.
2. P.C. Varghese, “*Building Materials*” by Prentice-Hall of India Private Ltd, 3<sup>rd</sup> Edition, New Delhi.

**ENGLISH LANGUAGE LAB**  
(Common to all Branches)

**Course Code:** 15HE1102

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**Course Outcomes:**

The Students will be able to:

CO1: Distinguish and use spoken English and respond appropriately.

CO2: Use language in formal and informal contexts.

CO3: Demonstrate oral skills in debates and group discussions.

CO4: Show fluency in speech

CO5: Identify the sounds of English and use stress and intonation in connected speech

**SYLLABUS:**

The following course content is prescribed for the English Language Laboratory sessions:

1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Listening for Comprehension
4. Situational Dialogues.
5. Oral Presentations- Prepared & Extempore
6. 'Just A Minute' Sessions (JAM)
7. Telephonic communication
8. Group Discussions
9. Debate
10. Presentations- *Pecha Kucha*
11. Reference Skills

**REFERENCES:**

1. DrSangeeta Sharma &DrBinod Mishra, "*Communication Skills for Engineers and Scientists*", PHI Learning, New Delhi, 2009.

2. Daniel Jones, “*English Pronouncing Dictionary with CD*”, 17<sup>th</sup> Edition, 2006.
3. T. Balasubramanian, “*A Text book of English Phonetics for Indian Students*”, 2nd Edition, Trinity Press/LakshmiPublications, 2013..
4. Meenakshi Raman & Sangeeta Sharma, “*Technical Communication Principles & Practice*”, 2nd Edition, New Delhi: OUP, 2012.
5. E. Suresh Kumar, P. Sreehari, J. Savithri, “*English for Success*”, New Delhi, Foundation Books, 2012.

## COMPUTER PROGRAMMING LAB

(Common to all Branches)

**Course Code:** 15CT1103

L	T	P	C
0	0	3	2

### Course Outcomes:

At the end of the course, a student will be able to

CO1: Use RAPTOR tool in program development.

CO2: Program mathematical operations using control statements.

CO3: Develop Programs for Arrays and String manipulations.

CO4: Implement Programs using functions, pointers, structures, and unions.

CO5: Implement Programs for File I/O operations

### LIST OF PROGRAMS:

- 1 Demonstration of RAPTOR Tool to generate flowcharts by considering simple algorithms. Generation of flow charts to solve problems such as Temperature Conversion, Swapping of two numbers etc. using RAPTOR Tool.
- 2 Write C Programs to solve problems such as Student Grading, Income Tax Calculation, and Largest of three Numbers etc., which expose students to various categories of IF Statements. Generate flowcharts using RAPTOR Tool.
- 3.a) Write a C program to find the roots of a quadratic equation.
- b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, \*, /, % and use Switch Statement.
- 4.a) The total distance travelled by vehicle in 't' seconds is given by  $\text{distance} = ut + \frac{1}{2}at^2$  where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec<sup>2</sup>). Write a C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.

- b) Write a C program to determine whether a given number is an Armstrong or not. (If the sum of the cubes of digits in the number is equal to the original number, then the number is called Armstrong number. Eg: 371 is Armstrong number ( $3^3+7^3+1^3=371$ ))
- 5.a) Write a C program to find the sum of individual digits of a positive integer.
- b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- 6.a) Write a C program to calculate the following:  $\text{Sum}=1-x^2/2! +x^4/4!-x^6/6! +x^8/8! - x^{10}/10!$
- b) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.
- 7.a) Write a C program to generate Pascal's Triangle.
- b) Write a C program to construct a Pyramid of Numbers.
- 8. Write C programs that use both recursive and non-recursive functions for the following
  - a) To find the factorial of a given integer.
  - b) To find the GCD (greatest common divisor) of two given integers.
- 9.a) Write a C function to read in two numbers, x and n, and then compute the sum of this geometric progression:  $1+x+x^2+x^3+\dots+x^n$  also perform error checking by considering negative values for n and also check for illegal values of x.
- b) Write a C function to read in two numbers, x and n (no. of terms), and then compute  $\sin(x)$  and  $\cos(x)$ .
- 10.a) Write a C program to find the largest and smallest number in a list of integers.
- b) Write a C program to perform Matrix Addition & Matrix Multiplication.
- c) Write a C program to compute Transpose of a Matrix.
- 11.a) Write a C program to exchange value of two integers using call

- by value and call by reference.
- b) Write C programs to demonstrate the use of Pointers.
12. Write user defined string handling functions to implement the following standard library functions: strlen(), strcpy(), strcat(), strrev(), strcmp().
- 13.a) Write a C program that displays the position/ index in the string S where the string T begins, or -1 if S doesn't contain T.
- b) Write a C program to determine whether a given string is Palindrome or not.
14. Write a C program that uses functions to perform the following operations:
- a) To insert a sub-string in to given main string from a given position.
  - b) To delete n Characters from a given position in a given string.
  - c) To replace a character of string either from beginning or ending or at a specified location.
- 15.a) Write a C program to find the two's complement of a binary number.
- b) Write a C program to convert a Roman numeral to its decimal equivalent.
16. Write a C program that uses functions to perform the following operations using Structures:
- a) Reading a complex number.
  - b) Writing a complex number.
  - c) Addition of two complex numbers.
  - d) Multiplication of two complex numbers.
- 17.a) Write a C program which copies one file to another.
- b) Write a C program to count the number of characters, lines, words, tabs and spaces in a given file.

## ENGINEERING WORKSHOP

(Common to all Branches)

**Course Code:** 15MT1101

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

### Course Outcomes:

At the end of the course, the student will be able to

- CO1: Prepare the wooden pieces into various joints. Prepare different forms of fit on metal pieces and identify different types of patterns used for mould preparations providing necessary allowances.
- CO2: Identify different tin-smithy tools for the preparation of models by sheet form various metals and discuss the types of switching operations used in house wiring application.
- CO3: Identify the peripherals of a computer, components in CPU and its functionalities.
- CO4: Install windows operating systems, learn MS-DOS commands, and work with MS-Office tools
- CO5: Set TCP/IP and LAN Connectivity and work with various search engine techniques

### LIST OF EXPERIMENTS

*Any six experiments from each module*

#### Module – 1

1. Carpentry: Making a Cross-half lap joint using wooden pieces.
2. Fitting: Preparation of a V-fit between flat mild steel pieces.
3. Foundry: Preparation of a sand mould using a single piece pattern.
4. Tin-Smithy: Preparation of a sheet metal funnel using tin-smithy tools.
5. House Wiring: One lamp controlled by a one-way switch.
6. House Wiring: Two-way switching for stair-case lamp.



**Experiments to be demonstrated**

1. **Lathe Machine:** Demonstration of turning related activities on Lathe machine.
2. **Drilling Machine:** Demonstration of drilling related activities on Drilling machine.

**Module – 2****Exercise - 1**

1. **Identify the peripherals of a computer** - Identification of the components in a CPU and its functions - Block diagram of the CPU along with the connectivity of the main components.
2. **Assembling and disassembling the system** - configuration of each peripheral. Disassembly and assembly of a personal computer.

**Exercise-2**

1. **Install windows XP operating system** - Installation of MS windows XP on the personal computer.
2. **MSDOS commands:** - Basic operations that can be performed through MS DOS commands.

**Exercise-3****MS OFFICE TOOLS:****Microsoft Word:-**

1. **Creation of project certificate:** Exposure to features like Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and / Word.
2. **Creating project abstract:** Features to be covered are Formatting Styles, Inserting table, Bullets and Numbering. Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

3. **Creating a Newsletter:** Features to be covered are Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes and Paragraphs.
4. **Creating a Feedback form** - Features to be covered are Forms, Text Fields, Inserting objects, Mail Merge in Word.

#### **Exercise-4**

##### **Microsoft PowerPoint:-**

1. Exposure to basic power point utilities and tools (PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering.
2. Auto Shapes, Lines and Arrows in both LaTeX and Power point, Hyperlinks, inserting Images, Clip Art, Audio, Video, Objects, Tables, Charts) to create basic power point presentation.

#### **Exercise-5**

##### **Microsoft Excel:-**

1. **Introduction of Excel** as a Spreadsheet tool, Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.
2. **Creating a Scheduler** - Features to be covered are Gridlines, Format Cells, Summation, auto fill, Formatting Text.
3. **Calculating GPA** - Features to be covered are Cell Referencing, Formulae in excel – average, standard deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP.

#### **Exercise-6**

1. **Search engines and netiquette** - Basic points of search engines, Search engines working procedure (Web crawling, Indexing, and Searching).
2. **Connectivity** - Connectivity to the Local Area Network and accessibility to the Internet. TCP / IP setting

#### **Experiments to be demonstrated**

1. **Install Linux operating system:** Installation of LINUX on the personal computer.
2. **Hardware & Software troubleshooting:**
  - Identification of the problem of a PC which does not boot (due to improper assembly or defective peripherals) and fixing it to get the computer back to working condition.
  - Identification of the problem of a malfunctioning (due to some system software problems) and fixing it to get the computer back to working condition.

**TEXT BOOK:**

1. P. Kannaiah and K.L. Narayana, “*Workshop Manual*”, 11<sup>th</sup> reprint, Scitech publications, October 2010.
2. Vikas Gupta, “*Comdex Information Technology Course tool kit*”, 1<sup>st</sup> Edition, WILEY Dreamtech, 2010.

**REFERENCES:**

1. Cherly A Schmidt, “*Complete computer upgrade and Rep-air book*”, 3rd edition, Wiley Dreamtech, 2012.
2. ITL Education Solutions limited, “*Introduction to Information Technology*”, 2<sup>nd</sup> Edition Pearson Education, 2011.
3. Kate J. Chase , “ *PC Hardware and A + Handbook*” , 1<sup>st</sup> Edition, PHI(Microsoft), 2012.
4. Leslie Lamport , “ *Latex Companion*”, 1<sup>st</sup> Edition , PHI/Pearson, 2011.
5. Alexis Leon and Mathews Leon , “*Introduction to Computers with MS-Office 2000*”, 1<sup>st</sup> Edition, Leon Tech world, 2011.

**PHYSICS LAB**  
(Common to all Branches)

**Course Code:** 15BP1102

<b>L</b>	<b>T</b>	<b>P</b>	<b>C</b>
<b>0</b>	<b>0</b>	<b>3</b>	<b>2</b>

**Course Outcomes:**

At the end the course, the student will be able to

- CO1: Demonstrate the elastic response of loaded beams; estimate the frequency of a vibrating system using standing wave pattern.
- CO2: Familiarize with CRO; assess the resonant frequency and quality factor of electrical oscillations.
- CO3: Estimate the strength of the magnetic field due to a current carrying coil.
- CO4: Interpolate some of the physical parameters based on optical phenomena.
- CO5: Realize explicit knowledge on the working and performance of photocells.

**Any TEN of the following 13 experiments shall be completed**

**ERROR ANALYSIS AND GRAPH DRAWING (LECTURE - DEMO)**

1. Bending of beams – Elliptical and Hyperbolic fringes - Determination of ‘Y’.
2. Melde’s experiment – determination of frequency of electrically maintained tuning fork.
3. Determination of wavelength of laser light using diffraction through a graded scale.
4. Particle size determination using He-Ne laser (Lycopodium powder).
5. ion grating – determination of wavelengths of spectral lines of Mercury spectrum by normal incidence method.
6. Polarization of light – verification of Malu’s law and to determine the Brewster’s Angle for glass.

7. Determination of Planck's constant.
8. Solar cell characteristics – I-V characteristics, measurement of efficiency and Fill factor.
9. Stewart – Gee apparatus – study of variation of magnetic field along the axis of circular current carrying loop.
10. LCR series and parallel resonance circuit to study the frequency response.
11. Familiarity of CRO – Lissajou's figures - determination of time period, voltage, frequency and phase of a wave.
12. Newton's Rings- determination of wavelength of the source/ radius of curvature of given convex lens.
13. Optical fibres- determination of Numerical aperture, acceptance angle and bending losses.

**Experiments offered beyond the curriculum:**

1. Torsional pendulum - comparison of rigidity moduli of various wires.
2. Spectrometer – determination of dispersive power of the material of a prism.