Course Structure & Syllabus for
1st year
(2022 Admission batch)
B.Tech Programme
Common to All Branches

GITA AUTONOMOUS COLLEGE

Affiliated to BPUT Odisha

1st Year Course Structure

First Semester

Theory

Sl. No.	Category	Course Code	Course Title	L-T-P	Credit
1	BS	22BT--TBS101	Engineering Mathematics I	3-0-0	3
2	BS	22BT--TBS102 / 22BT--TBS103	Engineering Physics / Engineering Chemistry	3-0-0	3
3	ES	22BT--TES101 / 22BT--TES102	Basic Electrical Engg. / Basic Electronics Engg.	3-0-0	3
4	HS	22BT--THS101	Functional English	2-0-0	2
5	ES	22BT--TES103	Programming for Problem Solving using C	3-0-0	3
6	MC	22BT--PMC101	Induction Training		0
				Total Credit (Theory)	**14**

Practical

1	BS	22BT--PBS101 / 22BT--PBS102	Physics Lab / Chemistry Lab	0-0-2	1
2	ES	22BT--PES101 22BT--PES102	Basic Electrical Engg. Lab / Basic Electronics Engg. Lab	0-0-2	1
3	ES	22BT--PES103 22BT--PES104	Engineering Graphics & Design Lab / Workshop	0-0-2	1
4	HS	22BT--PHS101	Functional English Lab	0-0-2	1
5	ES	22BT--PES105	Programming for Problem Solving using C Lab	0-0-2	1
				Total Credit (Practical)	5
				Total Semester Credit	**19**

Second Semester

Theory

Sl. No.	Category	Course Code	Course Title	L-T-P	Credit
1	BS	22BT--TBS204	Engineering Mathematics II	3-0-0	3
2	BS	22BT--TBS202 / 22BT--TBS203	Engineering Physics / Engineering Chemistry	3-0-0	3
3	ES	22BT--TES201 / 22BT--TES202	Basic Electrical Engg. / Basic Electronics Engg.	3-0-0	3
4	ES	22BT—TES204	Engineering Mechanics	3-0-0	3
5	HS	22BT--THS202	Business Communication and life Skills	2-0-0	2
6	ES	22BT—TES205	Programming for Problem Solving using Python	3-0-0	3
7	MC	22BT--PMC202	NSS / NCC / Yogo		0
				Total Credit (Theory)	**17**

Practical

1	BS	22BT--PBS201 / 22BT--PBS202	Physics Lab / Chemistry Lab	0-0-2	1
2	ES	21BTE--PES201 / 21BT--PES202	Basic Electrical Engg. Lab / Basic Electronics Engg. Lab	0-0-2	1
3	ES	22BT—PES203 22BT—PES204	Engineering Graphics & Design Lab / Workshop	0-0-2	1
4	ES	22BT--PES206	Programming for Problem Solving using Python Lab	0-0-2	1
				Total Credit (Practical)	4
				Total Semester Credit	**21**

1st Semester	22BT--TBS101	ENGINEERING MATHEMATICS - I	L-T-P 3-0-0	Credit 3

Prerequisite

Function, Limit of a function, Continuity of function, Differentiation, Integration.

Course Objectives:

- To discuss the concepts associated with Asymptote, Curvature,Special functions, Partial differentiation, Maxima, Minima and their applications.
- To discuss the concepts and different methods for solution of First order differential equations and its application to Electrical circuits.
- To describe the concepts of Linear differential equation of second order and its methods of solution as well as application to Electrical circuits.
- To present the concepts of Power series method and its its use in solving differential equations.
- To present the concepts of Laplace Transformation and it's use in getting solution to differential equations.

Evaluation Scheme

Teacher's Assessment			Written Assessment		Total
Quiz	Surprise Test(s)	Assignment(s)	Mid-Term	End-Term	
05	05	05	25	60	100

Module - I (8 Hrs)

Asymptote, Curvature (Cartesian and Polar), Gamma and Beta function, Partial differentiation, Maxima and Minima for function of two variables.

Module - II (8 Hrs)

Differential Equations: First order differential equations, Separable equation, Exact differential equation, Linear differential equation, Bernoulli's equation and application to Electrical circuits.

Module - III (9 Hrs)

Linear differential equation of second order, Homogeneous equation with constant co-efficient, Euler-Cauchy equations, Solution by undetermined co-efficient, Solutions by variation of parameters, Modeling of electric circuits.

Module - IV (10 Hrs)

Series solution of differential equations, Power series method, Legendre's equation and Legendre's polynomials, Bessel's equation, Bessel's function and its properties.

Module - V (10 Hrs)

Laplace Transformation and it's use in getting solution to differential equations, Convolution, Integral equations.

Text Books :

1. Differential Calculus by Santi Narayan and Mittal, Publisher: S. Chand.
2. Advanced Engineering Mathematics by E. Kreyszig, Publisher: Willey, 8th Edition.

References:

1. Higher Engineering Mathematics by B. V. Ramana , Publisher: Mc-Graw Hills Education.
2. Higher Engineering Mathematics by B.S. Grewal,, Khanna Publishers, 36th Edition, 2010.
3. Ordinary and Partial Differential Equations by J. Sinha Ray and S. Padhy, Publisher: Kayani Publishers.
4. Advanced Engineering Mathematics by P. V. O'NEIL , Publisher: CENAGE.

Online Resources :

Laplace Transform-https://onlinecourses.nptel.ac.in/noc21_ma69/preview

Course Outcomes:

After reading this subject, students will be able to:

1. Identify, formulate and solve Engineering problems.
2. Apply the knowledge of Mathematics in Physical sciences and Engineering.
3. Acquire knowledge about Advance Calculus.
4. Acquire knowledge about Series solution of Differential equations.
5. Acquire knowledge about Gamma and Beta function.
6. Acquire knowledge about Laplace transform and apply it to solve IVP.

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1st & 2nd Semester	22BT--TBS102 / 22BT--TBS202	ENGINEERING PHYSICS	L-T-P 3-0-0	Credit 3

PRE-REQUISITE:

Basic knowledge on intermediate Physics including mechanics, modern Physics, optics, wave motion, electricity and magnetism.

OBJECTIVE:

The objective of this course is to attract the students towards detail understanding of concepts, fundamentals and applications of Physics enriching engineering and its emerging branches. It makes students conceive new ideas to have theoretical and experimental knowledge to be applied in academics, designs and research.

Evaluation Scheme

Teacher's Assessment			Written Assessment		Total
Quiz	Surprise Test(s)	Assignment(s)	Mid-Term	End-Term	
05	05	05	25	60	100

DETAILED SYLLABUS:

Module I

OSCILLATIONS& WAVES: (08 HOURS)

Simple Harmonic Oscillation: velocity of motion, acceleration, time period, frequency, phase; damped harmonic oscillation: Differential equation of damped vibration, logarithmic decrement, Forced oscillation, resonance, velocity resonance and amplitude resonance, coupled oscillation, Normal coordinates and normal frequencies, In- phase and out-Phase Oscillation, Concept of wave and wave equation, Velocity of transverse vibration in a stretched string. Superposition principle.

Module II

WAVE OPTICS:(08 HOURS)

Concept of interference, two sources interference pattern, Bi-prism, Fringe width, Newton's ring & measurement of wavelength and refractive index. Diffraction: Huygen's principle, Fresnel's Diffraction and Fraunhoffer's diffraction, Half period zone, Zone plate, construction, principle, multiple foci, comparison ofzone plate with convex lens, Fraunhoffer's diffraction of Single slit, intensity distribution.

Module III

LASER and FIBRE OPTICS : (08 HOURS)

Atomic excitation and energy states, Interaction of external energy with atomic energy states, Absorption, spontaneous emission and stimulated emission, Population inversion, Pumping mechanism, optical pumping, Electrical Pumping, Components of laser system, active medium, population inversion, Ruby laser, Helium-Neon laser (basic concepts, energy level diagram and Engineering application only),Structure of optical fibre, Principle of propagation and numerical aperture, Acceptance angle, classification of optical fibre (Single mode and Multimode, SINand GRIN), FOCL (Fiber Optic Communication Link)

SOLID STATE PHYSICS: (04 HOURS)

Crystalline and Amorphous solid, unit cell, lattice parameter, Miller Indices, Bragg's law, Fermi level and Fermi distribution Functions, Band theory of Solids(Qualitative),Classification of materials: metals, semiconductor and insulator in terms of band theory.

Module IV

ELECTROMAGNETISM: (06 HOURS)

(Student will be familiarized with some basic used in vector calculus prior to Development of Maxwell's electromagnetic wave equations. No proof of theorems and laws included in this unit expected- statement and interpretation should suffice) Introduction; Scalar & vector fields, Gradient Of Scalar Field, divergence and curl of Vector Field, Gauss divergence theorem, Stokes theorem (Only Statements, noproof), Gauss's law of electrostatics in free space and in a medium (Onlystatements), Faraday's law of electromagnetic induction (Only statements), Displacement current, Ampere's circuital law, Maxwell's equation in Differential andIntegral form, Electromagnetic wave equation in E and B, Electromagnetic Energy,Poynting theorem and Poynting vector(no derivation)

Module V

QUANTUM PHYSICS: (08 HOURS)

Elementary concepts of quantum physics formulation to deal with physical systems. Need for Quantum physics- historical overviews (For concept), Einstein equation, de Brogliematter

waves, Compton Scattering, Pair production (no derivation), Uncertainty Principle, Application of Uncertainty Principle, Non-existence of electrons in the Nucleus, Ground state energy of a harmonic oscillator.Basic Features of Quantum Mechanics: Transition from deterministic to Probabilistic,Wave function, probability density, Normalization of wave function (Simple problem),operators, expectation values (Simple problem), Schrodingerequation-Time dependent and time independent equations.
Applications of quantum mechanics: Free Particle, Potential step, Particle in a box.

Text Books:

1. Engineering Physics by D.R. Joshi, Mc GrawHill
2. Principle of Physics Vol. I & Vol. II by Md. M. Khan & S. Panigrahi(Cambridge Univ.Press).
3. Lectures on Engineering Physics by L. Maharana, Prafulla ku. Panda, Sarat Ku. Dash, Babita Ojha(Pearson)
4. Engineering Physics by D.K. Bhattacharrya and Poom Tondon , Oxford UniversityPress

Reference Books:

1. Optics - A. K.Ghatak
2. Introduction to Electrodynamics - David J. Griffiths, PHI Publication
3. Concepts of Modern Physics – ArthurBeiser.
4. Physics-I for engineering degree students - B.B. Swain andP.K.Jena.

ONLINE RESOURSES

https://nptel.ac.in/courses/115/106/115106119/
https://nptel.ac.in/courses/122/106/122106034/
https://nptel.ac.in/courses/115/105/115105099/

COURSE OUTCOMES OF ENGINEERING PHYSICS :
Intended Learning Outcomes/ Course Outcomes (CO)

Upon completion of the subject, students will be able to

1. Learn vibrations and oscillatory systems. It helps in understanding multiple oscillatory systems and complex oscillations. It adds in developing ideas of wave propagation and superposition principle

2. Know the benefits the understanding of light and its wave nature in different experimental demonstration of interference. Diffraction in solids will help in dealing with XRD and structure of materials.

3. Make a clarity of making out crystal structures and crystallography to learn about different materials and characteristics of solids.

4. Different LASER'S like Ruby, He-Ne and S.C. Lasers will help to develop multiple ideas of its application. Principle of optical fibres will help to know new generation optical fibres in communication systems.

5. Gain some fundamental knowledge about electromagnetism. It will familiarize with some basic used in vector calculus prior to development of Maxwell's electromagnetic wave equations.

6. Deal with elementary concepts of quantum physics formulation with physical systems and to gain knowledge on applied quantum physics.

It will help in solving problems using Schrödinger wave equation and to acquire knowledge about application of Quantum mechanics.

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1st & 2nd Semester	22BT--PBS101 / 22BT--PBS201	ENGINEERING PHYSICS LAB	L-T-P 0-0-2	Credit 1

PRE-REQUISITE:

Basic knowledge of measurements, errors and uses of different measuring instruments like vernier calipers, screw gauge and spherometer is required. Students are supposed to be aware of the fundamental principles of lens, oscillation, waves, electronics and mechanics..

OBJECTIVES:

To make students engage in learning the experimental aspects of Physics with hands-on experience in precision measurements, experiments of optics, electronics and mechanics.

Evaluation Scheme

Experiment (work) Planning and execution	Results and interpretation	Report	Viva-voce to experiment	Total
20	30	30	20	100

DETAILS SYLLABUS OF ENGINEERING PHYSICS LABORATORY

A student is expected to perform ten experiments form the list given below.

1. Determination of Young's modulus by Searle's method.
2. Determination of Young's modulus by bending of beams.
3. Determination of Rigidity modulus by static method.
4. Determination of surface tension by capillary rise method.
5. Determination of acceleration due to gravity by Bar pendulum.
6. Verification of laws of vibration of string using sono meter.
7. Determination of wave length of light by Newton's ring apparatus.
8. Determination of wavelength of laser source by diffraction rating method.
9. Determination of grating element of a diffractiongrating.
10. Plotting of characteristic curve of a PN junctiondiode.
11. Plotting of characteristic curves ofBJT.
12. Study of HallEffect.
13. Study of RCcircuit.
14. Determination of unknown resistance using MeterBridge.
15. Energy gap determination by Four-Probemethod.

Text Books:

1. Engineering Practical Physics, by S.Panigrahi and B. Mallick, (CENGAGE learning)
2. Practical Physics, by Dr. Rajendra Singh, J. N. Jaiswal

Reference Books :

1. Practical Physics, by Savinder Singh
2. A Text-book of Practical Physics by Dr. William Watson

Course Outcomes:

Engineering Physics Laboratory:

Intended Learning Outcomes/ Course Outcomes (CO)

Upon completion of the subject, students will be able to.

1. Know the accuracy and precision in measurement.
2. know how to calculate Young's modulus, rigidity modulus of a wire and to understand the concept of vibration mechanism.
3. Determine the surface tension of liquid and to understand fluid properties.
4. To experiment with wave nature of light in diffraction through a grating.
5. To know the variation of I ~V of PN junction and BJT.
6. To determine the wavelength of light using Newton's ring.

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1st & 2nd Semester	22BT--TBS103 / 22BT--TBS203	ENGINEERING CHEMISTRY	L-T-P 3-0-0	Credit 3

Course Objectives

The main objective of the course is to impart knowledge on the fundamental concepts of chemistry involved in application of several important engineering materials that are used in the industry/day-to-day life.

The course aims to impart the basic understanding about the chemical behavior of fuels, alloy systems, corrosion, instrumental method of analysis and nanomaterials.

It also aims to develop selection of ideal engineering materials and its application in suitable engineering field.

Evaluation Scheme

Teacher's Assessment			Written Assessment		Total
Quiz	Surprise Test(s)	Assignment(s)	Mid-Term	End-Term	
05	05	05	25	60	100

Module-1

Energy Sciences:

Types of fuels, Calorific value, Determination of Calorific value by using Dulong's formula, Combustion and its calculations, Solid fuel: Coal analysis (Proximate and ultimate analysis), Elementary ideas on some gaseous fuels (Natural gas, Water gas, Producer gas, LPG) (Synthesis is excluded), Liquid fuels: IC - engine fuel, concept of knocking, antiknocking, octane number and cetane number, Fractional Distillation of petroleum, introductory idea about Cracking of heavy oils; 12 hrs.

Module-2

Instrumental Techniques:

Spectroscopy: Selection rule Lambert Beer's Law, Principles and applications of UV-Visible Molecular Absorption Spectroscopy; Chromophores, Auxochrome . Effect of conjugation on chromophores, , Basic Principles and application of rotational and vibrational Spectroscopy , selection rule of UV-visible, vibrational and rotational spectroscopy.

Module-3

Corrosion Science:

Definition and scope of corrosion, Dry and wet corrosion; Direct chemical corrosion, Electrochemical corrosion and its mechanisms; Types of electrochemical corrosion, (differential aeration, galvanic,& concentration cell Corrosion); Typical Electrochemical corrosion like Pitting, Waterline; Factors affecting corrosion, Protection against corrosion : Modifying the environment, Use of Inhibitors, Cathodic Protection: Sacrificial anode method, Impressed current Cathodic protection. Anodic & cathodic coating. 10 hrs

Module-4

Phase rule & Phase diagram

Statement of Gibb's phase rule and explanation of the terms involved, Advantages and imitations of phase rule, Phase diagram of one component system – water and sulpur system, Condensed phase rule, Phase diagram of two component system – Eutectic system: Bi-Cd, Pb-Tin system 7 rs

Module-5

Nanomaterials

Introduction, Top-down and Bottom-up approach, Classification on dimension(1D, 2D, 3D and 0D), Characteristic, properties & application: Carbon nanotube , Nanowire, Application of Nanomaterial : Catalysis, Medicine, Bio nanomaterials. 6Hrs

Text Books:

1. Text Book in Applied Chemistry by A. N. Acharya and B. Samantaray, Pearson India.
2. Engineering Chemistry, Jain and Jain, Dhanpat Rai Publication. Reference Books:
3. Textbook of nanoscience and Nanotechnology, McGraw Hill Education (India)Pvt. Ltd., 2012.
4. Fundamentals of Molecular Spectroscopy by Banwell, Tata McGraw Hill Education.
5. Quantum Chemistry by Ira N. Levine, Pearson 7th Edition.
6. Molecular Spectroscopy, Ira N. Levine, John Wiley and Sons

Reference Books:

1. R1. S. Chawla, Engineering Chemistry, Dhanpat Rai & Co.
2. R2. S. K. Bhasin and S. Rani, Engineering Chemistry, 3rd Edition, Dhanpat Rai & Co, 2012.
3. Introductory to Quantum Chemistry by A. K. Chandra. , 4th Edition, McgrawHill Education.
4. Inorganic Chemistry by Donald A. Tarr, Gary Miessler, Pearson India, Third Edition.
5. Engineering Chemistry (NPTEL web-book) by B. L. Tembe, Kamaluddin and M. S. Krishan.

Online Resources:

1. https://www.metrohm.com/en/industries/petro-lubricants/: Lubricant analysis according to international standards
2. http://www.eco-web.com/edi/01759.html: Efficient Wastewater Treatment: The field for analytical and monitoring

Course Outcomes

On successful completion of the course, the student will be able to:

CO1 : Classify various fuels based on combustion parameters and understand the working principle of various batteries.

CO2 : Apply the concept of molecular spectroscopy to analyze organic compounds using spectrophotometer .

CO3 : Utilize the knowledge of electrochemistry and corrosion science in preventing engineering equipments from corrosion.

CO4 : To understand the microstructure of a given alloy systems and eutectic systems under a given set of conditions.

CO5 : Discuss the benefits and applications of nano materials.

CO6 : Compare and contrast the chemical behavior and physical properties of common substances.

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1st & 2nd Semester	22BT--PBS102/ 22BT--PBS202	ENGINEERING CHEMISTRY LAB	L-T-P 0-0-2	Credit 1

Objectives :

In this laboratory the engineering students are provided with the basic practical knowledge on Analysis of Portable & waste water, sample ore analysis, characterisation of lubricating oils, introducing the students to some theoretical topics through instrumental method of analysis such as PH measurement, Viscocity and flash point measurement &weight measurement.

Pre-Requisites :

Student should have the knowledge of balancing equations, principle of titrations, titrant, titrand, preparation of standard solutions, concentration of a solution, indicators used in a titration, principle of reduction-oxidation reactions, handling of instruments like pH meter & accurate measurement of sample by using electronic balance

Teaching Scheme :

Regular laboratory experiments conducted under supervision of the teacher. Demonstration will be given for each experiment.

Evaluation Scheme

Experiment (work) Planning and execution	Results and interpretation	Report	Viva-voce to experiment	Total
20	30	30	20	100

Detailed Syllabus

At least 10 Experiments

1 Estimation of calcium in limestone powder
2 Determination of dissolved oxygen in supplied water.
3 Determination of Total hardness of water sample by EDTA method
4 Determination of alkalinity of water.
5 Determination of available chlorine of bleaching powder/residual chlorine in tap water
6 Determination of Flash-point/fire point of a lubricant by Pensky-Martein's apparatus.
7 Determination of kinematic viscosity and Viscosity Index of a lubricant by Redwood viscometer.

8 Standardization of KMnO4 using sodium oxalate.
9 Determination of Ferrous ion in a given sample of Mohr,s salt
10 Determination of the partition coefficient of a substance between two immiscible liquids.
11 Determination of Acid value of oil.
12 Determination of concentration of a colour substance by Spectrophotometer
13 Green synthesis of noble metal/oxide based nanoparticles
14 Determination of the partition coefficient of a substance between two immiscible liquids.
15 Proximate analysis of coal sample.
16 Determination of iodine value of oil/fat.

Text Books:

T1. Jain & Jain, Engineering Chemistry, 16th Edition, Dhanpat Rai Publishing Company, 2015.
T2. S. S. Dara, Engineering Chemistry, 12th Edition, S. Chand Publisher, 2014.
Reference Books:
R1. S. Chawla, Essentials of Experimental Engineering Chemistry, Dhanpat Rai & Co.
R2. S. K. Bhasin and S. Rani, Laboratory Manual on Engineering Chemistry, 3rd Edition, Dhanpat Rai & Co, 2012.

Online Resources:

1. https://www.metrohm.com/en/industries/petro-lubricants/: Lubricant analysis according to international standards
2. http://www.eco-web.com/edi/01759.html: Efficient Wastewater Treatment: The field for analytical and monitoring

Course Outcomes

The student at the end of the course will

CO1 learn and apply basic techniques used in chemistry laboratory for small/large scale water analyses/purification
CO2 be able estimate the ions/metal ions present in domestic/industry waste water.
CO3 utilize the fundamental laboratory techniques for analyses such as titrations, separation / purification and spectroscopy.
CO4 able to analyze and gain experimental skill.
CO5 Test the quality of an oil/fat by measuring its iodine or acid value by means of amount of unsaturation for various industrial use.
CO6 Verify quality of a lubricant by means of its viscocity or flash point which gives their nature & flammability for various industrial applications

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1st & 2nd Semester	22BT--TES101 / 22BT--TES201	BASIC ELECTRICAL ENGINEERING	L-T-P 3-1-0	Credit 3

Pre-Requisites:

Basic knowledge of intermediate Physics, knowledge of basic Mathematics suchas Calculus, Ordinary Differential Equations, Matrices etc.

Course Objectives:

- To provide an understanding of basics of Electricity and Magnetism.
- The course will cover the basics of DC & AC networks, principle of operation of different electrical machines.

Evaluation Scheme

Teacher's Assessment			Written Assessment		Total
Quiz	Surprise Test(s)	Assignment(s)	Mid-Term	End-Term	
05	05	05	25	60	100

Module-1 (12 Hours)

Fundamentals of Electric Circuits:

Charge & current, Voltage & current sources, Electrical circuit elements (R, L and C) and their characteristics, Kirchoff's current and voltage laws;Star-Delta Conversion, Current Division and Voltage Division, Resistive Network Analysis: Node voltage & Mesh current analysis, Node voltage and mesh current analysis with controlled sources, Thevenin's Theorem, Norton's Theorem, Principle of superposition. Maximum power transfer theorem.

Module-2 (6 Hours)

AC Circuits:

Complex Algebra, Representation of sinusoidal waveforms, peak and rms values, phasor representation, real power, reactive power, apparent power, power factor. Analysis of single-phase ac circuits consisting of R, L, C, and RL, RC, RLC combinations (series and parallel).

Module-3 (4 Hours)

Three Phase AC:

Three phase balanced circuits, Comparison between single phase and three phase circuits, voltage and current relations in star and delta connections. Power measurement by wattmeter method, Brief introduction to generation, Transmission and Distribution of electrical power, Earthing & electrical safety

Module-4 (8 Hours)

Magnetic Circuits:

MMF, flux, reluctance, magnetic circuit and magnetic reluctance, Magnetic materials, BH characteristics and Hysteresis loss, Series and parallel magnetic circuits. Ideal and practical transformer, e.m.f. equation of transformer, Equivalent circuit, open circuit and short circuit test(no problem),Auto-transformer

Module-5

Electrical Machines (6 hours)

Construction and principle of operation of DC machines (Generator and Motor), emf equation. Types of DC Generators and Motors, Back emf, applications. synchronous generator (construction and principle of operation)

Brief idea about Induction Motors (construction and principle of operation), slip, Torque-slip characteristics.

Text Books:

1. G.Rizzoni, Principles and Applications of Electrical Engineering, 5th Edition, McGraw Hill, 2006
2. L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.

3. Hughes, "Electrical Technology", VII Edition, International Student -on, Addison WelseyLongman Inc., 1995

Reference:

1. B. L. Theraja and A. K. Theraja, Textbook of Electrical Technology (Vol-I), 23rd Edition, S. Chand &Co.Ltd., 2002.
2. J.B. Gupta, “Fundamentals of Electrical Engineering and Electronics” S.K. Kataria & Sons Publications, 2002
3. Electrical Engineering Fundamentals, Vincent Del Toro, 2nd Edition, PHI

Course Outcomes:

- To analyze Electrical circuits to compute and measure the parameters of Electrical Energy.
- To comprehend the working principles of Electrical DC Machines.
- To comprehend the working principles of electrical AC machines.

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1st & 2nd Semester	22BT--PES101 / 22BTE--PES201	BASIC ELECTRICAL ENGINEERING LAB	L-T-P 0-0-2	Credit 1

Evaluation Scheme

Experiment (work) Planning and execution	Results and interpretation	Report	Viva-voce to experiment	Total
20	30	30	20	100

Any Eight

1. Verification of theorems (Norton, Thevenin, Superposition).
2. Connection and measurement of power consumption of a fluorescent lamp.
3. Power and phase measurements in three phase system by two wattmeter method .
4. V-I characteristics of incandescent lamps and time-fusing current characteristics of a fuse.
5. Connection and testing of a single-phase energy meter.
6. Calculation of current, voltage and power in series R-L-C circuit excited by single-phase AC supply and calculation of power factor.
7. Calculation of no load losses of a single-phase transformer.
8. Measurement of Field and Armature Resistance of a DC Shunt Motor.
9. Study of House wiring.

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1st & 2nd Semester	22BT--TES102 / 22BT--TES202	BASIC ELECTRONICS ENGINEERING	L-T-P 3-0-0	Credit 3

Objectives :

- knowledge of the basic principles of electronic components and circuits operation,
- calculation and measurement of various parameters for electronic circuits,
- Knowledge of basic Digital electronics and communication in electronic field,
- This course will also help students to understand basic concepts of communication systems, VLSI design, Internet of Things etc.

Pre-Requisites :

Knowledge on structure of solid, Energy band gap, Basic of Semiconductors, Intrinsic and Extrinsic semiconductors in Physics of Higher Secondary Science level.

Teaching Scheme :

Regular classroom lectures with use of ICT as and when required, sessions are planned to be interactive with focus on problem solving activities.

Evaluation Scheme

Teacher's Assessment			Written Assessment		Total
Quiz	Surprise Test(s)	Assignment(s)	Mid-Term	End-Term	
05	05	05	25	60	100

Module-1 (10 Hours)

Junction Diode, Principle of Diodes, V-I characteristics of junction diode, AC and DC Resistance of Diode, Diode Current Equation, Equivalent circuit of Diode, Breakdown Mechanism, Zener diode and applications, Rectifier circuit, Clipper and Clamper Circuit.

Module-2 (10 Hours)

Bipolar Junction Transistor: Transistor Operation, Current Equation in transistors, CB, CE, CC Configurations and their Characteristics, Load line Analysis, DC Biasing.

Module-3 (6 Hours)

Feedback Amplifiers: Principle, Types, Advantages and Disadvantages of Feedback, Different Negative Feedback Topologies. Oscillators – Barkhaunsen's criteria for oscillation. Field Effect Transistor (FET): Construction, Characteristics of Junction FET (JFET), Depletion and Enhancement type Metal Oxide Semiconductor FET (MOSFET), Fixed and Voltage divider Biasing Configurations, Introduction to Complementary MOS (CMOS) circuits

Module-4 (10 Hours)

Digital Electronic Principles: Number System, Number System Conversion, BCD arithmetic, Hexa decimal arithmetic, Binary arithmetic, Representation of Negative numbers, Complement arithmetic,Logic Gates, Realization of different gates using NAND and NOR gates. Boolean algebra – Laws and Rules, De Morgan's theorem, Standard forms of Boolean expressions, Realization of Boolean expressions using AOI logic and NAND /NOR logic.

Module-5 (4 Hours)

Communication Systems: Signals, Frequency spectrum of signals, Analog and digital signals, Elements of Communication Systems, Modulation: Amplitude Modulation, AM Detection (Demodulation), Frequency and Phase Modulation. Modulation: A comparison. Introduction to Microprocessor, Microcontroller, Embedded System, Internet of Things (IOT).

Total = 40 Hours

Text Books

1. R. L. Boylestad and L. Nashelsky, Electronic Devices and Circuit Theory, 11th Edition, Pearson Education.
2. S. Sedra and K. C. Smith, Microelectronic Circuits, 7th Edition, Oxford University Press.
3. Microprocessors and Interfacing, Programming & Hardware - Douglas V. Hall, McGraw Hill Education Pvt Ltd., 3rd edition.

Reference Books

1. Agarwal and J. Lang, Foundations of Analog and Digital Electronic Circuits, 1st Edition, Morgan Kaufmann, 2005.

CO1	Familiarize with different semiconductor device with their applications
CO2	Familiarize with different types of transistors with their configurations
CO3	Idea about the different feedback circuits
CO4	Familiarize with JFET, MOSFET, MOS with their applications
CO5	Knowledge about number systems, basic gates and logical expression.
CO6	To be aware with basic communication system including modulations

2. V. K. Mehta and Rohit Mehta, Principles of Electronics, 3rd Edition, S. Chand Publishing, 1980.

Online Resources

1. http://www.electrical4u.com/circuit-analysis.htm
2. http://www.allaboutcircuits.com
3. https://www.electronics-tutorials.ws/
4. https://www.edx.org/course/circuits-electronics-1-basic-circuit-mitx-6-002-1x-0

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

Program outcomes relevant to the course:

PO1 **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems in electronics and communication engineering.

PO2 **Problem analysis**: Identify, formulate, review research literature, and analyze complex electronics and communication engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 **Design/development of solutions**: Design solutions for complex electronics and communication engineering problems and design system components or processes that meet the specified

needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 **Conduct investigations of complex problems**: Use research-based knowledge and research methods related to electronics and communication including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

Program Specific Outcomes (PSO) relevant to the course:

PSO1 Should be able to understand the concepts of Electronics & Communication engineering and their applications in the field of semiconductor technology, consumer electronics, communication/ networking and other relevant areas.

PSO3 Should have the capability to analyze, comprehend, design & develop electronic instruments, Display devices for a variety of engineering applications and thus demonstrating professional ethics & concern for societal well-being.

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1st & 2nd Semester	22BT--PES102 / 22BT--PES202	BASIC ELECTRONICS ENGINEERING LAB	L-T-P 0-0-2	Credit 1

Objectives

Know broadly the concepts and functionalities of the electronic devices, tools and instruments. Understand general specifications and deploy ability of the electronic devices, and assemblies. Develop confidence in handling and usage of electronic devices, tools and instruments in engineering applications.

Pre-Requisites

Knowledge on intrinsic and extrinsic semiconductors, Physics and Chemistry of Higher Secondary Science level.

Teaching Scheme

Regular laboratory experiments to be conducted under the supervision of teachers and demonstrators with the help of ICT, as and when required along with pre-lab session and demonstration for each experiment.

Evaluation Scheme

Experiment (work) Planning and execution	Results and interpretation	Report	Viva-voce to experiment	Total
20	30	30	20	100

Assignment/Experiment

1 Familiarization of electronic components and devices (Testing of semiconductor diodes and transistors using digital multi-meter).

2 Study and use of Oscilloscope, signal generator to view waveforms and measure amplitude and frequency of a given waveform.

3 V-I characteristics of semiconductor diode and determining its DC and AC resistances.

4 Study of half-wave and full-wave rectifier circuits without and with capacitor filter; recording of the waveforms and measurement of average and rms values of the rectified output.

5 Implementation of clipper circuits, both positive clipper and negative clipper. Observe its output waveforms and compare them with theoretical analyzed results.

6 Study of static characteristics of BJT in CE configuration.

7 DC biasing() of the transistor in CE configuration and determination of its operating point.

8 Studies on logic gates truth table verification of various gates, implementation of EXNOR and

9 Design of Half Adder and FULL Adder using gates.

10 Studies on Op-Amp applications (Inverting, non-inverting, integrating differentiating configurations) recording of the input-output waveforms.

Text Books:

T1. R. L. Boylestad and L. Nashelsky, Electronic Devices and Circuit Theory, 11th Edition, Pearson Education.

T2.A. S. Sedra and K. C. Smith, Microelectronic Circuits, 7th Edition, Oxford University Press.

Reference Books:

R1.V. K. Mehta and R. Mehta, Principles of Electronics, 3rd Edition, S. Chand Publishing, 1980.

Online Resources:

1.http://vlab.co.in/ba labs all.php?id=1

2.http://iitg.vlab.co.in/?sub=59&brch=165

Course Outcomes:

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

CO1 Familiarize with various electronic components, measuring instruments

CO2 Acquire knowledge of characteristics of diodes and design, testing

CO3 Acquire knowledge of characteristics of transistors and design, testing & implementation of transistors in various applications

CO4 Develop understanding of digital logic gates and design & test digital circuits for various applications using logic gates.

CO5 Gain understanding of operational amplifiers (Op-Amp) and design & testing of electronic circuits for various applications using Op-Amp.

CO6 implementation of Diode in various applications RECTIFIER & CLIPPER

Program outcomes relevant to the course:

PO1 **Engineering knowledge**: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems in electronics and communication engineering.

PO2 **Problem analysis**: Identify, formulate, review research literature, and analyze complex electronics and communication engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3 **Design/development of solutions**: Design solutions for complex electronics and communication engineering problems and design system components or processes that

meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4 Conduct investigations of complex problems: Use research-based knowledge and research methods related to electronics and communication including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5 Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern Electronics and communication engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO6 The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO12 Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO) relevant to the course:

PSO1 Should be able to understand the concepts of Electronics & Communication engineering and their applications in the field of semiconductor technology, consumer electronics, communication/ networking and other relevant areas.

PSO2 Should have an ability to apply technical knowledge and usage of modern hardware tools related to Electronics & Communication engineering for solving real world problems.

PSO3 Should have the capability to analyze, comprehend, design & develop electronic instruments, Display devices for a variety of engineering applications and thus demonstrating professional ethics & concern for societal well-being.

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1st & 2nd Semester	22BT--PES103 / 22BT—PES203	ENGINEERING GRAPHICS & DESIGN LAB	L-T-P 0-0-2	Credit 1

(Minimum 8 Sheets)

COURSE OBJECTIVES:

1. To create awareness and emphasize the need for Engineering Graphics in all the branches of engineering.
2. To follow basic drawing standards and conventions.
3. To develop skills in three- dimensional visualization of engineering component,
4. To solve specific geometrical problems in plane geometry involving lines, plane figures
5. To produce orthographic projection of engineering components working from pictorial drawings.

Evaluation Scheme

Quality of job	Understanding of the job and related theory	Quality of report and Viva – Voce	Total
50	30	20	100

Prerequisites:
Basic understanding of Geometry

1. Principles of Engineering Graphics and their significance, usage of various drawing instruments, lettering, dimensioning principles. (1 Sheet)
2. Orthographic Projections: Projection of points and straight lines. (2 Sheets)
3. Projections of Planes. (1 Sheet)
4. Projection of Solids. (1 Sheet)
5. Section of Solids. (1 Sheet)
6. Principles of Isometric projection. (1 Sheet)
7. Development of surface and intersection of surfaces. (2 Sheets)
8. Introduction to AUTOCAD tools. (1 Sheet)

TEXT BOOKS:
1. N. D. Bhat, M. Panchal, Engineering Drawing, Charotar Publishing House, 2008.
2. M. B. Shah, B. C. Rana, Engineering Drawing and Computer Graphics, Pearson Education, 2008.
3. R. K. Dhawan, A Text Book of Engineering Drawing, S. Chand Publications, 2007.

REFERENCE BOOKS:
1. E. French, C. J. Vierck, R. J. Foster, Graphic Science and Design, 4th Edition, McGraw- Hill.
2. W. J. Luzadder, J. M. Duff, Fundamentals of Engineering Drawing, 11th Edition, PHI, 1995.
3. K. Venugopal, Engineering Drawing and Graphics, 3rd Edition, New Age International, 1998.

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1st & 2nd Semester	22BT--PES104 / 22BT—PES204	WORKSHOP PRACTICE *	L-T-P 0-0-2	Credit 1

Objective:
workshop Practice lab deals with different processes by which component of machines or equipments are made. Its purpose is to equip the trainee with knowledge, skill and attitude that enable them to perform basic workshop tasks.

FITTING PRACTICE
1. Use of hand tools in fitting, preparing a male female joint of M.S. or making a paper weight of Mild steel.

WELDING PRACTICE
2. Welding practice (Basic Theory to be explained prior to practice):
   A. Gas welding & Electric Arc welding practice.
   B. A joint such as a Lap joint, a T- joint or a Butt joint is to be prepared or to make furniture.

MACHINING PRACTICE
3. Machining (Basic Theory to be explained prior to practice):
   A. Stepped cylindrical Turning of a job and thread –cutting in lathe.
   B. Shaping
   C. Milling

Evaluation Scheme

Quality of job	Understanding of the job and related theory	Quality of report and Viva – Voce	Total
50	30	20	100

Outcomes:

Intellectual skills, Cognitive strategy, verbal information, motor skills and attitude

Course Outcomes

CO1 To be able to use various fitting tools and able to perform fitting operation.

CO2 To be able to understand principle of gas welding and able to perform gas welding operation.

CO3 To be able to understand principle of arc welding and able to perform arc welding operation.

CO4 To be able to understand different parts of a lathe and able to perform turning, facing, threading, tapering using lathe.

CO5 To be able to understand different parts of a shaping and milling machine and able to perform shaping and milling operation.

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1st Semester	22BT--THS101	FUNCTIONAL ENGLISH	L-T-P 2-0-0	Credit 2

Course Objectives

This subject aims to:

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.
- To help students in improving their accent, overall presentation skills to enhance their employability.

Evaluation Scheme

Teacher's Assessment			**Written Assessment**		**Total**
Quiz	Surprise Test(s)	Assignment(s)	Mid-Term	End-Term	
05	05	05	25	60	100

MODULE 1 Effective Reading Skills

Process of Reading, Global and Local Comprehension, Sub skills of Skimming, Scanning, Inferencing, Guessing word-meaning, Using appropriate speed for various kinds of reading. Correction of Reading faults of Eye-fixation, Regression, Finger-pointing, Sub-vocalising, Reading aloud, and indiscriminate use of the Dictionary.

The module will acclimatize students with short stories of R. K Narayan, which will enable them to understand the nuances of reading and comprehension.

Text Book:

Malgudi Days by R.K Narayan

1. An astrologer's day
2. The missing mail
3. The doctor's word
4. Gateman's gift Links:

- https://pdfroom.com/books/malgudi-days-narayan-r-k/or5WWqZn5qD
- https://www.press.umich.edu/9441812/building_academic_reading_skills_book_1_2nd_edition/?s=look_inside
- https://www.jmu.edu/valleyscholars/files/studyreadingskills.pdf
- https://files.eric.ed.gov/fulltext/ED583494.pdf

MODULE 2

Nitty Gritty of Writing in English

Writing Process, Paragraph writing, Summarizing, Blogging, Paraphrasing, Précis-writing, Essay writing and Reading Comprehension.

The module will familiarize students with the nitty gritty of writing in English by drawing from the referred text books.

Text Books:

1. The Submerged Vallley and Other Stories by Manoj Das
2. Real Writing with Readings by Susan Anker

Link:

https://ebin.pub/the-submerged-valley-and-other-stories.html

MODULE 3

The Quintessence of Effective Pronunciation

Introduction to Phonetics: IPA, Received Pronunciation, Phonetic and Non-Phonetic Writing Systems; IPA:

Vowels and Consonants, MTI, Problem sounds; Stress, Intonation, Rhythm, Strong and Weak forms. The module will familiarize students with the sounds of English language and help them to use it in day-today situations.

Text Book:

1. Better English Pronunciation by J D O'Connor
2. Phonetics A Coursebook by Rachel Anne Knight

Links:

- https://salahlibrary.files.wordpress.com/2017/03/a-practical-introduction-to-honetics.pdf
- https://bbooks.info/b/w/ef588b4a0491ac5e37669efa7c0d5476f92a872f/phonetics-for-dummies.pdf
- https://salahlibrary.files.wordpress.com/2018/10/d8b4d986d8a7d8aed8aa_d8a2d988d8a7.pdf

MODULE 4

Applied Grammar

Articles, Prepositions, Subject-Verb agreement, State and Event verbs, Modals and Auxiliaries, Finite and Non-finite Verbs; Tenses; Vocabulary
The student will get a better understanding of the nuances and application of grammar and vocabulary in day-to-day usage.

Text Books:

1. Oxford modern English Grammar
2. Destination B1 Grammar and Vocabulary with Answer Key (Malcolm Mann & Steve Taylore-Knowles)
3. English vocabulary in use (Michael MC Carthy)

Links:

https://pdfroom.com/books/oxford-modern-english-grammar/KRd6oO79gZp/download

Recommended Books:

1. Remedial English Grammar by F. T. Wood, Macmillan.
2. Essential English Grammar By Raymond Murphy, Cambridge University Press
3. The Visual Element in Language Teaching (Education Today Series) (ELT) by PIT CORDER
4. Introducing Applied Linguistics (Penguin modern linguistics texts) by S. Pit Corder
5. Advanced Grammar in Use with Answers, MARTIN HEWINGS
6. Phonetics for Dummies by William F. Katz

Intended Learning Outcomes/ Course Outcomes (CO)

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

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in various contexts and different cultural scenarios.
- Acquire proficiency in English including reading and listening comprehension, writing and speaking skills.
- Understand the nuances of spoken English and to be effective speakers.

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1st Semester	22BT--PHS101	FUNCTIONAL ENGLISH LAB	L-T-P 0-0-2	Credit 1

1 "Find The Word" Reading Aloud Activity (Pair Work); "Reading Aloud" Task (Pair Work / Small Group Work); "Team Reading Aloud" – Pronunciation Reading (Whole Group); Key Word Bingo – Vocabulary Based Reading Activity (Individual)
Pre-Reading Activities
https://theidealteacher.com/21-mustuse-reading-activities-for-your-language

2 True or False? – Post-Reading Activity (Alone); Summarise The Text – Post Reading Activity (Individual); Re-write The Text – Reading Activity (Alone); Walking Text – Reading Comprehension Activity (Individual)
Post-Reading Activities
https://theidealteacher.com/21-mustuse-reading-activities-for-your-language

3 Filminute: One-minute films in different languages on different topics, can watch without sound too! - IDEAS FOR USE: 1. Watch film clip and describe in detail what happened; 2. Watch film

clip and summarise; 3. Watch film clip and extend the story; 4. Listen to film clip without watching and imagine what the film is about and describe it.
Short video based – For Spontaneous Speaking & Writing in Language Learning
https://filminute.com/festival/

4 Picture interpretation: interpreting a given image and making a short presentation about the same.
Speaking Activity
https://ssol.tki.org.nz/Social-studies-110/Teaching-and-learning/Effectiveteaching-in-social-tudies/Teachingstrategies/writing_and_presenting_info rmation/Picture-interpretation

5 News Paper Article Analysis - (General Topics): Provide A Newspaper Article And Ask Students To Comprehend And Analyse And Then make a Presentation on it.
Listening, Speaking, Reading & Writing Based activity
https://cdn.ymaws.com/okpress.com/resource/resmgr/onf/nie/newspaper_ac tivities.pdf

6 Movie Talk Google Docs Database: Hundreds of short video clips and adverts with links and short descriptions of the clip content on a Google Doc. Most are French, Spanish, silent or with music only.
Short video based – For Spontaneous Speaking & Writing in Language Learning
https://docs.google.com/spreadsheets/d/1MjFKTuUu_fVwO30eJd9zGQliUIwNCO6VmT6kCZfI8V8

7 Digital Collage designing and presentation- students will design a collage in group based on a particular theme and will present it.
Speaking Activity
https://www.technokids.com/blog/app s/digital-collage-in-the-classroom/

8 Ppt-ask students to watch a web series of their choice. Give them few areas like Screenplay, Characterisation, Plot construction and ask them to make a power point presentation on it.
Listening, Speaking, Reading & Writing Based activity

9 Listening test: provide an audio clip and questions on it. Ask students to answer after listening to the audio. (Cambridge Assessment English content)
Listening, Reading & Writing Based activity
https://www.teachingenglish.org.uk/professional-development/podcast

10 Crea ve wri ng: students will be given a cue to write a short story.
Writing Activity
https://www-tc.pbs.org/now/classroom/acrobat/less on05.pdf

11 Grammar and Vocabulary Test
Writing Activity
https://toaz.info/doc-viewer

Evaluation Scheme

Experiment (work) Planning and execution	Results and interpretation	Report	Viva-voce to experiment	Total
20	30	30	20	100

COURSE OUTCOMES

1. Understanding the sounds of English and using them in the right context.
2. Write paragraphs, stories etc. using short and crisp sentences.
3. Listen, speak, read & write the sounds of English using correct stress, tone and rhythm.
4. Language Skills- Grammar Exercises, Jumbled Sentences & correcting errors.

5. Writing- Paragraph & Precis Writing.
6. Role-Play- enacting ideas, themes(short duration & one-on-one activity)
7. Critical Appreciation - Article Analysis
8. Introducing Self & Others- Learning the nuances of Introduction, Asking questions and Overcoming stage fright.
9. Presentations- Power point Presentations on general topics, Book Review.

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1st Semester	22BT--TES103	PROGRAMMING FOR PROBLEM SOLVING USING C	L-T-P 3-0-2	Credit 3

Course objectives: The course aims to provide exposure to problem-solving through programming. It aims to train the student to the basic concepts of the C-programming language. This course involves a lab component which is designed to give the student hands-on experience with the concepts.

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures. To make the student understand simple sorting and searching method

Unit-1

Basic of Computer and Introduction to the C Language (7 hours)

Components of a computer system, Fundamentals of Computing, Computer Languages, Problems, Algorithms, flowcharts, Pseudo-code. Compiler and interpreter.

Output statements, Literals, Identifiers, Variables, Datatypes, Number Systems & Conversion, Format specifiers, Input statements, Escape sequences, Constant, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Comments

Unit-2

Control Statements and Array (10 hours)

Decision making: if, if-else, nested if, else if ladder, switch, break statement, goto. Loop: while, do-while, for, continue, infinite loop, nesting of loops. Array: 1-D array creation and memory representation, Manipulating array elements, Linear Search, Binary Search, Bubble sort. 2-D array creation and memory representation, Programs on 2-D array.

Unit -3

Pointer, Function and String (10 hours)

Pointer: Declaring and initializing Pointer, dereferencing pointer, Pointer and Array, Pointer Arithmetic, sizeof() operator, constant pointer, pointer to constant, void pointer, Null Pointer, Array of pointers and pointer to array.

Functions: Types of functions, Parts of function, User defined functions,

Call by value and call by reference, Passing array to function, pointer to function, function returning pointer.

Recursion, programs on recursion.
C Strings, String Input / Output functions, arrays of strings, string manipulation functions.

Unit-4

Dynamic memory allocation, Structure and Union (7 hours)

Dynamic memory allocation concept, heap area, malloc, calloc, free. Advantage of dynamic memory allocation wrt static allocation, Programs on dynamic memory allocation.
Structure and Union: Need of structure, Creating a structure, typedef, array of structures, pointer to structure, passing structure to function, returning structure from function, self-referential structure. Creating a union, difference between structure and union.
Enum creation, assigning value to enum variables.

Unit-5

Macro, Storage Class and File Handling (6 hours)

Macro: Macro expansion process, programs on Macro.
Storage class: auto, extern, static, register.
Command Line Argument.
File Handling: File opening modes, read and write text in file, file copy, reading and writing structure variables in a file, fseek, ftell.

Text Books:

1. E. Balaguruswamy, Programming in ANSI C, Tata McGraw-Hill
2. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.

Reference Books:

1. Programming in C. P. Dey and M Ghosh, Oxford University Press.
2. ReemaThareja, Introduction to C Programming, 2nd Edition, Oxford University Press.
3. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
4. Problem solving with C, M.T.Somasekhara, PHI
5. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.

Online Resources:

https://nptel.ac.in/courses/106/105/106105171/
https://nptel.ac.in/courses/106/104/106104128/

Course outcomes:

Students will be able to:

CO1: Design simple algorithms for arithmetic and logical problems
CO2: Implement the algorithms to programs (in C language).
CO3: Carryout experiments and correct syntax and logical errors.
CO4: Implement conditional branching, iteration and recursion.
CO5: Analyze a problem , decompose into functions and synthesize a complete program using divide and Conquer approach.
CO6: Apply arrays, pointers and structures to formulate algorithms and programs.
CO7: Apply programming to solve simple numerical method problems, differentiation of function and simple integration.

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1st Semester	22BT--PES105	PROGRAMMING FOR PROBLEM SOLVING USING C LAB	L-T-P 0-0-2	Credit 1

Course objectives:

- To write, test, and debug simple C programs.
- To implement C programs with conditionals and loops.
- Use functions for structuring C programs.
- To understand and implement pointer and user defined data types
- To understand file concept and dynamic memory application
- To develop logic to solve problems using the programming

Experiment

Editing, compiling, executing, and debugging of simple C programs
Programs using operators and formatted input/output statements.

3,4	Decision making using if, if-else, else-if ladder, nested if
5	Decision making using switch-case construct.
6,7	Loop control structure (while, do-while, for) with jump statements
8	Nested loops (printing various formats)
9,10	1-D arrays including operation like searching, sorting, merging etc.
11	Handling 2-D arrays such as matrix operations
12 , 13	Programs on strings using various string handling functions (library functions)
14, 15	Designing user-defined functions.
16	Programs on recursion.
17	Designing user defined functions for string manipulation.
18	Passing arrays (both 1D and 2D) to functions
19 , 20	Structure, array of structure, nested structure.
21	Dynamic memory management.
22	Self-referential structure (create and display operation of single linked list)
23 , 24	File handling - reading from and writing to files.
25	Command-line argument, pre-processor directives.

Course outcomes:

CO1: Read, understand and trace the execution of programs written in C language.
CO2: Develop programs using the basic elements like control statements, Arrays and String
CO3: Implement Programs with pointers, and learn to use the pre-processors, command line arguments etc.
CO4: Write the C code for a given algorithm
CO5: Write programs that perform operations using derived data types.
CO6: Write programs that perform various operations on files

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2nd Semester	22BT--TBS204	ENGINEERING MATHEMATICS - II	L-T-P 3-0-0	Credit 3

Prerequisite

Matrix algebra, Determinants, Vector algebra.

Course Objectives:

- To discuss the concepts associated with Matrix Algebra, Solution of system of linear equations, Vector Spaces.
- To discuss the concepts of eigenvalues and eigenvectors, Real matrices, Complex matrices and Diagonalisation of Matrices.
- To describe the concepts of Vector differential calculus and its application.
- To present the concepts of Vector integral calculus and its application.
- To present the concepts of Fourier series, Fourier Integral and Fourier transform.

Evaluation Scheme

Teacher's Assessment			Written Assessment		Total
Quiz	Surprise Test(s)	Assignment(s)	Mid-Term	End-Term	
05	05	05	25	60	100

Module - 1 (8 hrs.)

Matrix Algebra, Solution of system of linear equations (Gauss Elimination), Rank and Inverse of matrices (Gauss-Jordan), Vector Space and its Examples.

Module - 2 (8 hrs.)

Eigen values and eigen vectors, Symmetric and skew-symmetric matrices, Orthogonal matrices, Complex matrices, Hermitian and skew matrices, Unitary matrices and similarity of matrices, Diagonalisation of Matrices.

Module - 3 (9hrs.)

Vector differential calculus: vector and scalar functions and fields, Derivatives, Curves, tangents and arc Length, gradient, divergence, curl.

Module - 4 (10 hrs.)

Vector integral calculus: Line Integrals, Green Theorem, Surface integrals, Gauss theorem and Stokes Theorem.

Module - 5 (10 hrs.)

Fourier series, Fourier expansion of functions of any period, Even and odd functions, Half range Expansion, Fourier Integral and Fourier transform.

Text Books:

1. Advanced Engineering Mathematics by E. Kreyszig, 8th Edition, Willey.

References:

1. Higher Engineering Mathematics by B.V. Ramana, McGraw Hills Education.
2. Higher Engineering Mathematics by B.S. Grewal,, Khanna Publishers, 36th Edition, 2010.
3. Advance Engineering Mathematics by P.V.O'NEIL, CENGAGE.
4. A text book of Engineering Mathematics by N.P. Bali and Manish Goyal, , Laxmi Publications, Reprint, 2008.

Online Resources :
Linear algebra-https://onlinecourses.nptel.ac.in/noc21_ma50/preview

Course Outcomes:
After reading this subject, students will be able to:
1. Apply the knowledge of Mathematics in Physical sciences and Engineering.
2. Modeling of Physical Problems to Mathematical problems.
3. Acquire knowledge of Double and Triple Integral and their applications in engineering subjects.
4. Acquire knowledge about Fourier series and Fourier transform.
5. Apply Knowledge vector calculus in engineering and physical sciences.
6. Acquire knowledge of Matrix Algebra, Determinants and their applications in engineering subjects.

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2nd Semester	22BT--THS202	BUSINESS COMMUNICATION AND LIFE SKILLS	L-T-P 2-0-0	Credit 2

Course Objectives
This subject aims to:
- Understand the concepts of business communication in a diverse workplace. It aims at building their business acumen in order to work in an inter-cultural environment.
- Improve the listening, conversation and writing skills of students, which would help them co-exist in the business world.
- Groom the learners as potential and prospective candidates to take on the present-day challenges in the job sector with their acquired soft skills.

Evaluation Scheme

Teacher's Assessment			Written Assessment		Total
Quiz	Surprise Test(s)	Assignment(s)	Mid-Term	End-Term	
05	05	05	25	60	100

UNIT-1
Writing Business messages and Documents (10 hours)
1.1 Importance of written Business communication, Types of Business messages, Stages of writing business messages, Plagiarism
1.2 Business letters- Common components and Strategies of writing a letter, Types of Business Letters, Sales Letters
1.3 Writing effective Memos - Principles and fundamentals to be followed to draft Business Memos, Letters Versus Memos, Characteristics of Effective Memos, Form and Structure, Parts of a Memo, Writing Strategies, Model Memos
1.4 Business Reports - Nature and Significance, Types of Reports, Formats of Reports, Structure of a formal Business Report.
1.5 Business Proposals – Types, Structure of a Business Report. Model Business Proposals.

1.6 E-mail Writing - Advantages of E-mail, Characteristics of Successful E-mail Messages Formatting, E-mail Format, Standard E-mail Practices, E-mail Writing Strategies

UNIT-2

Communicating at Workplace (10 hours)

2.1 Effective Listening - Introduction, Active and Passive Listening, Process of Listening, Advantages of Listening, Types of Listening, Effective and Ineffective Listening Skills

2.2 Factors affecting Listening, Role of Listening in Leadership Styles, Six Styles of Leadership, Listening at Three Managerial Levels

2.3 Benefits of Listening for Leaders and Teams, Motivational Benefits of Listening in the Workplace, Poor Listening Habits, Strategies for Effective Listening

2.4 Business Conversations - Importance of Business Conversations and Essentials of a Business Conversation

2.5 Conversation Management - Use Verbal and Non-verbal Cues appropriately in Conversations - How to Identify Cues and Clues Signs and Signals; Stressful Conversations

2.6 Business Presentations - Planning, Preparing, Practicing, Performing, Reviewing, Emphatic Closing, Stage Fright

2.7 Business Meetings – Agenda, Minutes of a Meeting, Leading Effective Meetings

UNIT-3

Communication for Career Management (08 hours)

3.1 Cover letter, Resume and CV Writing - Types, Formats, Cover letter - Format of cover letters, solicited and un-solicited job applications.

3.2 Group Discussion - Benefits of a GD; Workplace GD Guidelines - Planning and Preparation, Organizer's Role, Procedure; Functional and Non-functional Roles in Group Discussions; Tips for Success in GDs

3.3 Interviews - Fundamental Principles of Interviewing; General Preparation for an Interview, Stage of an interview, Success in an interview, Types of interviews

3.4 Life Skills – Problem Solving, Time Management, Stress Management, Leadership, Emotional Intelligence

UNIT-4

Use of Technology in Communication (04 hours)

4.1 Technology in Business Communication - Advantages and Disadvantages of Technology, Changing Role of Technology in Communication

4.2 Classification of Various Technologies Available - Internet, Technology Tools, Collaborative Tools, Technology for Daily Use, Intranet and Communication; How much Technology does Your Company Need for Communicating? Latest Trends in Technology; Online Etiquettes

Intended Learning Outcomes/ Course Outcomes (CO)

- Upon completion of the subject, students will be able to:
- Understand and learn different formats of business correspondence at the workplace through which communication takes place.
- Understand the importance of writing an effective Resume and Cover letter in the professional world and its uses.
- Learn the concept and the use of oral presentation to improve professional presentation and the importance of Personal Interview.
- Learn the concept and procedure of Group Discussion.

- Build qualities like Teamwork and leadership. Learning effective time management skills and assertiveness.
- Learn the nuances of effective listening and conversation and use them in their professional life.

Text Books:

1. Technical Communication, Principle and Practice by Meenakshi Raman & Sangeeta Sharma, Oxford University Press
2. Effective Technical Communication by M. Ashraf Rizvi, Mcgraw-Hill Education

Recommended Books:

1. Basic Communication Skills by P.Kiranmai Dutt, Geetha Rajeevan, Cambridge University Press Books
2. Business Communication- concepts, cases &applications, Chaturvedi & Chaturvedi, Pearson
3. Communication Technology by Everette M.Rogers,Free Press.
4. 101 Great Resumes. 5thJaico Impression. (2008). New Delhi: Jaico Publishing House.
5. Krannich, Caryl Rae & Krannich, Ronald L.. (2003). Nail the Job interview!
6. 101 Dynamite Answers to Interview Questions. (5th ed.). United States of America: Impact Publications.
7. Murphy, A. Herta; Hildebrandt, W. Herbert; Thomas, P. Jane. (2008) Effective Business Communication (7th, ed.). New Delhi: Tata Mc Graw – Hill Publishing Company Company Ltd.

Links:

- https://pdfroom.com/books/technical-communication-principles-and-practice/kZdowxNWdM8
- https://www.thebalancecareers.com/job-interview-questions-and-answers-2061204
- http://www.ascdegreecollege.ac.in/wp-content/uploads/2020/12/Business-Communicationby-P.-D.-Chaturvedi-Mukesh-Chaturvedig.pdf

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2nd Semester	22BT—TES204	ENGINEERING MECHANICS **	L-T-P 3-0-0	Credit 3

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2nd Semester	22BT—TES205	PROGRAMMING FOR PROBLEM SOLVING USING PYTHON	L-T-P 3-0-0	Credit 3

Course objectives:

- To read and write simple Python programs.
- To develop Python programs with conditionals and loops.
- To define Python functions and call them.
- To use Python data structures –- lists, tuples, dictionaries.

- To do input/output with files in Python.
- To use OOP concept such as class, object, inheritance in Python.

Prerequisites: Basic knowledge of programming

Unit-1 **(7 hours)**

Data, Expressions, Statements: Python interpreter and interactive mode; values and types: int, float, boolean, string, and list; variables, expressions, statements, tuple assignment, precedence of operators, comments; modules and functions, function definition and use, flow of execution, parameters and arguments;

Unit-2 **(10 hours)**

Control Flow, Functions: Conditionals: Boolean values and operators, conditional (if), alternative (if-else), chained conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; Fruitful functions: return values, parameters, local and global scope, function composition, recursion; Strings: string slices, immutability, string functions and methods, string module; Lists as arrays.

Unit 3 **(8 hours)**

Lists, Tuples, Dictionaries: Lists: list operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and methods; advanced list processing - list comprehension;

Unit-4 **(7 hours)**

Files, Modules, Packages: Files and exception: text files, reading and writing files, format operator; command line arguments, errors and exceptions, handling exceptions, modules, packages

Unit-5 **(8 hours)**

OOP Concepts: Basic Concepts of Object-Oriented Programming, Class, Objects and object instantiation, Class constructor, Class methods, creating more than one object of a class, Inheritance in Python Class.

Text Books:

T1: Allen B. Downey, ``Think Python: How to Think Like a Computer Scientist'', 2nd edition, Updated for Python 3, Shroff/O'Reilly Publishers, 2016 (http://greenteapress.com/wp/think- python/)

T2: Guido van Rossum and Fred L. Drake Jr, "An Introduction to Python – Revised and updated for Python 3.2, Network Theory Ltd., 2011.

Reference Books:

R1: Charles Dierbach, "Introduction to Computer Science using Python: A Computational Problem-Solving Focus, Wiley India Edition, 2013.

R2: John V Guttag, "Introduction to Computation and Programming Using Python'', Revised and expanded Edition, MIT Press , 2013

R3: Kenneth A. Lambert, "Fundamentals of Python: First Programs", CENGAGE Learning, 2012.

R4: Paul Gries, Jennifer Campbell and Jason Montojo, “Practical Programming: An Introduction to Computer Science using Python 3”, Second edition, Pragmatic Programmers,LLC,2013.

Online Resources:
https://wiki.python.org/moin/BeginnersGuide
https://nptel.ac.in/courses/106/106/106106182/

Course outcomes:
CO1: To get familiar with python environment.
CO2: To implement control structures and user defined functions in python
CO3: To understand the use of tuples, lists or maps.
CO4: To implement file and exception handling in python programs
CO5: To implement basic OOP concepts in python

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2nd Semester	22BT--PES206	PROGRAMMING FOR PROBLEM SOLVING USING PYTHON LAB	L-T-P 0-0-2	Credit 1

Course objectives:
- To write, test, and debug simple Python programs.
- To implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, and dictionaries.
- Read and write data from/to files in Python.
- To use OOP concept such as class, object, inheritance in Python.

Assignment/Experiment
1 Editing, compiling, executing, and debugging of simple Python programs
2 Programs on decision control
3 Programs on iterative control
4 Programs on nested loops
5 Programs on user defines functions
6 Programs of String manipulations
7 Programs to use list, tuples & dictionary
8 Programs to read/write files and use command line arguments
9 Programs to create modules and packages
10 Programs to create classes and corresponding objects
11 Programs to implement inheritance

Course Outcomes:
CO1: Understand the basic concept of programming
CO2: Apply programming concept to solve problem
CO3: Develop logic for problem solving
CO4: Remember the python programming approach for problem solving
CO5: Design various model to handle and process data.