UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: English Language & Technical Communication-I
Course Code: HU101
L-T Scheme: 2-0 **Course Credits: 2**

Introduction:

This course can enhance the drafting and understanding skills of engineering students.

Objectives:

1. This Course has been designed to impart advanced skills of Technical Communication in English through Language Lab. Practice Sessions to 1ST Semester UG students of Engineering &Technology.
2. To enable them to communicate confidently and competently in English Language in all spheres.

Learning Outcomes:

Knowledge:

1. This course will help the students to learn English very easily. Even the Hindi medium students can translates easily.
2. The technical communication will help the students to improve their speaking skills and drafting skill for engineering students.

Course Contents:

Unit 1: ENGLISH LANGUAGE GRAMMAR-Correction of Errors in Sentences Building Vocabulary Word formation Single Word for a group of Words Fill in the blanks using correct Words Sentence Structures and Transformation Active &Passive Voice Direct &Indirect Narration (MCQ Practice during classes).

Unit 2: READING COMPREHENSION-Strategies for Reading Comprehension Practicing Technical & Non Technical Texts for Global/Local/Inferential/Referential comprehension; Précis Writing

Unit 3: TECHNICAL COMMUNICATION-the Theory of Communication–Definition & Scope Barriers of Communication Different Communication Models Effective Communication (Verbal/Nonverbal) Presentation / Public Speaking Skills (MCQ Practice during classes)

Unit 4: MASTERING TECHNICAL COMMUNICATION- Technical Report (formal drafting) Business Letter (formal drafting) Job Application (formal drafting) Organizational

Unit 5: GROUP DISCUSSION–Principle & Practice

Text Books

1. Board of Editors: Contemporary Communicative English for Technical Communication Pearson Longman, 2010
2. Technical Communication Principle sand Practice by Meenakshi Raman, Sangeeta Sharma (Oxford Higher Education)
3. Effective Technical Communication by Barun K. Mitra (Oxford Higher Education).
4. P C WREN & H.MARTIN (English language & grammar)

References

1. D.Thakur: Syntax Bharati Bhawan, 1998
2. Longman Dictionary of Contemporary English (New Edition) for Advanced Learners
3. Internet

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Physics-1
Course Code: PH101
L-T Scheme: 3-1 **Course Credits: 3**

Introduction:

The study of Engineering Physics emphasizes the application of basic scientific principles to the design of equipment, which includes electronic and electro-mechanical systems, for use in measurements, communications, and data acquisition. The course is recommended for students interested in newly developing areas of physics, high technology, instrumentation and communications.

Objectives:

Engineering Physics students will:

- Excel in technical careers and thrive in graduate studies using scientific principles and application of physical sciences
- Work effectively in bringing multi-disciplinary ideas to diverse professional environments
- Improve their workplaces and communities, and the society through professional and personal activities
- be able to demonstrate competency and understanding of the basic concepts found in physics.
- be able to utilize the scientific method for formal investigation and to demonstrate competency with experimental methods that are used to discover and verify the concepts related to content knowledge.
- demonstrate skills necessary for conducting research related to content knowledge and laboratory skills.

Learning Outcomes:

- Upon completion, students will have:
- working knowledge of fundamental physics and basic electrical and/or mechanical engineering principles to include advanced knowledge in one or more engineering disciplines;
- the ability to identify, formulate, and solve engineering physics problems;
- the ability to apply the design process to engineering problems;
- the ability to formulate, conduct, analyze, and interpret experiments in engineering physics; and
- the ability to use modern engineering physics techniques and tools, including software and laboratory instrumentation.
- communicate their ideas effectively, both orally and in writing; and function effectively in multidisciplinary teams.
- an understanding of their professional and ethical responsibility to society;
- knowledge of the relationship between technology and society;
- a capacity and desire for life-long learning to improve themselves as citizens and engineers; and
- a knowledge of technical contemporary issues.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Course Contents:

Module 1: Oscillation:

1.1 Simple harmonic motion: Preliminary concepts, Superposition of S. H. M's in two mutually perpendicular directions: Lissajous figures

1.2 Damped vibration: Differential equation and its solution, Logarithmic decrement, Quality factor.

1.3 Forced vibration: Differential equation and its solution, Amplitude and Velocity resonance, Sharpness of resonance. Application in L-C-R Circuit

Module 2: Optics 1:

2.1 Interference of electromagnetic waves: Conditions for sustained interference, double slit as an example. Qualitative idea of Spatial and Temporal Coherence, Conservation of energy and intensity distribution, Newton's ring

2.2 Diffraction of light: Fresnel and Fraunhofer class. Fraunhofer diffraction for single slit and double slits. Intensity distribution of N-slits and plane transmission grating (No deduction of the intensity distributions for N-slits is necessary), Missing orders. Rayleigh criterion, Resolving power of grating and microscope. (Definition and formulae)

Module 3: Optics 2:

3.1 Polarization: General concept of Polarization, Plane of vibration and plane of polarization, Qualitative discussion on Plane, Circularly and Elliptically polarized light, Polarization through reflection and Brewster's law, Double refraction (birefringence) - Ordinary and Extra-ordinary rays . Nicol's Prism, Polaroid. Half wave plate and Quarter wave plate

3.2 Laser: Spontaneous and Stimulated emission of radiation, Population inversion, Einstein's A & B co-efficient (derivation of the mutual relation), Optical resonator and Condition necessary for active Laser action, Ruby Laser, He-Ne Laser- applications of laser.

3.3 Holography: Theory of holography, viewing the hologram, Applications

Module 4: Quantum physics:

4.1 Concept of dependence of mass with velocity, mass energy equivalence, energy-momentum relation (no deduction required). Blackbody radiation: Rayleigh Jeans' law (derivation without the calculation of number of states), Ultraviolet catastrophe, Wien's law, Planck's radiation law (Calculation of the average energy of the oscillator), Derivation of Wien's displacement law and Stephan's law from Planck's radiation law. Rayleigh Jean's law and Wien's law as limiting case of Planck's law. Compton Effect (calculation of Compton wavelength is required).

4.2 Wave-particle duality and de Broglie's hypothesis, Concept of matter waves, Davisson-Germer experiment, Concept of wave packets and Heisenberg's uncertainty principle.

Module 5: Crystallography:

5.1 Elementary ideas of crystal structure : lattice 5 , basis, unit cell, Fundamental types of lattices – Bravais lattice, Simple cubic, f.c.c. and b.c.c. lattices, (use of models in the class during teaching is desirable] Miller indices and miller planes, Co-ordination number and Atomic packing factor.

5.2 X-rays : Origin of Characteristic and Continuous X-ray, Bra g's law (No derivation), Determination of lattice constant.

Text Books

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

1. Basic Engineering Physics – Dr. Amal Chakraborty – All chapters
2. Basic Engineering Physics – Bhattacharya & Pal
3. Engineering Physics – Dr. Malik & Dr. Singh
4. Engineering Physics – Dr. R.K. Kar

Referenc Books

1. Optics – Dr. Ajoy Ghatak (Interference, Diffraction and Polarization)
2. Solid State Physics – S O Pillai (chapter on Crystallography Introduction)
3. Modern Engineering Physics (Quantum Mechanics, x-rays, Compton effect, relativistic mechanics)
4. Oscillations – Bhattacharya (SHM, Damped and forced Oscillations)

UNIVERSITY OF ENGINEERING &MANAGEMENT, JAIPUR

Course Description

Title of Course: Mathematics-I
Course Code: M101
L-T Scheme: 3-1 **Course Credits: 3**

Introduction:

The goal of this mathematics course is to provide high school students and college freshmen an introduction to basic mathematics and especially show how mathematics is applied to solve fundamental engineering problems. The Topics to be covered (tentatively) include:

Matrix
Successive differentiation
Mean -Value Theorems
Calculus of Functions of Several Variables
Infinite Series
Vector Algebra and Vector Calculus.

Course Objectives:

The objective of this course is to introduce the basic principles and techniques of Calculus and its engineering applications. It lays the required foundation and skills that can be repeatedly employed in subsequent courses at higher levels. Students will acquire the skills and techniques of:

1. Applying matrix and Vectors in engineering problems.
2. Change of variables using Jacobians.
3. Computing an average value of a function using mean value theorems and their applications to engineering problems.

Learning Outcomes:

Knowledge:

1. Student completing the first unit of this course would be expected to find the higher power of matrix.
2. At the end of second unit student will be able to differentiate function of more than one variable.
3. After the completion of the third unit, student will be able to trace, find the length of a given curve by studying its characteristics. Will be able to find the Area and Volume using multiple integrals.
4. At the end of Unit 4 student will be able to understand, analyze and apply the concept of differential operator of vectors, Divergence and curl of a vector and three important theorems Green, Stoke'sand Divergence on vector integration.
5. At the end of this course the student should be able to apply the above mentioned concepts to engineering problems.

Application:

1. Matrices can be used to solve physical related applications and one applied in the study of electrical circuits, quantum mechanics and optics, with the help of matrices, calculation of battery power outputs, resistor conversion of electrical energy into another useful energy can be done.
2. Vectors are the heart and soul of Cartesian geometry and mechanics, Fluid mechanics, thermodynamics, control/signals etc.
3. Partial differential equations are used in wave and heat equations.
4. Infinite series is used in harmonic analysis. Some differential equations cannot be solved using just one function, but can be approximated as an infinite series (of powers of x).
5. At the end of this course the student should be able to apply the above mentioned concepts to engineering problems.

UNIVERSITY OF ENGINEERING &MANAGEMENT, JAIPUR

Course Description

Course Contents:

Unit 1: Matrix: Determinant of a square matrix, Minors and Cofactors, Laplace's method of expansion of a determinant, Product of two determinants, Adjoint of a determinant, Jacobi's theorem on adjoint determinant. Singular and non-singular matrices, Adjoint of a matrix, Inverse of a non-singular matrix and its properties, orthogonal matrix and its properties, Trace of a matrix. Rank of a matrix and its determination using elementary row and column operations, Solution of simultaneous linear equations by matrix inversion method, Consistency and inconsistency of a system of homogeneous and inhomogeneous linear simultaneous equations, Eigen values and Eigen vectors of a square matrix (of order 2 or 3), Cayley-Hamilton theorem and its applications.

Unit 2: Successive differentiation: Higher order derivatives of a function of single variable, Leibnitz's theorem (statement only and its application, problems of the type of recurrence relations in derivatives of different orders and also to find (y^n) . Mean Value Theorems & Expansion of Functions: Rolle's theorem and its application, Mean Value theorems – Lagrange & Cauchy and their application, Taylor's theorem with Lagrange's and Cauchy's form of remainders and its application, Expansions of functions by Taylor's and Maclaurin's theorem, Maclaurin's infinite series expansion of the functions: sin x, cos x, e(x), log(1+ x), $(a + x)^n$,n being an integer or a fraction (assuming that the remainder R n $\rightarrow$0 as n $\rightarrow\infty$ in each case). Reduction formula: Reduction formulae both for indefinite and definite integrals of types are positive integers.

Unit 3: Calculus of Functions of Several Variables: Introduction to functions of several variables with examples, Knowledge of limit and continuity, Partial derivatives and related problems, Homogeneous functions and Euler's theorem and related problems up to three variables, Chain rules, Differentiation of implicit functions, Total differentials and their related problems, Jacobians up to three variables and related problems, Maxima, minima and saddle points of functions and related problems.

Unit 4: Infinite Series: Preliminary ideas of sequence, Infinite series and their convergence/divergence, Infinite series of positive terms, Tests for convergence: Comparison test, Cauchy's Root test, D' Alembert's Ratio test and Raabe's test (statements and related problems on these tests), Alternating series, Leibnitz's Test (statement, definition) illustrated by simple example, Absolute convergence and Conditional convergence.

Unit 5: Vector Algebra and Vector Calculus: Scalar and vector fields – definition and terminologies, dot and cross products, scalar and vector triple products and related problems, Vector function of a scalar variable, Differentiation of a vector function, Scalar and vector point functions, Gradient of a scalar point function, divergence and curl of a vector point function, Directional derivative. Related problems on these topics.Green's theorem, Gauss Divergence Theorem and Stoke's theorem (Statements and applications).

Text Books

1. Engineering Mathematics-I (B.K Pal and K.Das) [All course].

Reference Books

1. Advanced Engineering Mathematics 8e by Erwin Kreyszig is published by Wiley India
2. Engineering Mathematics: B.S. Grewal (S. Chand & Co.)

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Basic Electrical & Electronics Engineering-I
Course Code: ES101
L-T Scheme: 3-1 **Course Credits: 4**

Basic Electrical Engineering-I

Introduction:
The course of basic electrical engineering is an essential and fundamental for the students of engineering.

Objectives:
The course is aimed at conceptualizing the fundamental principles and theorems of ac and dc network and signals.
Learning Outcomes:
The students are able to understand the basics of networks and circuits and methods to solve them.
Knowledge:

- Understanding of network and circuits
- Use of KCL and KVL as fundamental tool for network solutions
- AC fundamentals
- Resonance in RLC circuit
- Electromagnetism

Course Contents:
Unit 1: Basics of network and circuits, concepts of linear, non linear, lateral, bi lateral elements. Loop and Node analysis methods. Current and voltage divider rule. Superposition, Thevenin, Norton, Maximum Power Transfer theorem.

Unit 2: AC fundamentals- RMS , Peak , Average value of ac signal. Power in AC circuits.Concept of real and active power. Power factor.

Unit 3: Resonance in AC circuits- Series and parallel resonance.

Unit 4: Electromagnetism- Biot Savart law, Amepere Cicuital law, magnetic circuits, analogy between electric and magnetic circuits, Lenz' law.

1.**Text Book:**

1. Basic Electrical Engineering -Abhijit Chakrabarti, Sudipta Nath,Chandan Kumar Chanda

References:

1. Basic Electrical Engineering(vol2)-B.L.Thereja
2. Basic Electrical engineering, D.P Kothari & I.J Nagrath, TMH, Second Edition
3. Hughes Electrical & Electronics Technology, 8/e, Hughes, Pearson Education

Basic Electronics Engineering-I

Introduction:

This course is suitable for engineers in academia. The purpose of this course is to provide the student with precise theoretical and practical up to date knowledge of Basic Electronics and it's applications in day -

to- day life. This course enhances the instructional capabilities of a student. This course is devoted to fundamental theory and recent developments addressing the related theoretical and practical aspects on electronic devices-their characteristics and applications.

Objectives:
In this course Students will be able to identify semiconductor materials, draw band-diagrams, distinguish between intrinsic and extrinsic semiconductors, n- and p- type semiconductors, calculate drift and diffusion current components. Students must be able to explain the junction properties and the phenomenon of rectification draw the I-V characteristics and identify operating points; Calculate ripple factors, efficiency of power supplies. Students will be able to draw and explain the I-V characteristics of BJTs– both input and output; learn to bias transistors, both as amplifiers and switches; identify operating points.

Learning Outcomes:
Knowledge:
1. Analyze and appreciate the working of electronic circuits involving applications of diodes.
2. Comprehend working of amplifiers.
3. Analyze and appreciate the working of electronic circuits involving applications of transistors.
4. Develop simple projects based on the different devices studied in this course.

Application:
1. There are so many applications of semiconductor devices in modern electronics. They are being used in manufacturing computers, in space research, in medical sciences and so on.
2. Rectifying a voltage, such as turning AC into DC voltages
3. Voltage Reference.
4. There are various kinds of transistors; there applications are also in diverse fields. They can be used in manufacturing logic gates which are the basis of the design of digital circuits.

Course Contents:
Unit 1: Crystalline material: Mechanical properties, Energy band theory, Fermi levels; Conductors, Semiconductors and Insulators: electrical properties, band diagrams. Semiconductors: intrinsic and extrinsic, energy band diagram, electrical conduction phenomenon, P-type and N-type semiconductors, drift and diffusion carriers.

Unit 2: Formation of P-N junction, energy band diagram, built-in-potential forward and reverse biased P-N junction, formation of depletion zone-I characteristics , Zener breakdown, Avalanche breakdown and its reverse characteristics; Junction capacitance and Varactor diode. Simple diode circuits, load line, linear piecewise model; Rectifier circuits: half wave, full wave, PIV, DC voltage and current, ripple factor, efficiency, idea of regulation.

Unit 3: Formation of PNP / NPN junctions, energy band diagram; transistor mechanism and principle of transistors, CE, CB, CC configuration, transistor characteristics: cut-off active and saturation mode, transistor action, injection efficiency, base transport factor and current amplification factors for CB and CE modes. Biasing and Bias stability: calculation of stability factor;

Text Books
1Salivahanan: Electronics Devices & Circuits; Chapter: 1-8
2 JB Gupta: electronic devices and circuits.
3 Rakshit Chattopadhyay: Electronics Fundamentals and Applications; Chapter: 1-8

References
1. Boylestad&Nashelsky : Electronic Devices & Circuit Theory
2. Malvino: Electronic Principle

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Engineering Mechanics
Course Code: ME101
L-T Scheme: 3-0 **Course Credits: 3**

Introduction:

This course is an introduction to learning and applying the principles required to solve engineering mechanics problems. Concepts will be applied in this course from previous courses you have taken in basic math and physics. The course addresses the modeling and analysis of static equilibrium problems with an emphasis on real world engineering applications and problem solving.

Objectives:

- The purpose of this course is to impart the laws of mechanics
- To introduce the applications of equations of static equilibrium
- To introduce the concepts of centre of gravity and moment of inertia
- To introduce the methods of analysis of determinate trusses
- To impart knowledge of rectilinear, curvilinear motion, impact of objects, work and energy principles

Learning Outcomes:
Knowledge:

Upon successful completion of the course, you should be able to:

1. Use scalar and vector analytical techniques for analysing forces in statically determinate structures
2. Apply fundamental concepts of kinematics and kinetics of particles to the analysis of simple, practical problems
3. Apply basic knowledge of maths and physics to solve real-world problems

Application:

1. In this syllabus, students will learn the applications of the equations of static equilibrium to interacting bodies or parts of a structure. Students will learn about systems containing multi-force members, frames, and machines.
2. In the section students will learn about Truss structures, specifically method of joints, method of sections, and zero force members
3. In this syllabus students will learn about space trusses and will be introduced to shear force and bending moment diagrams.
4. In this syllabus, students will learn about cable support systems, specifically concentrated loads and suspension loads.
5. In this syllabus students will learn about coulomb friction and belt friction.

Course Contents:
Unit 1:

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Course Description

Importance of Mechanics in engineering; Introduction to Statics; Concept of Particle and Rigid Body; Types of forces: collinear, concurrent, parallel, concentrated, distributed; Vector and scalar quantities; Force is a vector; Transmissibility of a force (sliding vector). Introduction to Vector Algebra; Parallelogram law; Addition and subtraction of vectors; Lami's theorem; Free vector; Bound vector; Representation of forces in terms of i,j,k; Cross product and Dot product and their applications. Two dimensional force system; Resolution of forces; Moment; Varignon's theorem; Couple; Resolution of a coplanar force by its equivalent force-couple system; Resultant of forces.

Unit 2:

Concept and Equilibrium of forces in two dimensions; Free body concept and diagram; Equations of equilibrium. Concept of Friction; Laws of Coulomb friction; Angle of Repose; Coefficient of friction.

Unit 3:

Distributed Force: Centroid and Centre of Gravity; Centroids of a triangle, circular sector, quadrilateral, composite areas consisting of above figures. Moments of inertia: MI of plane figure with respect to an axis in its plane, MI of plane figure with respect to an axis perpendicular to the plane of the figure; Parallel axis theorem; Mass moment of inertia of symmetrical bodies, e.g. cylinder, sphere, cone.

Unit 4:

Introduction to Dynamics: Kinematics and Kinetics; Newton's laws of motion; Law of gravitation & acceleration due to gravity; Rectilinear motion of particles; determination of position, velocity and acceleration under uniform and non-uniformly accelerated rectilinear motion; construction of x-t, v-t and a-t graphs. Plane curvilinear motion of particles: Rectangular components (Projectile motion); Normal and tangential components (circular motion).

Unit 5:

Kinetics of particles: Newton's second law; Equation of motion; D.Alembert's principle and free body diagram; Principle of work and energy ; Principle of conservation of energy; Power and efficiency.

Text Books

1. Beer, F.P and Johnston, E.R, "Vector Mechanics for Engineers, Statics and Dynamics", McGraw hill International Book co.

References

1. Meriam, J.L. and Kraige, L.S., "Engineering Mechanics (Statics and Dynamics)", John Wiley & sons.
2. Meriam.,J.L. and Kraige, L.S., Irving H.shames, " Engineering Mechanics (Statics and Dynamics)", Prentice Hall of India Pvt. Ltd.
3. Rajasekaran, S and Sankarasubramanian, G., "Engineering Mechanics", Vikas Publishing House Pvt. Ltd, 1999

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Basic Computation & Principles of Computer Programming-I
Course Code: CS101
L-T Scheme: 3-0 **Course Credits: 3**

Introduction:

Computers are so widely used in our day-to-day lives that imagining a life without them has become almost impossible. Learning computer fundamentals is a stepping stone to having an insight into how these machines work. Once the student is aware of the basic terminology that is commonly used in computer science, he/she can then go on to develop useful computer programs that may help solve a user's problem. Since computers cannot understand human languages, special programming languages are designed for this purpose. C is one such programming language. Being the most popular programming language, it is used in several different software platforms such as system software and application software. A few other programming languages such as C++ and JAVA are also based on C. Hence, mastering the C is prerequisite to become a successful computer engineer.

Objectives:
1. Learn how to solve common types of computing problems.
2. Learn data types and control structures of C
3. Learn to map problems to programming features of C.
4. Learn to write good portable C programs

Learning Outcomes:
Upon successful completion of the course, a student will be able to:
1. Appreciate and understand the working of a digital computer
2. Analyze a given problem and develop an algorithm to solve the problem
3. Improve upon a solution to a problem
4. Use the 'C' language constructs in the right way
5. Design, develop and test programs written in 'C'

Course Contents:
Unit 1: Introduction to Computers – Generations, Classifications, Applications, Basic Organization. Input and output devices. Basic concept of Computer memory, Computer software and networks.

Unit 2: Number system – Decimal, Binary, Octal, Hexa-decimal. Conversion of numbers, Addition and subtraction of two numbers. Two's compliment, Multiplication and division of binary numbers. Working with fractions, signed number representation in binary form, Logic gates.

Unit 3: Introduction to C – compiling and executing C programs, using comments, keywords, identifiers, Data type, variables, constants, input/output statements in C, operators in C, type conversion and type casting.

Unit 4: Decision Control and looping statements – conditional branching statement, iterative statements, nested loops, break and continue statements, goto statement.

Unit 5: Arrays – Declaration, accessing elements of array, storing values, calculating the length of array, two dimensional arrays. Strings – reading and writing strings, suppressing input, string taxonomy, string operations – using and without using library function, array of strings.

Unit 6: Functions – Declaration, prototype, definition, function call, return statement, passing parameters to the function, scope of variable, storage classes, recursive functions.

Unit 7: Pointers – introduction, declaration, Pointer expression and arithmetic, null pointer, generic pointer, passing arguments to functions using pointer, pointers and arrays, passing an array to function, difference between array name and pointer, pointers and strings, array of pointers, function pointers, pointers to pointers, dynamic memory allocation, drawbacks of pointers.

Unit 8: Structure, nested structure, array of structure, union, array of union variable, unions inside structure. Files – Reading –writing etc. Preprocessor directives.

Text Books

1. Brian Kernighan and Dennis Ritchie, The C Programming Language, 2nd Edition, Prentice Hall PTR, 1988.
2. Reema Thareja, Computer fundamentals and Programming in C, Oxford university press, 2012.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Physics-I Lab
Course Code: PH191
L-T-P scheme: 0-0-3 **Course Credit: 2**

Objectives:

Engineering Physics students will:

- Excel in technical careers and thrive in graduate studies using scientific principles and application of physical sciences
- Work effectively in bringing multi-disciplinary ideas to diverse professional environments
- Improve their workplaces and communities, and the society through professional and personal activities
- be able to demonstrate competency and understanding of the basic concepts found in physics.
- be able to utilize the scientific method for formal investigation and to demonstrate competency with experimental methods that are used to discover and verify the concepts related to content knowledge.
- demonstrate skills necessary for conducting research related to content knowledge and laboratory skills.

Learning Outcomes:

- Upon completion, students will have:
- working knowledge of fundamental physics and basic electrical and/or mechanical engineering principles to include advanced knowledge in one or more engineering disciplines;
- the ability to identify, formulate, and solve engineering physics problems;
- the ability to apply the design process to engineering problems;
- the ability to formulate, conduct, analyze, and interpret experiments in engineering physics; and
- The ability to use modern engineering physics techniques and tools, including software and laboratory instrumentation.
- Communicate their ideas effectively, both orally and in writing; and function effectively in multidisciplinary teams.
- an understanding of their professional and ethical responsibility to society;
- knowledge of the relationship between technology and society;
- a capacity and desire for life-long learning to improve themselves as citizens and engineers; and
- a knowledge of technical contemporary issues.

Course Contents:
Exercises that must be done in this course are listed below:

Group - 1: Experiments from Higher Secondary knowledge of Physics
1. Determination of thermal conductivity of a good conductor by Searle's method.
2. Determination of thermal conductivity of a bad conductor by Lees and Chorlton's method.
3. Determination of dispersive power of the material of given prism.
4. Use of Carry Foster's bridge to determine unknown resistance.

Group -2: Experiments on General Properties of matter

5. Determination of Young's modulus by Flexure method and calculation of bending moment and shear force at a point on the beam.
6. Determination of modulus of rigidity by static/dynamic method.
7. Determination of co-efficient of viscosity by Poiseulle's capillary flow method.

Group -3: Optics
8. Determination of wavelength of light by Newton's ring method.
9. Determination of wavelength of light by Fresnel's bi-prism method.
10. Determination of wavelength of light by Laser diffraction method.

Text Book:

1. Basic Engineering Physics – Pal & Bhattacharya
2. B. Sc. Practical Physics

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Course Description

Title of Course: Basic Electrical & Electronics Engineering-I Lab
Course Code: ES191
L-T-P scheme: 0-0-3 **Course Credit: 2**

Basic Electronic Engineering-I Lab
Objectives:
1. Impart understanding of working principles and applications of semiconductor devices in the design of electronic circuits.
2. Introduce basic applications like rectifiers, amplifiers and other signal conditioning circuits with emphasis on practical design considerations.
3. Provide basic understanding of digital circuits and principles of logic design.
4. To enhance the understanding of the topics in the curriculum, specific activities have been designed as conceptual and handsonaid.

Learning Outcomes: On successful completion of this course, the students will be able to:
1. Analyze and appreciate the working of electronic circuits involving applications of diodes and transistors.
2. Comprehend working of amplifiers.
3. Design simple analog circuits
5. Develop simple projects based on the different devices studied in this course.

Course Contents:
Exercises that must be done in this course are listed below:

1.To determine the stated value of the color code theresistor
2. To determine the forward characteristics of a p-n junction diode and determine the static and dynamic resistance.
3. Study of Zener diode as a voltage regulator
4. Study of ripple characteristic of full wave rectifier
5. Study of characteristics curves of B.J.T

Text Book:
1.Melvin: Electronic Principle.
2. Schilling&Belove: Electronics Circuits.
3.Millman&Grabal: Microelectronics

Recommend component Requirements:
1. Resisters , Capacitors ,Transistors ,Inductors ,Bread board and jumper wires
2. Input Output Device Function Generator CRO Probes.
3. Power Supply Proper Requirement.

Basic Electrical-1 Lab

Objectives:
1. To learn how we can connect the different elements (like resistance) series and parallel in breadboard.
2. Learn the practical verification of the network theorem with the theoretical results
3. Know about the connection of wattmeter, and how the power can be calculated for a given load by using a particular wattmeter.

Learning Outcomes: By doing this practical students will gain the knowledge about the requirement of the breadboard in the circuit connection and the proper way of connection of the elements in the bread board. Upon the completion of this practical course, the student will be able to:

- Understand the series and parallel connection of the breadboard.

- Understand about the construction of a circuit by using the different electrical elements in a breadboard.
- Understand how the power can be measure of a given load by using a wattmeter.
- Verify the theoretical results with the practical one in different network theorem's.

Course Contents:

Exercises that must be done in this course are listed below:

Exercise No.1: Study of Ammeter, Voltmeter and Wattmeter
Exercise No. 2: Verification of Thevenin's Theorem in breadboard
Exercise No. 3: Verification of Norton's Theorem in breadboard
Exercise No. 4: Verification of Superposition Theorem in breadboard

Text Books:

1. Basic Electrical Engineering -Abhijit Chakrabarti, Sudipta Nath,Chandan Kumar Chanda

References:

1. Basic Electrical Engineering(vol2)-B.L.Thereja
2. Basic Electrical engineering, D.P Kothari & I.J Nagrath, TMH, Second Edition
3. Hughes Electrical & Electronics Technology, 8/e, Hughes, Pearson Education.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Engineering Drawing & Computer Graphics Lab **Course Code: ME191**
L-T-P scheme: 1-0-3 **Course Credit: 3**

Objectives:

1. This course teaches the basics of engineering drawing utilising free hand sketching, mechanical drawing, and computer aided drafting and solid modelling.
2. To learn and understand the fundamental principles of orthographic projection as well as the topics of dimensioning, sectional views, isometric and perspective pictorials views, descriptive geometry and assembly drawings..
3. Drawings help us in developing our thoughts and ideas in to a final product
4. Drawings are also necessary for engineering industries since they are required and are being used at various stages of development of an engineering product.
5. To provide an understanding of the Industrial design aspects of different materials.

Learning Outcomes: Knowledge on the fundamentals of engineering drawing; ability to develop and/or comprehend a simple engineering drawing in both first and Third angle orthographic projections international standards in engineering drawing practice and engineering graphics. A fundamental knowledge on computer aided graphics. Ability of freehand sketching, visualization of images and their dimensions. In this course student will learn how to communicate technical information by:

- **Visualization** – the ability to mentally understand visual information.
- **Graphics theory** – geometry and projection techniques used for preparation of drawings.
- **Use of standards** – set of rules for preparation of technical drawings.
- **Use of conventions** – commonly accepted practices in technical drawings.
- **Tools** – devices used to create technical drawings and models.
- **Applications** – the various uses for technical drawings.

Course Contents:

Experiments **that must be done in this course are listed below:**

Experiment No.1: Introduction to, lines, lettering, dimensioning. (Sketch book)
Experiment No.2: SCALES; Plain scale, Diagonal scale, comparative scale, vernier scale. (Sheet no 1)
Experiment No 3: Geometrical construction and curves; Construction of polygons, Parabola, hyperbola, Ellipse. (Sheet No. 2)
Experiment No.4: Orthographic projection- 1st and 3rd angle projection. (Sheet No. 3)
Experiment No.5: Projection of lines (sheet No. 4)
Experiment No.6: Projection of surfaces (sheet No. 5)
Experiment No.7: Projection of solids; Cube, Pyramid, Prism, Cylinder, Cone. (Sheet No. 6)
Experiment No.8: Drawing isometric view. (Sheet No. 7)
Experiment No.9: Full and half sectional views of solids & Development of surfaces; Prism, Cylinder, Cone.(Sheet No. 8)

Text Book: K.L**.** Narayana and P.Kannaiah, Text Book of engineering Drawing "Engineering Graphics", Scitech Publication

N.D. Bhatt,"Elementary Engineering Drawing", Charotar Book Stall, Anand, 1998

V. Lakshminarayanan And R.S. VaishWanar, "Engineering Graphics", Jain brothers, New Delhi, 1998
A.M Chandra, and Satish Chandra, "Engineering Graphics", Narosa, 1998

Recommended Equipments/Systems/Software Requirements:

1. Drawing instruments, pencils, mini drafter
2. Auto cad software, computer system.

UNIVERSITY OF ENGINEERING & MANAGEMENT, JAIPUR

Course Description

Title of Course: Basic Computation & Principles of Computer Programming-I Lab
Course Code: CS191
L-T-P scheme: 0-0-3 **Course Credit: 2**

Introduction:
This course is designed to familiarize students with the basic components of a computer, so as to be able to operate it and be able to interact with it, and carry out simple tasks. In addition, it will initiate the students into the discipline of Programming. It aims to start off the development of problem solving ability using computer programming. This course teaches not only the mechanics of programming, but also how to create programs that are easy to read, maintain, and debug. Students are introduced to the design principles for writing good programs regardless of the hardware and the software platforms.

Objective:
Students will develop their ability to design, develop, test and document structured programs in C language.

Learning Outcomes: Students should be able to
1. Understand the basic terminology used in computer programming
2. Write, compile and debug programs in C language.
3. Use different data types in a computer program.
4. Design programs involving decision structures, loops and functions.
5. Explain the difference between call by value and call by reference
6. Understand the dynamics of memory by the use of pointers.
7. Enhance programming skills through problem solving and code development of small-size software applications.
8. Improve self-learning, teamwork and communication skills through project development practices.
9. Engage in continuing professional development under minimal guidance.

Course Contents:
Exercises that must be done in this course are listed below:
1 Introduction to C programming
2 Structured Program Developments in C
3 Flow chart and Algorithm
4 C Program Control
5 C Functions
6 C Arrays
7 C Pointers
8 C Characters and Strings
9 C Structures, Unions, Bit Manipulations and Enumerations

References
1. Yale N. Patt and Sanjay J. Patel, Introduction to Computing Systems, from bits & gates to C & beyond, 2nd Edition, 2004.
2. Deitel and Deitel, C How to Program, 7th Edition, 2013.
3. Venugopal Prasad, Mastering C, Tata McGraw Hill.
4. Complete Reference with C, Tata McGraw Hill.
5. Drmey, How to solve it by Computer, PHI.
6. Kerninghan and Ritchie, The C Programming Language.

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Course Description

Title of Course: Language Lab-I
Course Code: HU181
L-T-P scheme: 0-0-2 **Course Credit: 2**

Objectives:
1. This Course has been designed To impart advanced skills of Technical Communication in English through Language Lab. Practice Sessions to 1ST Semester UG students of Engineering & Technology.
2. To enable them to communicate confidently and competently in English Language in all spheres.

Learning Outcomes:
1. This course will help the students to learn English very easily. Even the Hindi medium students can translate easily.
2. The technical communication will help the students to improve their speaking skills and drafting skill for engineering students.

Course Contents:
Exercises that must be done in this course are listed below:
Exercise No.1: Phonetic symbols and transcription.
Exercise No. 2: Honing 'Listening Skill' and its sub skills through Language Lab Audio device;
Exercise No. 3: Honing 'Speaking Skill' and its sub skills;
Exercise No. 4: master Linguistic/Paralinguistic features (Pronunciation/Phonetics/Voice modulation/ Stress/ Intonation/ Pitch & Accent) of connected speech;
Exercise No. 5: Honing 'Conversation Skill' using Language Lab Audio –Visual input; Conversational Practice Sessions (Face to Face/ via Telephone, Mobile phone & Role Play Mode);
Exercise No. 6: Introducing 'Group Discussion' through audio –Visual input and acquainting them with key strategies for success;
Exercise No. 7: G D Practice Sessions for helping them internalize basic Principles (turn-taking, creative intervention, by using correct body language, courtesies& other soft skills) of GD;
Exercise No. 8: Honing 'Reading Skills' and its sub skills using Visual/ Graphics/Diagrams /Chart Display/Technical/Non Technical Passages; Learning Global/ Contextual/ Inferential Comprehension;
Exercise No. 9: Honing 'Writing Skill' and its sub skills by using Language Lab Audio –Visual input; Practice Sessions
Exercise No. 10: Group discussion

Text Book:

1. Phonetic Symbol Guide Book by Geoffrey K. Pullum.
2. Dr.D.Sudharani: Manual for English Language LaboratoryPearson Education (WB edition),2010
3. Board of Editors: Contemporary Communicative English for Technical CommunicationPearson Longman, 2010