Course Description

IInd Semester

Title: Life Skills and Effective Communication Code: **18B11HS411**
L-T-P scheme: 2**-0-0** **Credit: 2**

Prerequisites: None

Objective:

1. To employ positive behavior management techniques and to develop skills to manage their own behavior effectively
2. To develop one's personality by being aware of the self, connecting with others, reflecting on the abstract and the concrete.
3. To enhance the employability and maximize the potential of the students by introducing them to the principles that underlying personal and professional success, and help them acquire the skills needed to apply these principles in their lives and careers.

Learning Outcomes:

CO1	Outline different life skills required in personal and professional life.
CO2	Describe the application of different theoretical perspectives within the field of motivation and applying these motivation theories to everyday settings (e.g., business, social interactions, education)
CO3	Develop the understanding of personality and shaping behavior through personality
CO4	Identify the basic mechanics of perception by demonstrating these through presentations.
CO5	Apply well-defined techniques to cope with emotions and stress and develop an awareness of the self.
CO6	Understand the basics of leadership and Learning

Course Content:

Unit-1: Overview of Life Skills: Meaning and significance of life skills, Life skills identified by WHO: Self-awareness, Empathy, Critical thinking, Creative thinking, Decision making, problem solving, Effective communication, interpersonal relationship, coping with stress, coping with emotion.
Unit-2: Motivation: Morale and Morale Building, Need and Importance of motivation, Process and types of motivation, Theories of motivation, Essentials of Good Motivation system
Unit-3: Overview of Personality concept and types, Personality traits, Factors that help in shaping personality, Theories of personality, Measurement of personality
Unit-4: Perception: - Factors affecting perception, Perceptual mechanisms Perceptual errors and distortions, Behavioral applications of perceptions
Unit-5: Self Awareness, Coping with emotions: Identifying and managing emotions, harmful ways of dealing with emotions, Stress Management: Stress, reasons and effects, identifying stress, Managing Stress
Unit-6: Conflict Management –sources, process and resolution of conflict
Unit-7: Leadership: Need for Leadership, Models of leadership development, and Characteristics of a good leader.

Unit-8: Learning: Concepts and Theories, classical conditioning, operant conditioning, Biological influences, Cognitive influences, Social learning theory, Behavioral modification theory

Teaching Methodology:

Life skills are those competencies that provide the means for an individual to be resourceful and positive while taking on life's vicissitudes .This course will equip students with the social and interpersonal skills that enable them to cope with the demands of everyday life. There will be a particular focus on social-cognitive processes and how situational factors trigger various emotions and corresponding motives that can then drive behavior. The main objectives of this course is to build self-confidence, encourage critical thinking, foster independence and help students to communicate more effectively

Evaluation Scheme:

Exams	**Marks**	**Coverage**
Test-1	15 Marks	Based on Unit-1, Unit-2 & Unit-3
Test-2	25 Marks	Based on Unit-4 & Unit-5 and around 30% from coverage of Test-1
Test-3	35 Marks	Based on Unit-6, Unit-7 & Unit-8 and around 30% from coverage of Test-2
Assignment	10 Marks	
Tutorials	5 Marks	
Quiz	5 Marks	
Attendance	5 Marks	
Total	**100 Marks**	

Learning Resources:

Case studies, video lectures and lecture slides on Life Skills (will be added from time to time): Digital copy will be available on the JUET server.

Text Book:

1. "Effective Communication and Soft Skills"; Nitin Bhatnagar, Pearson Education India,1e, 2011
2. "Personality Development and Soft Skills"; Barun Mitra, Oxford Higher Education,2016
3. "Sizzling Soft Skills for Spectacular Success"; P. Ameer Ali, Notion Press, 2017
4. "Organizational Behavior"; Stephen P. Robbins, Timothy A. Judge, Neharika Vohra, Pearson Education India, 16e, 2016
5. "Managing Organisations"; Rachna Chaturvedi, Vikas Publications, 2013

Reference Books/Material:

1. "The Power of Your Subconscious Mind"; Joseph Murphy, General press, 2015
2. "The Life-Changing Magic of Tidying Up: The Japanese Art of De cluttering and Organizing"; Marie Kondō, 1e,Ten speed Press, 2011
3. "The Power of Habit: Why We Do What We Do in Life and Business"; Charles Duhigg, Random House, 2012

Course Title: Discrete Mathematics **Course Code: 18B11MA211**

L-T-P scheme: 3-1-0 **Credits: 4**

Objectives:

The aim of the course is to cover the basic principles sets relations functions partially ordered set, lattice, Boolean algebra and its applications. The main objective of the course is to develop in student, an intuitive understanding of graphs by emphasizing on the real world problems.

Course Outcomes:

At the end of the course, the student is able to:

CO1	Employ De Moivre's theorem in a number of applications to solve numerical problems.
CO2	Appreciate the definition and basics of graphs along with types and their examples.
CO3	Visualize the applications of graph theory to network flows. Understand the notion of planarity and coloring of a graph. Relate the graph theory to the real-world problems.
CO4	Understand the definition of a tree and learn its applications to fundamental circuits.
CO5	Solve real-life problems using finite-state and Turing machines
CO6	Learn about partially ordered sets, lattices and their types, Boolean algebra and Boolean functions, logic gates, switching circuits and their applications.

Course Contents:

Unit 1: Basics of set theory, Mathematical induction. Relations, Equivalence relation, partial- ordered relation algorithms and functions.

Unit 2: Big O notation, Proposition, Basic logical operators, Propositional functions and Quantifiers.

Unit 3: Graphs and related definitions, Eulerian and Hamiltonian graphs, Graph colorings. Trees, Algebraic expressions and Polish notation, shortest path.

Unit 4: Algebraic Systems. Lattice and Boolean Algebra.

Unit 5: Language, Finite State Automata and Machines. Grammars.

Methodology:

The course will be covered through lectures supported by tutorials. Apart from the discussions on the topics covered in the lectures assignments/ quizzes in the form of questions will also be given.

Evaluation plan:

Exams	Marks	Coverage
Test-1	15 Marks	Based on Unit-1
Test-2	25 Marks	Based on Unit-2 & Unit-3 and around 30% from coverage of Test-1
Test-3	35 Marks	Based on Unit-4 to Unit-5 and around 30% from coverage of Test-2
Assignment	10 Marks	
Tutorials	5 Marks	
Quiz	5 Marks	
Attendance	5 Marks	
Total	**100 Marks**	

References:

1. B. A, Davey & H. A. Priestley (2002). "Introduction to Lattices and Order" (2nd edition) Cambridge University, Press.
2. Edgar, G. Goodaire & Michael M. Parmenter (2018). "Discrete Mathematics with Graph Theory" (3rd edition). Pearson Education.
3. Rudolf Lidl & Günter Pilz (1998). "Applied Abstract Algebra" (2nd edition).Springer.
4. Kenneth H. Rosen (2012). "Discrete Mathematics and its Applications: With Combinatorics and Graph Theory" (7th edition), McGraw-Hill.
5. C. L. Liu (1985). "Elements of Discrete Mathematics" (2nd edition). McGraw- Hill.

Title of Course: Physics-II **Course Code: 18B11PH211**

L-T Scheme: 3-1-0 **Course Credits: 4**

Objective:

Broadly, the study of Physics improves one's ability to think logically about the problems of science and technology and obtain their solutions. The present course is aimed to offer a broad aspect of those areas of Physics which are specifically required as an essential background to all engineering students for their studies in higher semesters. At the end of the course, the students will have sufficient scientific understanding of basic vector calculus, electrostatics, magnetostatics, electromagnetic fields and waves, basic understanding of physics of semiconducting materials

Course Outcomes:

Course Outcome	**Description**
CO1	Learn to apply the basic concepts of vector calculus and understanding of various co-dinate systems and related properties, Demonstrate basic understanding of formulation and duction of electric field produced by static charge distributions
CO2	Evaluate the electrostatic field due to symmetric charge distributions, Understand the utility of formulation of electric potential and solve related problems using special techniques and boundary conditions
CO3	Acquired understanding of electrostatic fields inside matter, Explain the magnetic field due to moving charge distribution, evaluate the magnetic field due to current distribution in space,
CO4	appreciate the importance of Maxwell's equations and understand the electromagnetic wave propagation in free space Categorisation of materials on the basis of band structure
CO5	Developed understanding of quantum mechanical origin of band formation in solids, describing the energy state of electrons in crystalline materials, comprehend basic carrier properties

Course Content:

Unit I *(Electrostatics)*

Review of vector calculus, Cartesian, spherical polar and cylindrical co-ordinate systems, concept of gradient, divergence and curl, Coulomb's law, Gauss law and its applications, Boundary condition on electrostatic field, electric potential, Laplace equation, Poisson equation and related boundary value problems, capacitance, electrostatic fields in matter [**10**]

Unit II (*Magnetostatics*)

Lorentz force, cyclotron formula, line, surface and volume currents, , Biot-Savart law and its applications, Ampere's law and its applications, equation of continuity, Faraday's law of electromagnetic induction, boundary conditions on magnetic field, Magnetic field in matter [**08]**

Unit III (Electromagnetic field)

Maxwell's equations in free space and matter, Maxwell correction to Ampere's law, Electromagnetic waves in free space and matter, Transverse nature of em waves and Polarization, Propagation of electromagnetic field in free space and Poynting vector, Poynting theorem , Normal incidence of em waves [**10]**

Unit IV *(Elements of Solid State Physics)*

Basic ideas of bonding in solids, Crystal structure, X-ray diffraction, Band theory of solids, Distinction between metals, semiconductors and insulators **[04]**

Unit V (*Physics of Semiconductors)*

Band theory of solids, Kronig Penney model, effective mass, Direct and indirect bandgap semiconductors, optical and thermal properties, Fermi-Dirac Distribution in semi-conductors, Equilibrium carrier concentrations in intrinsic and extrinsic semiconductors, Fermi energy variation with temperature and impurity concentration, Hall Effect in semiconductors, P-N junction characteristics **[10]**

Text/ Reference Books:

1. D.J. Griffiths, *Introduction to electrodynamics*, Prentice Hall of India Ltd.
2. B.G. Streetman, S. Banerjee, Solid State Electronic Devices
3. Semiconductor Physics and Devices, Donald A. Neamen
4. Boylstad and Nashelsky, *Electronic Devices and Circuits*, PHI, 6e, 2001.
5. J. Reitz, F. Milford and R. Christy, *Foundation of Electromagnetic Theory*, Narosa Publishing.
6. J. Millman and C.C. Halkias, Electronic Devices and Circuits, Millman, McGra-Hill

Title: Electrical Science **Code: 18B11EC211**

L-T-P Scheme: 3-1-0 **Credit: 4**

Prerequisite: Students must have studied the core concepts of "*Physics-1*".

Course Objectives:

1. This course is designed for developing the understanding about basics of electrical and electronics concepts.
2. In this course students will have an enough idea about the working of systems and enable them to analyze a circuit.

Learning Outcomes:

1. The students shall acquire the generic skills to study & analyze the electrical and electronic systems.
2. This course will enable them to think and design various applications of the electrical and electronics at basic level.

The student will be able to:

Course Outcome	Description
CO1	Understand the basic electrical and electronics component and their importance determine the current, voltage and power.
CO2	Apply networks laws and theorems to solve electric circuits and may understand circuit reduction techniques with their advantages.
CO3	Understand charging discharging Steady state and transient
CO4	Demonstrate the use of semiconductor diodes in various applications.
CO5	Discuss and explain the working of transistors Amplifiers, their configurations and applications.
CO6	Analysis concept and two port networks simplification technique.

Course Content:

Unit I: Basic Electrical Circuit: Electromotive Force (EMF), Terminal Voltage; Resistance (*R*), Inductance (*L*) and Capacitance (*C*) from (i) Circuit, (ii) Energy, and (iii) Geometrical Points of View; Voltage Divider, Current Divider; Star-Delta Transformation; Voltage Source and Current Source, Source Transformation, Combination of Sources; Controlled (Dependent) Sources.

Unit 2: Methods of Analysis: Kichhoff's Circuit Laws; Loop-Current Analysis, Mesh Analysis;

Node-Voltage Analysis; Choices of Method of Analysis.

Unit 3: Network Theorems (DC Circuits): Superposition Theorem; Thevenin's Theorem; Norton's Theorem; Maximum Power Transfer Theorem.

Unit 4: DC Transients: Simple *RL* Circuit, Time Constant, Decay and Growth of Current; Simple *RC* Circuit, Discharging of a Capacitor, Charging of a Capacitor.

Unit 5: Two-Port Networks: Impedance, Admittance, Hybrid, Transmission Parameters; Equivalent Networks.

Unit 6: Diodes and its Applications: Unidirectional property, *PN*-junction with no bias, with forward bias and with reverse bias, *V-I* characteristics, Comparison of Si and Ge diodes,Temperature effects, Diode resistance (static and dynamic), Diode equation, Ideal diode, Circuit model of a diode. Half-wave and full-wave (centre tap and bridge) rectifiers, PIV rating of diode, Performance of half-wave and full-wave rectifiers, Shunt capacitor filter. Clippers: Series and Parallel, Limiters, Clampers. Zener diode, Analysis of Zener voltage regulator. LED, varactor diode .

Unit 7: Transistor: BJT Structure, Working of a transistor, Transistor current equation, Collector reverse saturation current, DC alpha of a transistor. The three configurations, CB and CE input and output characteristics.

Teaching Methodology:

Lectures would be interactive and it would cover the core concepts that are explained in the text and reference materials with adequate examples.

Evaluation Scheme:

Exams	Marks	Coverage
Test-1	15	Based on Unit-1 & Unit-2
Test-2	25	Based on Unit-3, Unit-4 & Unit-5 and around 30% from coverage of Test-1
Test-3	35	Based on Unit-6 to Unit-7 and around 30% from coverage of Test-2
Assignment	10	Based on Unit-1, Unit-2 & Unit-3
Tutorials	5	Based on Unit-4 & Unit-5

Quiz	5	Based on Unit-6 & Unit-7
Attendance	5	Based on attendance in the theory classes
Total	**100**	

Learning Resources:

Tutorials sheets, lecture slides and handwritten notes on Electrical circuit, Electrical Science and Basic Electronics (will be added from time to time): Digital copy will be available on the JUET server.

Text-Books:

1. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill Education, 2009.
2. W.H. Hayt, J. E. Kemerlay & S.M. Durbin, "Engineering Circuit Analysis (Sixth Edition)", McGraw Hill, 2006.
3. R.C. Dorf & J.A. Svoboda, "Introduction to Electric Circuits", John Wiley, 2004.
4. D.S. Chauhan & D.C. Kulshreshtha, 'Electronics Engineering', New Age, 2e, 2009.
5. D.C. Kulshreshtha, 'Electronic Devices and Circuits', New Age, 2e, 2006.

References:

1. Van Valkenburg, "Network Analysis", Prentice-Hall India Ltd., 2001.
2. Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, "Basic Electrical Engineering", Tata McGraw Hill Publishing Co, 2008.
3. Vincent Del Toro, "Principles of Electrical Engineering", Prentice Hall of India.
4. Kumar and Jain, 'Electronic Devices and Circuits', PHI, 2007.
5. Boylstad and Nashelsky, 'Electronic Devices and Circuits', PHI, 6e, 2001.

Web References:

1. https://www.electrical4u.com/electrical-engineering-objective-questions-mcq/
2. https://www.pdfdrive.com/basic-electric-circuit-analysis-books.html
3. https://lecturenotes.in/subject/842

Journals References:

1. Circuits, Systems, and Signal Processing (CSSP), Springer
2. Journal of Electrical & Electronic Systems
3. International Journal of Circuit Theory and Applications, Wiley

Title of Course: Object Oriented Programming **Course Code: 18B11CI211**
L-T-P Scheme: 3-1-0 **Course Credit: 4**

Prerequisites:
Students must have already registered for the course, "Software Development Fundamentals"

Objectives:
To strengthen their problem solving ability by applying the characteristics of an object-oriented approach and to introduce object oriented concepts in C++.

Learning Outcomes

Course Outcome	Description
CO1	List various principles of Object-Oriented Programming (OOP).
CO2	Describe the real world problems using object-oriented programming concepts.
CO3	Develop the programs using the fundamental concepts of OOP.
CO4	Identify and use various techniques used in OOP.
CO5	Apply techniques used in OOP to solve the software design problems on a given software project.
CO6	Demonstrate the learning on the course to solve the real life programming problems.

Course Content

Unit-1: Review of Structured programming in C, Structured versus Object-Oriented Programming, Principles of Object-Oriented Programming, Beginning with C++, Control Structures, Functions in C++, Reference Variables, Default Parameters, Function Overloading, Inline Function, Const Variables.

Unit-2: Classes, Member Functions, Objects, Static Data Members, Static Member Functions, Friend Functions, Pointer to Members, Local classes, Constructors and Destructors of objects in C++,

Unit-3: Operator overloading and Type Conversions, Inheritance and its form, Multiple Inheritance in C++, Function Overriding, Virtual Inheritance, Virtual Base Class .

Unit-4: Pointers, Early binding, late binding, Type of polymorphism, Virtual Functions, Abstract Class, Virtual Destructor

Unit-5: Managing Console I/O Operations, File handling and Exception handling.

Unit-6: Templates, Function templates, Class templates, introduction to Standard Template Library (STL), Sequence, Containers, Iterators

Teaching Methodology

The course will use the mixed technique of interactive lectures, tutorials, guided case studies, literature survey, regular assignments and project work. Teaching in this course is designed to engage the students in active and experiential learning by taking a problem solving and design-oriented approach with special emphasis on real world applications.

In the lectures the fundamental theoretical concepts will be introduced and demonstrated through examples and case studies. Discussion in lecture will be done using design problems which will be implemented in laboratory individually in C++.

Evaluation Scheme

Evaluations	**Marks**	**Remarks**
T1	15 Marks (1 Hour)	
T2	25 Marks (1.5 Hours)	
T3	35 Marks(2 Hours)	
Assignments	10 Marks	2 or 3 Assignments to given
Quiz	5 Marks	2 or 3 quizzes
Tutorials	5 Marks	
Attendance	5 Marks	
Total	**100 Marks**	

Text books

Text book1: Robert Lafore, Object oriented programming in C++, Waite Group.
Text book2: E Balagurusamy, "Object-Oriented Programming with C++"

References

1. Deitel and Deitel,"C++ How to program", - Pearson Education.
2. Stroustrap B., the C++ Programming Language, Addison Wesley.
3. Lippman F. B., C++ Primer, Addison Wesley.
4. Prata S., C++ Primer Plus, Waite Group.
5. Parimala N., Object Orientation through C++, Macmillan India Ltd. 1999.
6. Pohl I., Object oriented Programming Using C++, Addison Wesley.
7. Grady Booch, James Rambaugh, Ivar Jacobson,"Unified Modelling Language user's guide" , Addison Wesley Limited

Title of Course: Physics Lab-II **Course Code: 18B17PH271**
L-T-P Scheme: 0-0-2 **Course Credit: 1**

Learning Outcomes

Course Outcome	Description
CO1	Demonstrate ability to collect experimental data and understanding the working procedures within the precautionary limits
CO2	Acquired the ability to analyze the experimental data and related errors in a reflective, iterative and responsive way
CO3	Developed understanding of the basic concepts related to Modern Physics, Basic Solid State Physics, Optics,
CO4	Acquired a first hand and independent experience of verifying the working principle of solar cell
CO5	Appreciate the importance of the laboratory work culture and ethics that is intended to impart features like regularity, continuity of self evaluation and honesty of reporting the data

Experiments List

1. To determine the magnetic susceptibility of a paramagnetic, $FeCl_3$ solution by Quinck's tube method.
2. To determine dispersive power of a prism using spectrometer.
3. To study the magnetostriction in metallic rod using Michelson-Interferometer.
4. To determine the Planck's constant using Photo electric effect.
5. To study the Hall effect in P type semi conductor and to determine
   (i) Hall voltage and Hall coefficient
   (ii) Number of charge carriers per unit volume
   (iii) Hall angle and mobility
6. To study the variation of resistivity of a semiconductor with temperature and to determine the band gap using Four-Probe method.
7. To study the presence of discrete energy levels in an atom by Franck Hertz experiment.
8. Using solar cell Trainer (a) study voltage and current of a solar cell (b) Voltage and current in series and parallel combinations (c) Draw power curve to find maximum power point (MPP) and to obtain efficiency of a solar cell.

Title: Electrical Science Lab

Code: 18B17EC271

L-T-P Scheme: 0-0-2 **Credit: 1**

Prerequisite: Student must have already registered for the course, "*Physics Lab-I*"

Objective:

1. The main aim of the lab is to familiarize with different types of electrical and electronic circuits
2. Identify their applications to the different electrical and electronic systems.

Learning Outcomes:

1. Completion of lab students will be able to understand the different techniques to simplify circuit
2. Two port networks and basic principles of different electronic devices and their characteristics.

Course Outcome	**Description**
CO1	Simplify complex network using Thevenin theorem and verify it.State Superposition Theorem and verify.Perform and verify Maximum Power Transfer Theorem.
CO2	To determine the Z parameters of the given two port network. Calculate the Y parameters for the given two port network.
CO3	V-I characteristic of p-n junction diode
CO4	Design Clipper and Clamper Circuit.
CO5	Rectifier circuits
CO6	Transistor and their v-I characteristics

Course Content:

1. Simplify complex network using Thevenin theorem and verify it.
2. State Superposition Theorem and verify.
3. Perform and verify Maximum Power Transfer Theorem.
4. To determine the Z parameters of the given two port network.
5. Calculate the Y parameters for the given two port network.
6. Perform Clipper Circuit.
7. Design Clamper Circuit.
8. Half wave rectifier with and without filter circuit.
9. Full wave rectifier with and without filter circuit.
10. Transistor as an Amplifier.
11. Common Emitter *v-i* characteristic of n-p-n transistor.
12. Common base *v-i* characteristic of n-p-n transistor.

Unit I: Basic Electrical Circuit

Voltage Divider, Current Divider; Kichhoff's Circuit Laws; Loop-Current Analysis, Mesh Analysis; Node-Voltage Analysis; Choices of Method of Analysis. Source Transformation, Combination of Sources; series and parallel combination of resistors.

Unit 2: Network Theorems (DC Circuits)

Superposition Theorem; Thevenin's Theorem; Norton's Theorem; Maximum Power Transfer Theorem.

Unit 3: Two-Port Networks

Impedance, Admittance, Hybrid, Transmission Parameters; Equivalent Networks.

UNIT 4: Diodes and its Applications

Unidirectional property, *PN*-junction with no bias, with forward bias and with reverse bias, *V-I* characteristics, Diode resistance (static and dynamic), Diode equation, Ideal diode, Circuit model of a diode. Half-wave and full-wave (centre tap and bridge) rectifiers, PIV rating of diode, Performance of half-wave and full-wave rectifiers, Shunt capacitor filter.

Clippers: Series and Parallel, Limiters, Clampers. Zener diode, Analysis of Zener voltage regulator. LED, varactor diode .

UNIT 5: Transistor

BJT as an amplifier, CB and CE input and output characteristics.

Teaching Methodology:

In each experiment the practical is designed and analyzed on bread board with the help of physical devices by each student and further checked and validated by faculty and lab staff.

Evaluation Scheme:

Exams	**Marks**		**Coverage**
P-1	**15 Marks**		**Based on Lab Exercises: 1-6**
P-2	**15 Marks**		**Based on Lab Exercises: 6-12**
Day-to-Day Work	Viva	20 Marks	**70 Marks**
	Demonstration	20 Marks	
	Lab Record	15 Marks	
	Attendance & Discipline	15 Marks	
Total		**100 Marks**	

Learning Resources:

Tutorials sheets, lecture slides and handwritten notes on Electrical circuit, Electrical Science and Basic Electronics (will be added from time to time): Digital copy will be available on the JUET server.

Text-Books:

1. D.C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill Education, 2009.
2. W.H. Hayt, J. E. Kemerlay & S.M. Durbin, "Engineering Circuit Analysis (Sixth Edition)", McGraw Hill, 2006.
3. R.C. Dorf & J.A. Svoboda, "Introduction to Electric Circuits", John Wiley, 2004.
4. D.S. Chauhan & D.C. Kulshreshtha, 'Electronics Engineering', New Age, 2e, 2009.
5. D.C. Kulshreshtha, 'Electronic Devices and Circuits', New Age, 2e, 2006.

References:

1. Van Valkenburg, "Network Analysis", Prentice-Hall India Ltd., 2001.
2. Abhijit Chakrabarti, Sudipta Nath, Chandan Kumar Chanda, "Basic Electrical Engineering", Tata McGraw Hill Publishing Co, 2008.
3. Vincent Del Toro, "Principles of Electrical Engineering", Prentice Hall of India.
4. Kumar and Jain, 'Electronic Devices and Circuits', PHI, 2007.
5. Boylstad and Nashelsky, 'Electronic Devices and Circuits', PHI, 6e, 2001.

Web References:

1. https://www.electrical4u.com/electrical-engineering-objective-questions-mcq/
2. https://www.pdfdrive.com/basic-electric-circuit-analysis-books.html
3. https://lecturenotes.in/subject/842

Journals References:

1. Circuits, Systems, and Signal Processing (CSSP), Springer
2. Journal of Electrical & Electronic Systems
3. International Journal of Circuit Theory and Applications, Wiley

Title of Course: Object Oriented Programming Lab **Course Code: 18B17CI271**
L-T-P Scheme: 0-0-2 **Course Credit: 1**

Pre-requisites

Students must have already registered for the course, "Software Development Fundamentals Lab".

Objectives

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

Learning Outcomes

CO1	Define basic concepts of Object-Oriented Programming (OOP).
CO2	Illustrate the key features available in OOP using C++.
CO3	Apply the concepts of OOP to solve different common problems.
CO4	Utilize the knowledge of OOP in solving programming problems.
CO5	Analyze the various concepts of OOP for their suitability on a given problem.
CO6	Design the systems, from concept to executable artefact, using object oriented techniques.

Course Content

Unit-1: Structured versus Object-Oriented Programming, Principles of Object-Oriented Programming, Beginning with C++, Control Structures, Functions in C++, Reference Variables, Default Parameters, Function Overloading, Inline Function, Const Variables.

Unit-2: Classes, Member Functions, Objects, Static Data Members, Static Member Functions, Friend Functions, Pointer to Members, Local classes, Constructors and Destructors of objects in C++,

Unit-3: Operator overloading and Type Conversions, Inheritance and its form, Multiple Inheritance in C++, Function Overriding, Virtual Inheritance, Virtual Base Class .

Unit-4: Pointers, Early binding, late binding, Type of polymorphism, Virtual Functions, Abstract Class, Virtual Destructor

Unit-5: Managing Console I/O Operations, File handling and Exception handling.

Unit-6: Templates, Function templates, Class templates, introduction to Standard Template Library (STL), Sequence, Containers, Iterators

Laboratory work and project

The students shall be given regular lab assignments, which will allow them to practically apply the concepts studied in the lecture Session. The lab assignments will be designed with focus on applying the concepts learnt in object-oriented programming, Data structures in an integrated manner.

Evaluation Scheme

Evaluations		**Marks**	**Remarks**
P-1		15 Marks	
P-2		15 Marks	
Continuous Evaluations	Viva	20 Marks	
	Demonstration	20 Marks	
	Lab Record	15 Marks	
	Discipline and Punctuality and Attendance	15 Marks	
Total		**100 Marks**	

Text book

Text Book1: Robert Lafore, Object oriented programming in C++, Waite Group
Text Book2: E Balagurusamy, "Object-Oriented Programming with C++"

References

1. Stroustrap B., the C++ Programming Language, Addison Wesley.
2. Lippman F. B., C++ Primer, Addison Wesley.
3. Prata S., C++ Primer Plus, Waite Group.
4. Parimala N., Object Orientation through C++, Macmillan India Ltd. 1999.
5. Pohl I., Object oriented Programming Using C++, Addison Wesley.
6. Grady Booch, James Rambaugh, Ivar Jacobson,"Unified Modelling Language user's guide" , Addison Wesley Limited

Title: Engineering Drawing & Design Lab **Code: 18B17ME272**
L-T-P scheme: 0-0-3 **Credits: 1.5**

OBJECTIVE

[1] Enables students to learn the concepts of graphic communication, their role in sanitary construction.
[2] Make familiar with different drawing equipment, technical standards and procedures for construction of geometric figures.
[3] Equipped with the skill that enables them to convert pictorial to orthogonal representations.

Learning Outcomes:

Course Outcome	**Description**
CO1	**Outline** the objectives of scale and develop the imagination and mental visualization capabilities for correlating the geometrical details of objects.
CO2	To **develop** the constructional ability for a different curve.
CO3	To **Describe** BIS rules for orthogonal projection and understand the fundamental concept of orthogonal projection for point, line, plane and solids.
CO4	Understand and **apply** orthogonal projection for solids, section and intersection of solid objects/structures
CO5	To **apply** the skill of development of surfaces of three dimensional objects for evaluation of black size of the components.
CO6	**Demonstrate** computer aided drafting tools and techniques using CAD software's

Course Content:

Unit-1: Study and construction of lines, lettering, dimensioning, plane scales, diagonal scales, construction of different methods used for the construction of conic curves.
Unit-2: Study and construction of geometrical construction, cycloidal curves, involutes and helix etc.
Unit-3: Orthogonal projection of point in all possible positions, Study and construction of projection of line and its applications (inclined to both planes), and projection of planes (inclined to both planes).
Unit-4: Study and construction of projection of solids (right circular cone, prism, pyramid and cylinders), and true shape of sections,
Unit-5: Study and construction of oblique projection and development of surface, isometric view using orthogonal projection on isometric scales.
Unit-6: Introduction to basic and editing command of CAD software, 2-D drafting, surface modeling, and 3-D geometrical model.

Teaching Methodology:

This course is introduced to build the imagination and established the correlation between the real object and engineering drawing and CAD developed by the design engineers and the requirement of the production engineers of the different units.

Evaluation Scheme:

Exams		Marks	Coverage
P-1		15 Marks	**Based on Lab Exercises: 1-7**
P-2		15 Marks	**Based on Lab Exercises: 8-14**
Day-to-Day Work	Viva	20 Marks	**70 Marks**
	Demonstration	20 Marks	
	Lab Record	15 Marks	
	Attendance & Discipline	15 Marks	
Total		**100 Marks**	

Learning Resources:

The study material of engineering drawing & design lab (will be added time to time): Digital copy will be available on the JUET server.

Text Book:

1. Bhatt, N.D., Engineering Drawing,

Reference Books:

1. Gill, PS, A Text Book of Engineering Drawing (Geometrical Drawing)
2. Dhananjay A J, Engineering Drawing with an introduction to Auto CAD, Mc Graw Hill