Vidya Pratishthan's

Kamalnayan Bajaj Institute of Institute of Engineering and Technology

Vidyanagari, Baramati, Dist. – Pune 413133

An Autonomous Institute Approved by AICTE and affiliated to SPPU, Pune

Department of General Science & Engineering

VPKBIET

Curriculum Structure and Syllabus
of
F Y B Tech Electronics and Telecommunication Engineering
(Course 2023)

With effective from Academic Year 2023-24

Syllabus: First Year (FY B. Tech.) Electronics and Telecommunication Engineering w.e.f. AY:2023-2024

SEMESTER-I

Course Code	Courses Name	Teaching Scheme			Examination Scheme and Marks							Credits			
		TH	PR	TUT	Activity	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
BS23101	Engineering Mathematics - I	3	-	1	10	30	60	20	-	-	120	3	-	1	4
BS23103	Engineering Chemistry	3	2	-	10	30	60	20	30	-	150	3	1	-	4
EL23101	Basic Electrical Engineering	3	2	-	10	30	60	20	30	-	150	3	1	-	4
ME23102	Engineering Graphics	1	2	-	10	-	40	30	-	-	80	1	1	-	2
ET23102	Electronics Measuring Instruments & Tools	2	-	-	10	20	40	-	-	-	70	2	-	-	2
ET23103	Workshop	1	2	-	10	-	-	20	30	-	60	-	2	-	2
HS23102	Indian Knowledge System	2	-	-	10	-	-	20	-	30	60	2	-	-	2
HS23103-A	Physical Education - Exercise and Field Activities-I	-	2	-	-	-	-	-	30	-	30	-	1	-	1
HS23104-A	Co-Curricular Courses-I	-	2	-	-	-	-	-	30	-	30	-	1	-	1
	Total	**15**	**12**	**1**	**70**	**110**	**260**	**130**	**150**	**30**	**750**	**14**	**07**	**01**	**22**

SEMESTER-II

Course Code	Courses Name	Teaching Scheme			Examination Scheme and Marks							Credits			
		TH	PR	TUT	Activity	ISE	ESE	TW	PR	OR	Total	TH	PR	TUT	Total
BS23102	Engineering Mathematics - II	3	-	1	10	30	60	20	-	-	120	3	-	1	4
BS23103	Engineering Physics	3	2	-	10	30	60	20	30	-	150	3	1	-	4
ET23101	Basic Electronics	3	2	-	10	30	60	20	30	-	150	3	1	-	4
CO23101	Programming & Problem Solving	3	2	-	10	30	60	20	30	-	150	3	1	-	4
IT23101	Computer Proficiency	1	2	-	10	-	-	20	30	-	60	-	2	-	2
HS23101	Communication and Professional Skills	2	-	-	10	-	-	20	-	30	60	2	-	-	2
HS23103-B	Physical Education - Exercise and Field Activities-II	-	2	-	-	-	-	-	30	-	30	-	1	-	1
HS23104-B	Co-Curricular Courses-II	-	2	-	-	-	-	-	30	-	30	-	1	-	1
	Total	**15**	**12**	**1**	**60**	**120**	**240**	**120**	**180**	**30**	**750**	**14**	**07**	**01**	**22**

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Vidya Pratishthan's Kamalnayan Bajaj Institute of Engineering and Technology, Baramati (Autonomous Institute)		
First Year Engineering (2023 Course)		
BS23101 - Engineering Mathematics-I (Linear Algebra, Differential Calculus and Statistics)		
Teaching Scheme: Theory: 3 Hours/Week Tutorial: 1 Hour/Week	**Credits 04**	**Examination Scheme: In-Semester Exam: 30 Marks End-Semester Exam: 60 Marks Course Activity: 10 Marks Term Work: 20 Marks**

Prerequisites:

Differentiation, Integration, Basics of Matrices and Determinants.

Course Objectives:

To make the students familiarize with concepts and techniques in Calculus, and Matrices. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance analytical thinking power, useful in their disciplines.

Course Outcomes (COs): The students will be able to

CO1: Apply the concept of rank to solve systems of linear equations, examine linear dependent and independent vectors and analyze systems of linear equations and transformation.

CO2: Understand the concept of Eigenvalues and Eigenvectors and apply it for solving Engineering problems.

CO3: Expand function in power series by using Taylor's and Maclaurin's series and evaluate indeterminate form using L' Hospital Rule.

CO4: Develop basic concepts of partial derivatives and apply to solve various problems on partial derivatives.

CO5: Apply partial differentiation to evaluate Jacobian, extreme values of the functions and estimate Error & Approximation.

CO6: Represent, visualize and analyze Statistics data and learn basic concepts of probability.

DSawawane
(Subject Coordinator)

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Course Contents

Unit 1: Linear Algebra-Matrices, System of Linear Equations **[07 Hours]**

Rank of a Matrix, Echelon form and Normal form, System of Linear Equations, Linear Dependence and Independence, Linear and Orthogonal Transformations.

Unit 2: Linear Algebra-EigenValues and EigenVectors, Diagonalization **[07 Hours]**

Eigenvalues and Eigenvectors, Cayley Hamilton theorem, Diagonalization of a matrix and Applications, Application to problems in Engineering.

Unit 3: Differential Calculus **[07 Hours]**

Expansion of Functions: Taylor's series, Maclaurin's series, Indeterminate Forms, L' Hospital rule, Evaluation of limits.

Unit 4; Partial Differentiation **[07 Hours]**

Introduction to functions of several variables, Partial Derivatives, Euler's Theorem on Homogeneous functions, Partial derivative of Composite Function, Total Derivative.

Unit 5: Applications of Partial Differentiation **[07 Hours]**

Jacobian and its applications, Errors and Approximations, Maxima and Minima of functions of two variables, Lagrange's method of undetermined multipliers.

Unit 6: Statistics and Probability **[07 Hours]**

Importance of Statistics in Engineering. Data Types, Measures of Central Tendency and their Applications. Probability Theory. Classical definition, Equiprobable Sample Space. Conditional Probability, Bayes Theorem, Applications.

Text Books:

1. Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill).
2. Applied Mathematics (Vol. I & Vol. II) by P.N.Wartikar and J.N.Wartikar

(Vidyarthi Griha Prakashan, Pune).

Reference Books:

1. Engineering Mathematics: A tutorial approach by Ravish R Singh and Mukul Bhatt (Tata McGraw Hill Education Private Limited).
2. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi).
3. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.).
4. Advanced Engineering Mathematics by Peter O'Neil (Thomas Learning).
5. Fundamentals of Mathematical Statistics by S. C. Gupta and V. K. Kapoor (Sultan Chand & Sons)

Guidelines for Tutorial and Term Work:

i) Tutorial for the subject shall be engaged in minimum three batches (batch size of 22 students maximum) per division.

ii) Term work shall consist of Six assignments and on each Unit-1 to Unit-6 and is based on performance and continuous internal assessment.

D Sonawane
(Sonawane D. S.)
(Subject Coordinator)

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BS23104: Engineering Chemistry		
Teaching Scheme:	**Credits:04**	**Examination Scheme:**
TH: 03 Hrs/Week		**Course Activity: 10 Marks**
		In-Semester Exam: 30 Marks
		End-Semester Exam: 60 Marks
PR: 02 Hrs/Week		**Practical Exam: 30 Marks**
		Term-Work: 20 Marks

Prerequisite Courses:

Knowledge of water and pollution, periodic table, Titrations- volumetric analysis, structure property relationship, types of crystals, classification and properties of polymers, knowledge of fuels, electromagnetic radiations, electrochemical series and corrosion

Companion Course, if any: Laboratory Practical

Course Objectives:

1. To understand technology involved in the analysis of water for improving its quality as a commodity by purification and the chemistry of pollution with preventive measures.
2. To acquire the knowledge and importance of electro-analytical techniques for qualitative and quantitative analysis of materials.
3. To understand chemistry of various engineering materials with composition-structure, properties and applications of speciality polymers and nano material.
4. To study conventional and green fuels with respect to their composition, properties and applications and to build consciousness about the advancement in batteries.
5. To study spectroscopic techniques for chemical analysis.
6. To understand corrosion mechanisms and study preventive methods for corrosion control.

Course Outcomes

On completion of the course, learner will be able to

CO-1: Apply different methodologies for the analysis of water and techniques involved in the softening of water as a commodity and apply the knowledge of environmental pollution to solve related problems.

CO-2: Select appropriate electro-analytical technique and apply the method for the material analysis.

CO-3: Illustrate the knowledge of advanced engineering materials for various engineering applications on the basis of structure and properties.

CO-4: Analyze fuels and suggest the use of alternative green fuels along with energy storage.

CO-5: Identify chemical compounds based on their molecular structures using UV-Visible and IR spectroscopy.

CO-6: Explain causes of corrosion and methods used for minimizing corrosion along with finishing of metals with technological importance.

Course Contents

Unit I: Water Treatment & Pollution **(7 Hrs)**

[A] **Water Treatment:** Impurities in water (Suspended, Biological & Dissolved chemical), Hardness of water- Types, Units (no conversions). Analysis of water: alkalinity, hardness (EDTA method) and chloride content (Mohr's method) determination methods and Numericals. Water Softening methods: Zeolite method with numericals, Demineralization method.

[B] **Pollution and its control:** Air pollution- Urban air quality standards as per WHO, its sources, acid rain, ozone depletion and controlling methods. Water pollution- water quality index as per WHO, its sources and controlling methods.

Unit II: Instrumental Methods of Chemical Analysis **(7 Hrs)**

Qualitative and quantitative analysis.

Electro-Analytical Methods: fundamentals of an electrochemical cell, EMF of cell, reference and indicator electrodes and Nernst Equation.

1. **Conductometry:** Introduction, Kohlrausch's law, conductivity cell, conductometric titrations of strong acid versus strong base, weak acid with strong base and titration curves.
2. **pH-metry:** Introduction, Action of buffers, standardization of pH meter, pH metric titration of strong acid versus strong base with titration curve.

Unit III: Chemistry of Engineering Materials **(8 Hrs)**

A] Polymers: Introduction, Classification of polymers, Polymer terminologies, properties of polymers- Crystallinity and Glass transition temperature. Speciality Polymers: Introduction, Structure, properties and applications of the following polymers-

1. Engineering Thermoplastics: Polycarbonate,
2. Biodegradable Polymers: Polyhydroxy Butyrate Valerate, PHBV
3. Conducting Polymer: Polyacetylene, PPV- OLED Applications
4. Polymer composites: Fiber reinforced plastic (FRP)- Carbon reinforced polymer composite.

B] Nanomaterials: Introduction, Importance and classification of nanomaterials based on dimensions (zero dimensional, one-dimensional, two-dimensional and three-dimensional), structure, properties and applications of graphene and carbon nanotubes, quantum dots (semiconductor nanoparticles).

Unit IV: Fuels & Batteries **(7 Hrs)**

Introduction (definition, classification of fuels and characteristics of an ideal fuel)

Calorific value (CV): Higher calorific value (HCV) and Lower calorific value (LCV), Determination of Calorific value: Principle, construction and working of Bomb calorimeter and numericals,

Solid fuel: Coal: Analysis of Coal-Proximate - numericals,

Liquid fuel: Refining of petroleum /crude oil and composition, boiling range and uses of various fractions,

Green Fuels: Hydrogen gas as a future fuel: synthesis by Steam reforming method, H_2-O_2 Fuel Cell. Preparation reactions, properties, advantages and disadvantages of Power alcohol and biodiesel.

Introduction to Renewable fuels: Solar cell and batteries (Li-ion Battery).

Unit V: Spectroscopic Techniques **(6 Hrs)**

Fundamentals of spectroscopy, Spectroscopy as an analytical tool, Accuracy, Precision, Reliability of Analytical data, confidence limits.

[A] Ultraviolet (UV)-Visible spectroscopy: Introduction, interaction of electromagnetic radiation with matter, Principle of UV-Visible spectroscopy, statement of Beer-Lambert's law, absorption of UV radiation by organic molecule leading to different electronic transitions.

Terms involved in UV-visible Spectroscopy- chromophore, auxochrome, bathochromic shift, hypsochromic shift, hyperchromic shift and hypochromic shift, Instrumentation and basic principle of single beam spectrophotometer, applications of UV-visible spectroscopy.

[B] Infrared (IR) spectroscopy: Principle of IR Spectroscopy, types of vibrations: Stretching (symmetric and asymmetric) and bending (scissoring, rocking, wagging and twisting), conditions of absorption of IR radiations, vibration of diatomic and polyatomic molecules. applications of IR spectroscopy.

Unit VI: Corrosion and Corrosion Control **(7 Hrs)**

Introduction, Types of corrosion – Dry and Wet corrosion, mechanism of dry corrosion, nature of oxide films and Pilling-Bedworth's rule, Electrochemical theory of wet corrosion – mechanism: hydrogen evolution and oxygen absorption, galvanic cell corrosion, differential aeration corrosion. Factors influencing rate of corrosion: nature of metal, nature of environment.

Methods of corrosion control and prevention: cathodic protection, metallic coatings and its types, surface preparation, methods to apply metallic coatings - hot dipping (galvanizing and tinning), cladding and electroplating.

Books & Other Resources:

Text Books:

1. Engineering Chemistry, Wiley India Pvt. Ltd.
2. Engineering Chemistry by O. G. Palanna, Tata McGraw Hill Education Pvt. Ltd.
3. Textbook of Engineering Chemistry by Dr. S. S. Dara, Dr. S. S. Umare, S. Chand & Company Ltd.

Reference Books:

1. Basic Concept of Analytical Chemistry, 2ed, S. M. Khopkar, New Age-International Publisher.
2. Recent trends in Fuel Cell Science and Technology-Suddhasatwa Basu, Anamaya Publishers, New Delhi.
3. Spectroscopy of organic compounds, 2 ed, P. S. Kalsi, New Age-International Ltd., Publisher
4. Polymer Science, V. R. Gowarikar, N. V. Viswanathan, Jayadev Sreedhar, Wiley Eastern Ltd.

5. F.W. Billmeyer, Text Book of Polymer Science, John Wiley & Sons, 4th Edition, 1999.
6. Principles of Physical Chemistry, B.R. Puri, L.R. Sharma & M.S. Pathania, S. Nagin Chand & Co., 41 Edition, 2004.
7. Instrumental Methods of Chemical analysis, Willard Dean, Merrittee, Tata McGraw Hill Limited.
8. Environmental Chemistry, A. K. De, New Age International Publications, eighth edition.

Guidelines for Laboratory - Term work Assessment:

1. The distribution of weightage of term work marks should be informed to students before start of the semester.
2. Term work assessment should be on continuous basis. At frequent intervals students are expected to inform about their progress/lagging.

Guidelines for Laboratory Conduction:

1. DO's and DONT'S, along with precautions, are need to be displayed at prominent location in the laboratory.
2. Students should be informed about DO'S and DON'T and precautions before performing.

LIST OF PRACTICALS (Any 10 to be performed by the student)

1. To determine hardness of water by EDTA method.
2. To determine alkalinity of water.
3. To determine strength of strong acid using pH meter.
4. To determine maximum wavelength of absorption of CuSO4/FeSO4/ KMnO4, verify Beer's law and find unknown concentration of given sample.
5. Titration of a mixture of weak acid and strong acid with strong base using conductometer.
6. To determine molecular weight/radius of macromolecule polystyrene/ polyvinyl alcohol by viscosity measurement.
7. Determination of fixed carbon content of coal.
8. Study of corrosion of metals in a medium of different pH.
9. Estimation of percentage of iron in the given rust solution using standard Potassium Dichromate solution (External indicator method).

10. To coat copper and zinc on iron plate using electroplating.
11. Saponification/acid value of an oil.
12. Preparation of biodiesel from edible oil.
13. Colloidal synthesis of 2-6 or 3-5 semiconductor quantum dots nano particles
14. Synthesis of Conducting Polyaniline from Aniline by Chemical Oxidative Polymerization and Conductivity measurements
15. Study of pH sensitive Keto-enol tautomerism in curcumin (Turmeric)

Dr. N. A. Tarle
(Subject Incharge)

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EL23101: Basic Electrical Engineering		
Teaching Scheme:	**Credits:04**	**Examination Scheme:**
TH: 03 Hrs/Week		**Course Activity: 10 Marks**
		In-Semester Exam: 30 Marks
		End-Semester Exam: 60 Marks
PR: 02 Hrs/Week		**Practical Exam: 30 Marks**
		Term-Work: 20 Marks

Prerequisite Courses:

Engineering physics, Electron theory, Fundamentals of Electromagnetism.

Companion Course, if any: Laboratory Practical

Course Objectives:

1. To introduce fundamental concepts of DC circuits, Star-Delta transformation, KCL, KVL and theorems to find the solution of circuits.
2. To impart knowledge of electromagnetic circuits and differentiate electromagnetic circuits with electric circuits.
3. To impart basic knowledge of fundamentals of Electrostatics and all electrical quantities such as current, voltage, power, energy, frequency along with different parameters of AC waveform, phase angles and various arithmetic operations of phasor quantities.
4. To provide knowledge about fundamental parameters of single phase AC circuits consists of resistance, inductance and capacitance with different waveforms and phasor diagrams.
5. To provide knowledge about fundamental parameters such as line and phase quantities in three phase AC circuits and basics of work, power and energy .
6. To understand the operation of a single phase transformer.

Course Outcomes

On completion of the course, learner will be able to

CO-1: Apply star-delta transformation techniques to simplify the resistive circuits and find out the solution of DC circuits by using KVL, KCL and different network theorems

CO-2: Apply the knowledge of electromagnetic circuits to calculate various parameters and to differentiate magnetic circuits with electrical circuits.

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.CO-3: Apply the knowledge of Electrostatics and AC fundamentals to find various parameters of alternating sinusoidal quantities, differentiate various types of phase angles and perform various arithmetic operations of phasor quantities

CO-4: Understand fundamentals of single phase AC circuits consisting of resistance, inductance and capacitance with different waveforms and phasor diagrams to calculate various parameters of it.

CO-5: Understand fundamentals of three phase AC circuits with different waveforms and phasor diagrams and apply the knowledge of work, power and energy to solve energy conversion problems.

CO-6: Understand the operation of single phase transformers to calculate efficiency and regulation at different loading conditions.

Course Contents

Unit I: D.C Circuits **(7 Hrs)**

Classification of electrical networks, classification of voltage as well as current sources: ideal and practical, numerical based on source transformation techniques, numerical based on simplification of networks to find equivalent resistance by using Series and parallel combinations, Star to Delta and delta to star conversion (including derivations). Kirchhoff's Voltage and Current Laws to find solutions of networks using loop analysis, Superposition theorem, Thevenin's theorem and Norton's theorem.

Unit II: Electromagnetism **(7 Hrs)**

Magnetic effect of an electric current, cross and dot conventions, right hand thumb rule, nature of magnetic field of long straight conductor, solenoid and toroid. Definition and units: magnetomotive force, flux, flux density, reluctance, permeability and field strength, and their relationships. Series magnetic circuit, only theory of parallel magnetic circuit and comparison of electric circuit with magnetic circuit. Force on current carrying conductor placed in magnetic field, Fleming's left hand rule, Faraday's laws of electromagnetic induction, Fleming's right hand rule, statically and dynamically induced e.m.f, self and mutual inductance, coefficient of couplings. Energy stored in a magnetic field.

Unit III: Electrostatics and AC Fundamentals **(7 Hrs)**

A) Electrostatics: Electrostatic field, electric flux density, electric field strength, absolute

permittivity, relative permittivity and capacitance. Capacitor, capacitors in series and parallel, energy stored in capacitors, charging and discharging of capacitors (no derivation) and time constant. **(3 Hrs)**

B) AC Fundamentals: Sinusoidal voltages and currents, their mathematical and graphical representation, Concept of cycle, Period, frequency, instantaneous, peak (maximum), average and r.m.s. values, peak factor and form factor. Phase difference, lagging, leading and in phase quantities and phasor representation. Rectangular and polar representation of phasor. **(4 Hrs)**

Unit IV: Single Phase AC Circuits **(7 Hrs)**

Study of AC circuits consisting of pure resistance, pure inductance, pure capacitance, series R-L, R-C and R-L-C circuits, phasor diagrams, voltage, current and power waveforms, resonance in series and parallel RLC circuits, concept of impedance and admittance, concept of active, reactive, apparent, complex power and power factor, only theory of Parallel AC circuits.

Unit V: Three Phase AC Circuits and Work, Power, Energy **(7 Hrs)**

A) Three Phase A.C. Circuits: Concept of three-phase supply and phase sequence. Balanced and unbalanced load, Voltages, currents and power relations in three phase balanced star-connected loads and delta-connected loads along with phasor diagrams. **(3 Hrs)**

B) Work,Power,Energy: Effect of temperature on resistance, resistance temperature coefficient, insulation resistance, conversion of energy from one form to another in electrical, mechanical and thermal systems, Simple numerical based on calculation of residential electricity bill. **(4 Hrs)**

Unit VI: Single phase AC Transformer **(7 Hrs)**

Principle of working, construction and types of transformers, emf equation, voltage and current ratios. Losses, definition of regulation and efficiency, to determine regulation and efficiency by direct loading method, concept of autotransformers.

Books & Other Resources:

Text Books:

1. Principles of Electrical Engineering, V. D. Toro,Prentice Hall India, 1989
2. Theory and Problems of Basic Electrical Engineering, D. P. Kothari, I.J. Nagrath, PHI Publication
3. Basic Electrical Engineering,V.K. Mehta, Rohit Mehta, S Chand Publications
4. A text book on electrical technology Vol-I, B. L. Theraja

Reference Books:

1. Electrical technology, H Cotton, CBS Publications
2. Fundamentals of Electrical Engineering‖, L. S. Bobrow, Oxford University , 2011.
3. Electrical and Electronics Technology‖, E. Hughes, Pearson, 2010.
4. Basic Electrical Engineering, D. C. Kulshreshtha, McGraw Hill, 2009

Guidelines for Laboratory - Term work Assessment:

1. The distribution of weightage of term work marks should be informed to students before the start of the semester.
2. Term work assessment should be on a continuous basis. At frequent intervals students are expected to inform about their progress/lagging.

Guidelines for Laboratory Conduction:

1. DO's and DON'TS, along with precautions, are needed to be displayed at prominent locations in the laboratory.
2. Students should be informed about DO'S and DON'T and precautions before performing.

Guidelines for Students Lab Journal:

The Student's Lab Journal should contain following related to every experiment –

1. Theory related to the experiment.
2. Apparatus with their detailed specifications.
3. Connection diagram /circuit diagram.
4. Observation table/ simulation waveforms.
5. Sample calculations for one/two readings.
6. Result table.

7. Graph and Conclusions.
8. There should be continuous assessment for the TW.
9. Assessment must be based on understanding of theory, attentiveness during practical, understanding Session, how efficiently the student is able to make connections and get the results, and timely submission of journals.

LIST OF PRACTICALS (Any 08 to be performed by the student)

1. To study safety precautions while working on electrical systems, handling various equipments such as multimeter, ammeters, voltmeters, wattmeter, real life resistors, inductors and capacitors.
2. To demonstrate different types of electrical protection equipment such as fuses, MCB, MCCB, and ELCB.
3. To verify KVL and KCL.
4. To verify the Superposition theorem.
5. To verify Thevenin's and Norton's theorem in a DC network.
6. To observe charging and discharging response of capacitor on storage oscilloscope using DC step input.
7. To observe voltage and current waveforms of series RL and RC circuit on storage oscilloscope and measure the phase angle between them.
8. To verify the relation between phase and line quantities in three phase balanced Star connected to load.
9. To verify the relation between phase and line quantities in three phase balanced Delta connected load.
10. To determine efficiency and regulation of single phase transformer by direct loading test.
11. To measure insulation resistance of three core cables by using Megger.
12. To draw and make connections of Staircase wiring and Godown wiring.

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Autonomy
Co-ordinator
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Mr. P.D. Upadhye
Academic Coordinator
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ME23102-Engineering Graphics- F.Y.- B. Tech (Sem-I and Sem-II)		
Teaching Scheme:	**Credits:02**	**Examination Scheme:**
TH: 01 Hrs/Week		**Course Activity: 10 Marks**
PR: 02 Hr/Week		**End-Semester Exam: 40 Marks**
		TW: 30 Marks

Engineering Graphics is a fundamental subject in engineering that involves creating and interpreting graphical representations of objects, designs, and systems. It serves as a communication tool among engineers, designers, and other stakeholders in the engineering field. It is considered as a language of an engineer.

Prerequisite: Basic trigonometry and knowledge of basic drawing instruments

Course Objectives:

1. To familiarize students with technical drawing conventions and abbreviations.
2. To communicate design concepts effectively through graphical representation.
3. To develop visualization skills through orthographic and isometric projections.
4. To acquire knowledge of development of lateral surfaces for optimizing material usage.
5. To make use of Computer Aided Design (CAD) software for developing technical drawings.

Course Outcomes On completion of the course, learner will be able to

CO1: ***Develop*** various engineering curves using the drawing instruments.

CO2: ***Construct*** development of lateral surfaces for cut sections of geometrical solids.

CO3: ***Generate*** 2D drawings from 3D views using the concept of Orthographic Projection

CO4: ***Generate*** 3D views from 2D drawings using the concept of Isometric Projection

CO5: ***Construct*** fully-dimensioned 2D, 3D. drawings using computer aided drafting tools.

28/10/2023
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Unit-1: Engineering Graphics Fundamentals and Engineering Curves **[3 Hrs.]**

Need of Engineering Drawing and design, Sheet layout, Line types and dimensioning and simple geometrical constructions, *Introduction to CAD software: Basic commands*, Introduction to conic sections and its significance, various methods to construct the conic sections. Helix for cone and cylinder, rolling curves (Involutes, Cycloid) and Spiral.

Unit-2: Development of Lateral Surfaces **[3 Hrs.]**

Introduction to development of lateral surfaces and its industrial applications. Draw the development of lateral surfaces for cut sections of cone, pyramid, prism etc.

Unit-3: Orthographic Projection **[3 Hrs.]**

Principles of Orthographic Projections, types of orthographic projections–First angle and third angle projections, obtaining orthographic projections of given pictorial views by using first angle projection method along with sectional views.

Unit-4: Isometric Projections **[3 Hrs.]**

Principles of Isometric projection – Isometric and natural Scale, Isometric views of simple and compound solids, drawing isometric views from given orthographic views.

Text Books:

1. Bhatt N.D and Panchal VM, Elementary Engineering Drawing, (Plane and Solid Geometry), Charotar Publishing House, 53rd Edition.

2. Jolhe Dhananjay, Engineering Drawing with An Introduction to Autocad, Tata McGraw Hill Publishing Company Limited,5th Edition 2017.

3. K. Venugopal, K, (2015), "Engineering and Graphics", New Age International, New Delhi

4. Dhawan, R. K., (2000), "A Textbook of Engineering Drawing", S. Chand, New Delhi

Reference Books:

1. Shah, M.B. & Rana B.C. (2008), Engineering Drawing and Computer Graphics, Pearson Education
2. Madsen, D. P. and Madsen, D. A., (2016), "Engineering Drawing and design", Delmar Publishers Inc., USA
3. Rathnam, K., (2018), " A First Course in Engineering Drawing", Springer Nature Singapore Pte. Ltd., Singapore
4. Narayana, K.L. & Kannaiah P. (2002), Engineering Graphics, SCITECH Publication Pvt. Ltd., India.

Practical Session (Term Work Assessment Guidelines)

Draw minimum two problems on each assignment on the A3 size drawing sheet.

Suggested List of Laboratory Experiments/Assignments

Assignment 1: Construct an Engineering Curves by appropriate method based on the input data.

Assignment 2: Draw the development of the lateral surface of a solid/ truncated solid.

Assignment 3: Orthographic view of any machine element along with sectional view.

Assignment 4: Draw Isometric view for given orthographic views.

Assignment 5: Construct above assignments with same or different problems using CAD software. (Prints can be taken on A4 size papers)

25/10/2023
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Subject: Electronics Measuring Instruments & Tools (EMIT) (ET23102)		
Teaching Scheme: **TH : 02 Hrs./week** **PR : --**	**Credits: 02**	**Examination Scheme** **Course Activity : 10 Marks** **In - Semester : 20 Marks** **End - Semester : 40 Marks**
Pre-Requisites: NIL		
Course Outcomes: At the end of the course, the student will be able to **CO1:** Identify various electronics components with their specifications. **CO2:** Study different laboratory instruments, component testers. **CO3:** Apply tools for design of printed circuit boards for simple circuits and to learn emerging trends in Electronics and Telecommunication.		
Syllabus		
Unit 1 (7 Hrs.) **Introduction to Components:** Resistors, inductors, Capacitors, ICs, Breadboards, PCBs, ICs, IC sockets, cables and connectors, Diodes, Transistors, 7-segment displays. Introduction to testing of components: Active & Passive components testing, IC testers. **Unit 2 (7 Hrs.)** **Instruments and their working:** CROs, DSOs, DVMs, DMMs, Frequency counters, Waveform generators, working with power supplies, Assembling and Disassembling a gadget/ simple instrument. **Unit 3 (7 Hrs.)** **Introduction to PCB Design:** Soldering and desoldering techniques, SMD soldering methods, Bread boarding, General purpose PCBs, PCB artwork , Various types of Printed Circuit Boards-Single Sided Boards, Double Sided Plated through Hole Boards, multilayer		

Boards. Study of Packages of Electronic Components. Study of SMD Components. Process of PCB design and product development flow, Design of PCBs for simple circuits, PCB Drillers, Hand tools.
Text Books: 1. Instrument manuals published by respective Manufacturers. 2. Kalsi H.S "Electronic Instrumentation", Tata McGraw Hill, 2004. **Other Resources:** 1. Lab charts/manuals. 2. Equipment manuals. 3. Datasheets. 4. Internet resources.

VPKBIET BARAMATI
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PUNE (MS.)

Shashank D. Biradar.

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Vidyanagari, Baramati-413133

Subject: Workshop E&TC (ET23103)		
Teaching Scheme: **TH : 01 Hrs./week** **PR : 02 Hrs./week**	**Credits: 02**	**Examination Scheme** **Activity: 10 Marks** **Practical : 30 Marks** **Term work: 20 Marks**

Course Objectives:

1. Familiarise the versatile MATLAB programming language
2. Apply the fundamental techniques through MATLAB Programming
3. Familiarise the versatile Arduino programming language
4. Apply the fundamental techniques through Arduino Programming

Course Outcomes: On completion of the course, learner will be able to–

CO1: Able to use MATLAB for interactive computations and Apply the knowledge and techniques for implementation of simple programs on MATLAB.

CO3: Understand the fundamentals of Arduino and Apply the knowledge, techniques for implementation of simple programs on Arduino.

Module I: MATLAB and SIMULINK (7 Hours TH, 14 Hours WS)

MATLAB: Introduction to MATLAB, Data Types and Variables, Basic MATLAB Functions, Script Files, Arrays operations, Graphics.

MATLAB SIMULINK: Basic Waveforms, Trigonometric Functions, Differential Equations.

Module II: Introduction of Arduino (7 Hours TH, 14 Hours WS)

Introduction and Familiarization: Hardware Overview, Download and Install the Arduino IDE, Arduino IDE and Sketch Overview, Understanding Arduino Syntax.

Basics: Understanding and Using Variables, Blink an LED, digital Read() and Serial Port Communication, analog Read() and Serial Port Communications, Reading Analog Pins and Converting the Input to a Voltage, Fade an LED with Pulse Width Modulation using analogWrite().

Implementation: Blink an LED Without using the delay() Function, Using Buttons, State Change Detection and the Modulo Operator, Debouncing a Button, Analog I/O and Serial Communications

Study Resources:

1. MATLAB Onramp: Learn the basics of MATLAB through this introductory tutorial on commonly used features and workflows. Get started with the MATLAB language and environment so that you can analyze science and engineering data. https://MATLABacademy.mathworks.com/details/MATLAB-onramp/gettingstarted
2. MATLAB Fundamentals: Learn core MATLAB® functionality for data analysis, visualization, modeling, and programming. Implement a common data analysis workflow that can be applied to many science and engineering applications. https://MATLABacademy.mathworks.com/details/MATLAB-fundamentals/mlbe
3. "Internet of Things: Case Studies", Libelium Inc, White papers, Spain http://www.libelium.com/resources/case-studies
4. NPTEL Course on "Introduction to IOT", by Prof. Sudip Misra, IIT Kharagpur Link of the Course: https://nptel.ac.in/courses/106105166

List of Practical:

1. Write a basic MATLAB program to declare variables, perform basic operations on variables and Use trigonometric function (Sine/Cosine) & plot the graph.
2. Write a MATLAB program to define an array & perform various operations. Create a matrix & perform addition of two matrices.
3. Write MATLAB code to print the sum of the first 10 natural numbers using (For Loop).
4. Create SIMULINK model for to generate basic waveforms.
5. Create SIMULINK model for given differential equation.
6. Interface LED with Arduino & write a program for LED Blinking with delay function.
7. Interfacing various sensors like temperature, humidity, and buzzer with Arduino board.
8. Interface LED with Arduino & write a program to fade an LED with Pulse Width Modulation.

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HS23102: Indian Knowledge System		
Teaching Scheme: **TH: 01 Hr./Week** **PR: 02 Hrs./Week**	**Credit: 02**	**Examination Scheme:** **Course Activity: 10 Marks** **TW: 20 Marks** **Oral Exam: 30 Marks**

Course Objectives:

1. To create awareness about the history and rich culture of the country.
2. To introduce Vedic mathematics principles for faster calculations.
3. To know the science and Astronomy contributions of the traditional knowledge of Bhārata.
4. To learn engineering and technology contributions of the traditional knowledge of Bhārata.
5. To Convert the Bhāratīya wisdom into the applied aspect of the modern scientific paradigm
6. Adding career, professional and business opportunities to the youths.

Course Outcomes: Students will be able to

CO1: Explain the historicity of Indian Knowledge System and the broad classification of Indian philosophical systems.

CO2: Apply Vedic Mathematics for faster calculations.

CO3: Understand the importance of science and astronomy concepts developed Bhārata;

CO4: To understand the contributions in the science, engineering & technology heritage of ancient and medieval India.

Course Contents

UNIT -I: Bhāratīya Civilization and Development of Knowledge System **(04 hours)**

Genesis of the land, Antiquity of civilization, the Saraswatī-Sindhu Civilization, Traditional Knowledge System, The Vedas, Main Schools of Philosophy, Ancient Education System, the Takṣaśilā University, the Nālandā University, Knowledge Export from Bhārata. Ethnic Studies, Life Science studies, Agriculture, Ecology and Environment, Āyurveda, Integrated Approach to Healthcare, Medicine, Microbiology, Surgery, and Yoga.

UNIT-II: Vedic Mathematics **(08 hours)**

Indian Mathematicians, Varahmihir, Brahmagupta, Srinivasa Ramanujan, Neelkanth Somayya, Bharti Krishna Tirtha, Introduction to sutras, and sub sutras,

Methods for Addition, Multiplication, division, squaring and square roots, cube and cube roots, Factorization. Differentiation and Integration methods

Easy Solution of linear equations: Introduction of simple equation, Solutions of simple equations, Solutions of linear equations in two variables, Practical application of linear equations in two variables, Quadratic equations

High-Speed Matrix Algebra: Introduction and history of Matrices and Determinants, Matrices and Determinants of third order, Inverse of Matrices,

Vedic Geometry: Different forms of straight lines, The Triangle, The Cyclic Quadrilateral, Squares, and the Circle, Geometrical constructions (such as Altars), Transformation of simple shapes, Kalpa Sutras-Srautha Sutras and Sulbha Sutras

UNIT-III: Science, Astronomy **(04 hours)**

Concept of Matter, Life and Universe, Gravity, Sage Agastya's Model of Battery, Velocity of Light, Vimāna: Aeronautics, Vedic Cosmology and Modern Concepts, Bhāratīya Kāla-gaṇanā, History and Culture of Astronomy, Sun, Earth, Moon, and Eclipses, Earth is Spherical and Rotation of Earth, Archaeoastronomy.

UNIT-IV: Engineering, Technology, and Architecture **(04 hours)**

Pre-Harappan and Sindhu Valley Civilization, Laboratory and Apparatus, Juices, Dyes, Paints and Cements, Glass and Pottery, Metallurgy, Engineering Science and Technology in the Vedic Age and Post-Vedic Records, Iron Pillar of Delhi, Rakhigarhi, Mehrgarh, Sindhu Valley Civilization, Marine Technology, and Bet–Dwārkā.

Textbooks:

1. Textbook on The Knowledge System of Bhārata by Bhag Chand Chauhan,
2. Engineering and Technology in Ancient India by Ravi Prakash Arya
3. History of Science in India Volume-1, Part-I, Part-II, Volume VIII, by Sibaji Raha, et al. National Academy of Sciences, India and The Ramakrishna Mission Institute of Culture, Kolkata (2014).
4. Science and Technology in Ancient Indian Texts by Bal Ram Singh, Nath Girish, Umesh Kumar Singh
5. Vedic Mathematics, Swami Bharati Krishna Trithaji, Motilal Banarsidass, New Delhi.

Reference Books:

1. Pride of India- A Glimpse of India's Scientific Heritage edited by Pradeep Kohle et al. Samskrit Bharati (2006).

2. Vedic Physics by Keshav Dev Verma, Motilal Banarsidass Publishers (2012).

3. India's Glorious Scientific Tradition by Suresh Soni, Ocean Books Pvt. Ltd. (2010).

4. Modern Introduction to Ancient Indian Mathematics, T S Bhanumurthy, Wiley Eastern Limited, New Delhi

5. Advance Vedic Mathematics, Rajkumar Thakur, Rupa Publications India Pvt. Ltd 2019

6. Arihant Vedic Mathematics Made Easy - Pt. Ramnandan Shastri

7. Magical World of Mathematics, VG Unkalkar, Vandana publishers, Bangalore

8. Vedic Geometry Course, S. K. Kapoor, Lotus Press

9. NPTEL Course: Indian Knowledge System (IKS): Concepts and Applications in Engineering https://onlinecourses.swayam2.ac.in/imb23_mg53/preview

Head
First Year
VPKBIET, Baramati-413133

Dr. R.K. Shashtri
Subject co-ordinator

HS23103A - Physical Education - Exercise and Field Activities-I		
Teaching Scheme: **Theory: --** **Practical: 2 Hour/Week**	**Credits: 01**	**Examination Scheme:** **Practical: 30 Marks**

Prerequisites:

Introduction to sports and yoga.

Course Objectives:

- To impart the students with basic concepts of Physical Education, Sports and Yoga for health and wellness.
- To familiarize the students with health related Exercise, Sports and Yoga for Overall growth & development.
- To impart the basic knowledge and skills to teach Physical Education, Sports & Yoga activities.

Course Outcomes (COs): The students will be able to

CO1: To understand the basic principles and practices of Physical Education, Sports and Yoga.

CO2: To be able to practice Physical Activities, Sports and Yoga.

Course Contents

1. **Introduction to Sports and Health.** **(04 Hours)**

   Need and Importance, History, Types, Typical equipment and other requirements, Precautions, Benefits, Rules and regulations, and Modern trends of Physical Education, Sports and Yoga (Through class room videos interaction/Self learning videos)

2. **Physical Fitness Practice:** **(12 Hours)**

   - Importance of Yoga & Fitness.
   - Fundamental Principles of Yoga & Fitness Training.
   - Components of Fitness and Fitness Equipment.
   - Types of Yoga Practices – Yogic Asanas, Pranayama and Meditation
   - Introduction to Nutrition and Balanced Diet for Fitness

3. Sports and Games **(12 Hours)**

- Student should select one unique game out of the following in each Semester:
  - Outdoor Games: Cricket, Volleyball, Basketball, Kabbadi, Khokho, Handball, Netball, Softball, Football, Baseball, Skating.
  - Indoor Games: Badminton, Table Tennis, Ball badminton, Lawn Tennis, Wrestling, Squash..
  - Athletics: Track Events, Long Jump, High Jump, Triple Jump, Shot put, Discus Throw, Hammer, Javelin Throw, Archery, Pole Vault.
  - Gymnastics: Mallakhamb, Rope Mallakhamb .
  - Swimming: Swimming Events, Diving, Water polo.
  - Other Indoor Games:
    (A) Weight Lifting, Power Lifting, Body Building.
    (B) Board Games: Chess, Bridge.
  - Martial Arts: Boxing, Judo, (Taekwondo, Fencing, Karate)

Text Books:

1. DK (2021) Know your sport,DK India.
2. J Bains (2019),Essential of physical education,Kalyani publication.
3. Swami Vivekananda Yoga Prakashana

Reference Books:

1. William Martin (2023),the book of sports.
2. Om book editorial team (2016),Encyclopedia:Sports Encyclopedia Om book international.
3. Yogacharya Swami Omkareshwarananda (2019),Yogasanas,Pranayama and Meditation,Pigeon books.
4. V.K.Sharma (2022),Health and physical education,New sarawati house India Pvt.Ltd.
5. You tube and other online resourses.

Guidelines for Practical Conduction:

1. Physical Education
   - General & Specific warm up exercises
   - Recreation Games and Fitness
   - Any one Major Game
2. Yoga
   - Suryanamaskara
   - Basic Set of Yoga Asanas
   - Basic Set of Pranayama & Meditation

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Vidyanagari, Baramati-413133

FY B. Tech Semester I Subject Name: Cocurricular course – I Subject Code :-HS23104 -A		
Teaching Scheme: **TH:** - **PR:** 02 Hrs./Week	**Credits: 01**	**Examination Scheme:** **Course Activity:** **In-Semester Exam:** - **End-Semester Exam:** -
		PR 30 Marks

Introduction:

The Cocurricular course is designed to introduce students to the world of performing arts by combining dance, drama, and various art forms. Students will learn to express themselves creatively, collaborate with peers, and develop a deeper understanding of storytelling through movement, acting, and visual arts.

Companion Course, if any: Practical

Course Objectives:

The course aims to foster creativity, collaboration, and a holistic understanding of performing arts and their integration.

Course Outcomes:

On completion of the course, learner will be able to –

CO1: express themselves creatively.

CO2: demonstrate teamwork, and collaboration with peers.

CO3: develop a deeper understanding of storytelling through movement, acting, and visual arts.

CO4: enhance experiential learning through use of technology for effective communication.

Course Contents

Unit I: Introduction to Co-curricular Activities **(6 Hrs.)**

Types, Theory (of Music, Dance, Theater, Literary, Fine Art, Applied and Other Forms), Programmes and Competitions, Benefits, Professional Aspects

Unit II: Performing Activities/Practicing – Demos etc. **(10Hrs.)**

Student **must Join one / one from each group** of the following clubs and perform activities on given theme in group or Individual.

Group I:

(a) Music and Singing: Singing and Instrumental (Percussion Group: Keyboard, Tabla, Flute etc.) and String Group: (Tambora, Veena, Guitar, Violin, Banjo etc.), Folk Type: Dafali, Ektari, Dholki. Types: Classical, Semi-classical, and Westerns

(b) Dance: Types: Classical, Semi-classical, Contemporary

(c) Theater: Drama, One-act-play, Mono-act, Skit, Mime, Mimicry,

Group II:

(d) Literary: Poetry, Elocution, Quiz, Debate

(e) Art & Craft and Fine Art: Drawing, Painting, Rangoli, Cartooning, Knitting, Weaving, Embroidery, Quilling, Paper Folding, Clay Modeling Tattoo Making Photography, Videography, Digital Art (Related to Computers, Media)
(f) Other Activities: NSS, Gardening, Cooking.

Unit III: Post Activity **(6 Hrs)**

Report preparation/ performance video/ Participation/ Group Activities/ Professional Certification.
Sample Topics in each Performing Activity: Performing, Choreography/Composing/Direction, Backstage Management (Lighting, ...) Literary: Script Writing.

Guidelines for Laboratory - Practical Assessment:

1. The distribution of weightage of practical marks should be informed to students before start of the semester.
2. Student progress should be observed on a continuous basis. At frequent intervals students are expected to inform about their progress/lagging. Practical examinations will be conducted at the end of semester.

LIST OF ACTIVITIES (to be performed by the student)

1. Students should prepare a short video of his/her own art form. (3-4 min)
2. Student should participate in any of the competition conducted in the institute or outside the institute as an outcome of the course and to show evidence of the same.
3. Student should prepare a portfolio report of his/her work for submission.

P.A.Bokey
course co-ordinator

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VPKBIET BARAMATI
Affiliated to S.P.P.U. Pune Id No./PU/PN/Engg./152/2000
PUNE (MS.)

Vidya Pratishthan's Kamalnayan Bajaj Institute of Engineering and Technology, Baramati (Autonomous Institute)		
First Year Engineering (2023 Course)		
BS23102 - Engineering Mathematics-II (Ordinary Differential Equations, integral Calculus and Fourier Series)		
Teaching Scheme: **Theory: 3 Hours/Week** **Tutorial: 1 Hour/Week**	**Credits** **04**	**Examination Scheme:** **In-Semester Exam: 30 Marks** **End-Semester Exam: 60 Marks** **Course Activity: 10 Marks** **Term Work: 20 Marks**

Prerequisites:

Differentiation, Integration, Differential Equations.

Course Objectives:

To make the students familiarize with Mathematical Modeling of physical systems using differential equation, advanced techniques of integration, tracing of curves, multiple integrals and their applications. The aim is to equip them with the techniques to understand advanced level mathematics and its applications that would enhance thinking power, useful in their disciplines.

Course Outcomes (COs): The students will be able to

CO1: Solve first order first degree differential equations using suitable methods.

CO2: Apply the concept of differential equations for various physical systems such as Newton's law of cooling, electrical circuits, rectilinear motion, mass spring system and heat transfer.

CO3: Understand basic concepts of periodic functions, Fourier series, harmonic analysis.

CO4: Evaluate definite improper integrals using techniques like Gamma, Beta function, DUIS, and Error function.

CO5: Sketching the curve of a given equation and measuring the arc length of various curves.

CO6: Evaluate multiple integrals and apply it to calculate area, volume, Center of gravity and moment of inertia.

D Sonawane
(Sonawane D.S.)
(Subject Coordinator)

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Course Contents

Unit 1: First Order Ordinary Differential Equations **[07 Hours]**

Exact differential equations, Equations reducible to exact form. Linear differential equations, Equations reducible to linear form, Bernoulli's Equation.

Unit 2: Applications of Differential Equations **[07 Hours]**

Applications of Differential Equations to Orthogonal Trajectories, Newton's Law of Cooling, Kirchhoff's Law of Electric Circuits, Rectilinear Motion, One Dimensional Conduction of Heat.

Unit 3: Fourier Series **[07 Hours]**

Definition, Dirichlet's conditions, Full Range Fourier Series, Half Range Fourier Series, Harmonic Analysis and Applications to Problems in Engineering.

Unit 4: Integral Calculus **[07 Hours]**

Reduction Formulae, Beta and Gamma functions, Differentiation Under Integral Sign and Error functions.

Unit 5: Curve Tracing **[07 Hours]**

Tracing of Curves Cartesian, Polar and Parametric curves, Rectification of curves.

Unit 6: Multiple Integrals and their Applications **[07 Hours]**

Double and Triple integrations, Change of order of integration, Applications to find Area, Volume, Mass, Centre of Gravity and Moment of Inertia.

Text Books:

1. Higher Engineering Mathematics by B. V. Ramana (Tata McGraw Hill).

2. Applied Mathematics (Vol. II & Vol. III) by P.N.Wartikar and J.N.Wartikar (Vidyarthi Griha Prakashan, Pune).

3. Engineering Mathematics: A tutorial approach by Ravish R Singh and Mukul Bhatt (Tata McGraw Hill Education Private Limited)

Reference Books:

1. Higher Engineering Mathematics by B. S. Grewal (Khanna Publication, Delhi).
2. Advanced Engineering Mathematics by Erwin Kreyszig (Wiley Eastern Ltd.).
3. Advanced Engineering Mathematics by Peter O'Neil (Thomas Learning).
4. Schaum's Outlines: Differential Equations by Richard Bronson and Gabriel B. Costa.
5. Schaum's Outlines: Calculus by Frank Ayres and Elliott Mendelson.

Guidelines for Tutorial and Term Work:

- Tutorial for the subject shall be engaged in minimum three batches (batch size of 23 students maximum) per division.
- Term work shall consist of Six assignments and on each Unit-1 to Unit-6 and is based on performance and continuous internal assessment.

D Sarawane
(Subject Coordinator)

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BS23103: Engineering Physics		
Teaching Scheme: **TH : 03 Hrs./week** **PR : 02 Hrs./Week**	**Credits** **04**	**Examination Scheme:** **Activity: 10 Marks** **In Semester: 30 Marks** **End Semester: 60 Marks** **PR Exam: 30 Marks** **TW: 20 Marks**

Prerequisite Courses, if any:
Fundamentals of: optics, interference, diffraction polarization, wave-particle duality, semiconductors, and magnetism

Companion Course, if any: Laboratory Practical, Term work

Course objectives

To teach students basic concepts and principles of physics, relate them to laboratory experimentsand their applications

Course Outcomes:

On completion of the course, the learner will be able to –

CO1: Understand the basics of wave optics and their applications in the engineering field.

CO2: Learn the basics of lasers and optical fibers and their use in some applications.

CO3: Understand concepts and principles in quantum mechanics and its applications in various fields.

CO4: Understand the theory of semiconductors and their uses in electronic devices.

CO5: Explain the basics of magnetism and superconductivity. Explore a few of their technological applications.

CO6: Comprehend the use of concepts of physics for Non-Destructive Testing. Learn some properties of nanomaterials and their applications.

Course Content

Unit I: Wave Optics **(07 Hrs)**

Interference

Introduction to interference, Constructive and destructive interference, Path difference and phase difference, Interference in a thin film of uniform thickness (with derivation), Interference in a thin film wedge shape (qualitative), Applications of interference: testing optical flatness, anti-reflection coating.

Diffraction

Diffraction of light, Diffraction at a single slit, conditions for principal maxima and minima. Diffraction grating (qualitative).

Polarization

Polarization of light, Malus law, Specific rotation (qualitative only), Optically active materials, Laurent's Half shade polarimeter.

Unit II: Laser and Optic Fibre **(07 Hrs)**

Laser

Basics of laser and its mechanism, characteristics of laser. Semiconductor laser, ii) Ruby laser, iii) He-Ne laser.

Applications of lasers: Holography, IT, industrial, medical.

Optic Fiber

Introduction, Acceptance Angle, Acceptance Cone, Numerical Aperture, Attenuation and reasons for losses in optic fibers (qualitative), Communication system: Basic building blocks, Advantages of optical fiber communication over conventional methods.

Unit III: Quantum Mechanics (07 Hrs)

De-Broglie hypothesis, De-Broglie wavelength in terms of kinetic energy and potential Heisenberg Uncertainty Principle, Properties of matter-wave, Wave-function and its physical significance, Schrodinger's equations: time-independent and time-dependent, Application of Schrodinger's time independent wave equation - Particle enclosed in an infinitely deep potential well (Particle in Rigid Box) and numerical.

Unit IV: Semiconductor Physics (07 Hrs)

Introduction, classification of solids based on band theory. Conductivity of conductors and semiconductors, Fermi Dirac distribution function, Position of Fermi level in intrinsic semiconductors (with derivations) and extrinsic semiconductor (qualitative) Hall effect: Derivation for Hall voltage, Hall coefficient, applications of Hall effect, Formation of PN junction with band diagram (forward and reverse bias), Solar cell (basic principle with band diagram) I-V Characteristics.

Unit V: Magnetism and Superconductivity (07 Hrs.)

Magnetism

Origin of magnetism, Magnetic parameters, Classification of magnetism based on permeability (qualitative), Applications of Magnetic Devices: Magneto-opticalrecording.

Superconductivity

Introduction to superconductivity; Properties of superconductors: Zero electrical resistance, Meissner effect, Critical magnetic field, Persistent current, Type I and Type II superconductors, Applications of superconductors: SQUID, Maglev.

Unit VI: Non-Destructive Testing and Nanotechnology (07 Hrs.)

Non Destructive Testing

Introduction to non-destructive testing, Difference between destructive and non-destructive testing, Advantages of Non-destructive testing, Methods of Non-destructive testing, Acoustic Emission Testing, Ultrasonic (thickness measurement, flaw detection), Radiography testing.

Nanotechnology

Introduction to nanotechnology, Surface-to-volume ratio, Properties of nanoparticles: optical, electrical, mechanical, Applications of nanoparticles: Medical (targeted drug delivery), electronics, industrial, automobile.

Books:

Text Books:

1. Engineering Physics, Avadhanulu, Kshirsagar, S. Chand Publications
2. A textbook of optics – N Subrahmanyam and BriLal, S. Chand Publications
3. Engineering Physics, Gaur, Gupta, Dhanpat Rai and Sons Publications

Reference Books

1. Fundamentals of Physics, Resnick and Halliday (John Wiley and Sons)

2. Optics, Jenkins and White (Tata Mcgraw Hill)
3. Principles of Physics, Serway, and Jewett (Saunders College Publishing)
4. Introduction to Solid State Physics, C. Kittel (Wiley and Sons)
5. Principles of Solid State Physics, H. V. Keer, New Age International
6. Laser and Non-Linear Optics, B. B. Laud (Oscar publication)
7. Nanotechnology: Principles and Practices, Dr. S. K. Kulkarni (Capital PublishingCompany

List of experiments (Any Eight)

1. To determine the radius of curvature of a plano-convex lens by Newton's ring method.
2. To determine wavelength by using a plane diffraction grating.
3. Determination of specific rotation of a solution with Laurent's Half Shade Polarimeter
4. Experiment based on Laser (Thickness of wire, determination of grating element).
5. To determine the energy band gap of a semiconductor.
6. To study I-V characteristics and determine the fill factor of a solar cell.
7. To determine the Hall coefficient and charge carrier density.
8. To determine the absorption coefficient of the sound of a given material.
9. To determine ultrasonic velocity in liquid using an ultrasonic interferometer and its compressibility.
10. To find out the resolving power of Diffraction Grating/Telescope.
11. To verify Malus Law.
12. Determination of electrical resistivity of given semiconductor using four probe method.
13. To find out the Magnetic susceptibility of a given material.

Dr. Anil Bisne.
Subject Coordinator.

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Subject: Basic Electronics Engineering (ET23101)		
Teaching Scheme: **TH : 03 Hrs./week** **PR : 02 Hrs./week**	**Credits: 04**	**Examination Scheme** **Course Activity : 10 Marks** **In - Semester : 30 Marks** **End - Semester : 60 Marks** **Practical : 30 Marks** **Term work : 20 Marks**

Course Objectives:

- The principle of electronics and working principle of PN junction diode and special purpose diodes.
- The functioning of transistors like BJT, MOSFETs and OPAMP.
- Basics of various logic gates, digital circuits and their applications.
- Working and functions of various electronic instruments.
- The operating principles and applications of various active and passive sensors.
- Basic principles of communication systems.

Course Outcomes: On completion of the course, learner will be able to–

CO1: Explain the working of P-N junction diode and its circuits.

CO2: Identify types of diodes and plot their characteristics and also can compare BJT with MOSFET.

CO3: Build and test analog circuits using OPAMP.

CO4: Build and test digital circuits using universal/basic gates and flip flops.

CO5: Select sensors for specific applications.

CO6: Describe basic principles of communication systems.

Course Contents

Unit I: Introduction to Electronics and Diode Circuits (07 Hrs.)

Evolution of Electronics, Impact of Electronics in industry and in society. Introduction to active and passive components.

P-N Junction Diode and applications: P-N Junction diode: construction and its working in forward and reverse bias condition, V-I characteristics of P-N junction Diode. Diode Applications: Diode as a switch, Half Wave Rectifier, Full wave center tap and Bridge Rectifier, Diode Limiters and Clampers.

Special purpose diodes: Zener diode, Light Emitting Diode (LED) and photo diode along with V-I characteristics and their applications.

Unit II: Transistors and applications (06 Hrs.)

Bipolar Junction Transistor: Construction, type, Operation, Different configurations of BJT, operating regions of BJT, input and output characteristics in CE configurations , DC load line and operating point, Applications of BJT : BJT as switch, Common Emitter Amplifier.

Metal Oxide Semiconductor Field Effect Transistors (MOSFET): Construction, Types, Operation, V-I characteristics, Regions of operation, MOSFET as switch & amplifier.

Unit III: Operational amplifier (06 Hrs.)

Differential amplifiers, Functional block diagram of operational amplifier, ideal operational amplifiers and parameters, OP AMP applications: Op-amp as Inverting and Non inverting amplifier, Summing amplifier, Comparator, Integrator and differentiator.

Unit IV Number System and Logic Gates (06 Hrs.)

Number System: Binary, BCD, Octal, Decimal, Hexadecimal their conversion. Signed and unsigned numbers, Binary arithmetic, Binary subtraction using 2's complement Boolean Algebra, De-Morgan's theorem.

Basic Gates: AND, OR, NOT, Universal Gate: NAND, NOR ,XOR ,XNOR, Half adder, Full adder

Sequential Circuits: Flip Flop's (Circuit diagram and truth Table) - SR, JK, T and D

Introduction to Microprocessor and Microcontroller (Only block diagram and explanation).

Unit V Sensors (06 Hrs.)

Classification of a sensors, Active /Passive Sensors, Analog/Digital Sensors, Motion Sensors (LVDT, Accelerometer), Temperature Sensors (Thermocouple, Thermistor, RTD), Optical Sensors (LDR), Mechanical Sensors (Strain Gauge, Load Cell, Pressure sensors), Biosensors. (Working Principle and one application).

Unit VI Communication Systems (06 Hrs.)

Basic block Diagram of communication system , Modes of Communications , Communication Media: Types of Wired and Wireless media , Electromagnetic Spectrum, Allotment of frequency band for different applications, necessity of modulation ,Introduction to AM and FM Modulation , Modulation index, spectrum , waveforms and equations of AM and FM wave , comparison between FM and AM.

Books and Other Resources:

Text Books:

1. Thomas. L. Floyd "Electronics Devices", 9th Edition, Pearson (Unit I, II)

2. R.P. Jain, "Modern Digital Electronics", 4th Edition, Tata McGraw Hill (Unit III)

3. H.S. Kalsi, "Electronic Instrumentation", 3rd Edition, Tata McGraw Hill (Unit IV)

4. D. Patrnabis, "Sensors and Transducers", 2nd Edition, PHI (Unit V)

5. by Kennedy and Davis "Electronic Communication Systems", 4th Edition, Tata McGraw Hill (Unit VI)

6. M. Schwartz, "Mobile Wireless communication", Cambridge University Press (Unit VI)

Reference Books:

1. Thomas. L. Floyd, "Digital Fundamentals", 11th Edition, Pearson

2. J. Schiller, "Mobile Communication", 2nd Edition, Pearson

3. S. Soloman, "Sensors Handbook", 2nd Edition.

List of Laboratory Experiments/Assignments	
Hardware Practical's (Any 6)	
1.	**Electronic Components:** Study of Active and Passive components.
2.	**Measurements using various measuring equipment's:** a) Set up CRO and function generator for measurement of voltage, frequency b) Measure voltage, current and resistance using a digital multimeter.
3.	**Diode Characteristics** a)V-I characteristics of PN Junction diode
4.	**Rectifier circuits:** Implement half wave, full wave and bridge rectifier using diodes
5.	**Frequency response of BJT :** To plot frequency response of BJT amplifier.**(Simulation)**
6.	**Linear applications of Op-amp:** Build inverting and non-inverting amplifier using op-amp **(Study the datasheet of typical Op-Amp 741)**
7.	**Test and verify the truth tables of:** a) Basic and Universal Gates **(Study the data sheet of respective IC's)** b) Half and Full Adder
8.	**Case Study of any one electronics appliances (Microwave oven, AC, TV, Mobile, Washing Machine) with block diagram, specification etc.**
	Simulation Experiments using MultiSim (Any Two)
9.	Simulation of inverting, non-inverting, voltage follower circuits using OP AMP.
10.	Simulation of regulated power supply.
11.	Simulation of Digital circuits.

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CO23101: Programming and Problem Solving		
Teaching Scheme: **TH: 03 Hrs./Week** **PR: 02 Hrs./Week**	**Credits** **04**	**Examination Scheme:** **Activity : 10 Marks** **In-Semester : 30 Marks** **End-Semester : 60 Marks** **TW : 20 Marks** **PR : 30 Marks**

Prerequisite Courses, if any: students are expected to have a good understanding of basic computer principles.

Companion Course, if any: Programming and Problem Solving Laboratory

Course Objectives:

The Primary objective is to give students a basic introduction to programming and problem solving with the computer language Python. And to introduce students not merely to the coding of computer programs, but to computational thinking, the methodology of computer programming, and the principles of good program design including modularity and encapsulation.

1. To understand problem solving, problem solving aspects, programming and to know about various program design tools.
2. To learn problem solving with computers
3. To learn basics, features and the future of Python programming.
4. To acquaint with data types, input output statements, decision making, looping and functions in Python
5. To learn features of Object Oriented Programming using Python
6. To acquaint with the use and benefits of files handling in Python

Following Fields are applicable for courses with companion Laboratory course

Course Outcomes: On completion of the course, the learner will be able to –

CO1: Apply various skills in problem solving.

CO2: Choose the most appropriate programming constructs to solve the problems

CO3: Exhibit the programming skills for writing of well- documented programs including use of the logical constructs.

CO4: Use modular programming approach to solve problems

CO5: Apply several built-in functions in python to manipulate strings & to handle files

CO6: Apply object oriented constructs for organizing code to maximize its reusability

Course Contents

Unit I **Problem Solving, Programming and Python Programming** **(07 Hrs)**

General Problem Solving Concepts- Problem solving in everyday life, types of problems, problem solving with computers, difficulties with problem solving, Problem Solving Strategies, Top down design.

Program Design Tools: Algorithms, Flowcharts and Pseudo-codes, implementation of algorithms.

Basics of Python Programming: Features of Python, Literal constants, variables and identifiers, Basic Data Types, Input operation, Comments, Keywords, Indentation, Operators and expressions, Expressions in Python, Writing and executing Python programs.

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Unit II **Python List, Tuples and Dictionary** **(07 Hrs)**

List: Creating list, traversing list, List operations, List methods, List slicing, map and reduce.
Tuple: Creating tuple, traversing tuple, tuple operation, tuple methods, conversion: list to tuple & tuple to list
Dictionaries: Creating dictionary, key and value, dictionary operations, dictionary methods

Unit III **Decision Control Statements** **(07 Hrs)**

Decision Control Statements: Decision control statements, **Selection/conditional** branching Statements: if, if-else, nested if statements. **Basic loop** Structures/Iterative statements: while loop, for loop. Nested loops, Looping with indices, The *break, continue, pass, else* statement used with loops.

Unit IV **Functions and Modules** **(07 Hrs)**

Need for functions, Function: definition, call, variable scope and lifetime, Function arguments, return statement. Defining functions, Type conversions, Recursive function, Advanced Functions: lambda, map, filter, reduce, documentation string, Modular programming: Introduction to modules, Introduction to packages in Python, Overview of standard library, Introduction to Some commonly used libraries (math) and MathPlotLib

Unit V **Strings and File Handling** **(07 Hrs)**

Strings and Operations- concatenation, appending, multiplication and slicing, strings formatting operator, built in string methods and functions, Slice operation, in and not in operators, comparing strings, Iterating strings, the string module, Debugging.
Files: Introduction, File path, Types of files, Opening and Closing files, Reading and Writing files. Directory Introduction and basic operations.

Unit VI **Object Oriented Programming** **(07 Hrs)**

Programming Paradigms-monolithic, procedural, structured and object oriented, Features of Object oriented programming: classes, objects, data abstraction and encapsulation, inheritance, polymorphism, reusability, methods and message passing, delegation,
Classes and Objects: Creating class, Creating object, class variables and object variables , public and private members, self-method, class method, constructor

Text Books:

1. Reema Thareja, "Python Programming Using Problem Solving Approach", Oxford University Press, ISBN 13: 978-0-19-948017-6
2. R. Nageswara Rao, "Core Python Programming", Dreamtech Press; Second edition ISBN-10: 938605230X, ISBN-13: 978-9386052308 ASIN: B07BFSR3LL

Reference Books:

1. R. G. Dromey, "How to Solve it by Computer", Pearson Education India; 1st edition, ISBN- 10: 8131705625, ISBN-13: 978-8131705629 Maureen Spankle, "Problem Solving and Programming Concepts", Pearson; 9th edition, ISBN-10: 9780132492645, ISBN-13: 978- 0132492645
2. Romano Fabrizio, "Learning Python", Packt Publishing Limited, ISBN: 9781783551712, 1783551712
3. Paul Barry, "Head First Python- A Brain Friendly Guide", SPD O'Reilly, 2nd Edition, ISBN:978-93-5213-482-3
4. Martin C. Brown, "Python: The Complete Reference", McGraw Hill Education, ISBN-10: 9789387572942, ISBN-13: 978-9387572942, ASIN: 9387572943
5. Jeeva Jose, P. Sojan Lal, "Introduction to Computing & Problem Solving with Python", Khanna Computer Book Store; First edition, ISBN-10: 9789382609810, ISBN-13: 978-9382609810

Guidelines for Laboratory Conduction

List of laboratory assignments is provided below for reference. The instructor is expected to frame the assignments by understanding the prerequisites, technological aspects, utility and recent trends related to the topic. The assignment framing policy needs to address the average students and inclusive of an element to attract and promote the intelligent students. The instructor may set multiple sets of assignments and distribute them among batches of students. It is appreciated if the assignments are based on real world problems/applications. Encourage students for appropriate use of coding style, proper indentation and comments.

Use of open source software and recent versions is to be encouraged.

In addition to these, instructors may assign one real life application in the form of a mini-project based on the concepts learned. Instructors may also set one assignment or mini-project that is suitable to each branch beyond the scope of the syllabus.

Suggested List of Laboratory Experiments/Assignments

Sr. No.	Problem Statement Write Program in Python (with function/class/file, as applicable)
1.	To calculate the salary of an employee given his basic pay (taken as input from the user). Calculate gross salary of employee. Let HRA be 10 % of basic pay and TA be 5% of basic pay. Let employees pay professional tax as 2% of total salary. Calculate net salary payable after deductions.
2.	To accept an object mass in kilograms and velocity in meters per second and display its momentum. Momentum is calculated as $e=mc^2$ where m is the mass of the object and c is its velocity.
3.	To accept N numbers from users. Compute and display maximum in list, minimum in list, sum and average of numbers.
4.	To accept a student's five course marks and compute his/her result. Student is passing if he/she scores marks equal to and above 40 in each course. If student scores aggregate greater than 75%, then the grade is distinguished. If aggregate is 60>= and <75 then the grade of first division. If aggregate is 50>= and <60, then the grade is second division. If aggregate is 40>= and <50, then the grade is third division.
5.	To check whether the input number is Armstrong number or not. An Armstrong number is an integer with three digits such that the sum of the cubes of its digits is equal to the number Itself. Ex. 371.
6.	To simulate a simple calculator that performs basic tasks such as addition, subtraction, multiplication and division with special operations like computing x^y and x!.
7.	To accept the number and Compute a) square root of number, b) Square of number, c) Cube of number d) check for prime, d) factorial of number e) prime factors
8.	To accept two numbers from user and compute smallest divisor and Greatest Common Divisor of these two numbers.
9.	To accept a number from the user and print digits of the number in a reverse order.
10.	To input a binary number from the user and convert it into a decimal number.

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IT23101: Computer Proficiency		
Teaching Scheme: **TH: 01 Hrs/Week** **PR: 02 Hrs/Week**	**Credits: 02**	**Examination Scheme:** **Practical Exam: 30 Marks** **Activity 10 Marks** **Term Work: 20 Marks**

Prerequisite Courses: Basic Computer knowledge

Course Objectives:

1. Understand the basics of computer operating systems.
2. Apply Basic operations on data using word sheets, spreadsheets, and presentations.
3. Understand the WWW and information on the Internet (the web).
4. Understand the networks and its working.
5. Understand Digital Financial Services, e-commerce technologies.
6. Use of various Social Media networking platforms, e-Governance and their usage etc.

Course Outcomes:

On completion of the course, learner will be able to –

CO1: Understand the working and function of the computer system and Operating System.

CO2: Apply word processing skills for preparing documents.

CO3: Design spreads sheet for preparing database records.

CO4: Create powerpoint presentation for business purpose.

CO5: Understand basic concepts of HTML CSS and Networking.

CO6: Use social media platforms and Google technologies.

Course Contents

Unit I: Introduction to Operating System **[03 Hours]**

Installation of Operating System(OS), Main features of Windows OS, Concept of various shortcut commands, booting system, Types of memories and their features, Hardware and software issues and their solutions, Usage of Application software and Antivirus, Basic DOS Internal and External Commands, Open Source Software, Introduction to Linux Operating System, features, structure, files and processes, Basic Linux commands.

Unit II: Word Processing Application: **[02 Hours]**

Introduction to the various applications in Microsoft Office(MS)/ LibreOffice/ MS Office 365/Google Docs, Word features, Office button toolbars. Creating, saving, formatting and printing documents using Word. Working with objects, macro, mail merge, templates and other tools in Word.

Unit III: Spreadsheet Application: **[03 Hours]**

Introduction to Excel, Features and Data Types. Cell referencing and linking Sheets. Introduction to various functions in all categories of Excel. Concepts of sorting, filtering and validating data. Analyzing

data using charts, data tables, pivot tables, goal seek and scenarios.

Unit IV: Powerpoint Presentations **[02 Hours]**

Image editing, Presentations, Introduction to Open Office. Introduction to the properties and editing Of images. Introduction to different formats of images and their uses. Introduction to PowerPoint and its advantages. Creating Slideshows.

Unit V: Communicating in a Connected World **[02 Hours]**

Concept of Web: Introduction to Programming and Scripting Languages, Introduction to HTML and various tags in HTML, Concepts of CSS and applying CSS to HTML, communicating on a Local Network, how are Networks Built? Networks types-LAN, MAN, WAN, W-LAN, roles of devices in a network. How Does Wi-Fi Work? Internet Concepts-Introduction to www, Concept of Internet, Web Browsers, internet servers and search engine. Introduction to Cyber Security.

Unit VI: E-Commerce and Online Social Platforms **[02 Hours]**

(A)Introduction to E Commerce and advantages. Demonstrate e-Commerce sites. List features of e-commerce sites. Use e-commerce sites to search for an item.
(B)Google Technologies: Gmail, Google Form, Google Maps, Google Classroom, YouTube, Google Ads
(C)Online Meets: Google Meet, Zoom, WebEx, Microsoft team.
(D)Interactive Touch Screen Board.
(E)Social Networking: Linked In, Facebook, WhatsApp, Instagram, Twitter etc.

Text Books:

1. Computer Basics for Beginner by Daniel Guzman.
2. Absolute Beginners Guide to Computing by Wallace Wang
3. Jon Duckett's HTML and CSS.

Reference Books:

1. Computer Basics Absolute Beginner's Guide, Windows 10 Edition by Michael Miller
2.Computers for Seniors: Email, Internet, Photos, and More in 14 Easy Lessons by Chris Ewin, Carrie Ewin & Cheryl Ewin
3.Computers Made Easy: From Dummy to Geek by James Bernstein
4. "Is This Thing On?": A Friendly Guide to Everything Digital for Newbies, Technophobes, and the Kic by Abby Stokes.
5. A beginner's guide to HTML, CSS, JavaScript, and Web Graphics, by Jennifer Niederst Robbins.

Guidelines for Lab /TW Assessment

- Examiners will assess the term work based on performance of students considering the parameters such as timely conduction of practical assignment, methodology adopted for implementation of practical assignment, timely submission of assignment in the form of handwritten write-up along with results of implemented assignment, attendance etc.
- Examiners will judge the understanding of the practical performed in the examination by asking some questions related to theory & implementation of experiments he/she has carried out. Appropriate knowledge of usage of software and hardware related to respective laboratories should be as a conscious effort and little contribution towards Green IT and environment awareness, attaching printed papers of the program in a journal may be avoided. There must be hand-written write-ups for every assignment in the journal.
- The HDD/SSD/USB drive containing student programs should be attached to the journal by every student and the same to be maintained by the department/lab In-charge is highly encouraged. For reference one or two journals may be maintained with program prints at Laboratory.

- Term work shall consist of six assignments and Practical's on each Unit-1 to Unit-6 and is based on performance and continuous internal assessment.

Guidelines for Laboratory Conduction

1. All the assignments should be implemented.
2. All assignments are compulsory.
3. The instructor is expected to frame the assignments by understanding the prerequisites, technological aspects, utility and recent trends related to the topic.
4. All the assignments should be conducted on the latest version of Windows OS and MS office.
5. The following practical should be conducted batch wise using Computer System, with Webcam and headphone facility.
6. Practical for the subject shall be engaged in minimum four batches (batch size of 20 students).

List of Assignments

1. Demonstration of OS installation : Windows and Linux. Study and execute basic linux commands.
2. Prepare Resume using MS office/LibreOffice/MS Office 365/Google Docs following feature: Heading Font Size: 12 Bold, Font type: Times New Roman, Tables, Images, Bullets. List.
3. Create a database for student result analysis records using MS excel sheet (Use properties like: Sum, Average, Order, Alphabet order, Percentage, Topper list, analysis)
4. Design a PowerPoint Presentation for a suitable topic using following design features like drawing, design, transition, animations, themes, timing etc.
5. Create a web page using HTML and CSS. (Website domain: Educational, Social, Entertainment, Sports, Trading, Medical, etc.).
6. (A) Create your personal social media account on LinkedIn. Group discussion on technical topics using Zoom/Google meet/Microsoft team online platform.
   (B) Study and Understand how to use the Google technologies (Gmail, Classroom, YouTube, etc.), Record, upload and publish videos on YouTube.

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HS23101: Communication and Professional Skills F.Y. B. Tech (Sem-I and Sem-II)		
Teaching Scheme: **TH.: 2 Hr. / Week**	**Credits: 02**	**Examination Scheme:** **Activity: 10 Marks** **TW : 20 Marks** **Oral : 30 Marks**

Course Objectives:

1. To communicate well using meaningful sentences for conversation or speech
2. To comprehend communication process and write effectively and enhance formal communication
3. To acquire better presentation skills and participate in healthy discussion: both formal and informal among peers
4. To be confident in facing interviews, acquiring professional skills and be industry ready

Course Outcomes: On completion of the Course, learner will be able to:

CO1: Communicate with their peers and professionals confidently.

CO2: Understand how to analyse their personality using SWOC analysis technique.

CO3: Develop presentation and participate in group discussion.

CO4: Understand and implement etiquette in workplace and in society at large.

Course Contents

Unit I: English Grammar and Linguistic Competence Building **[07 Hrs.]**

Tenses in English, Modal Auxiliary Verbs, Enhancement of Word Power, Essentials of Pronunciation in English

Unit II: Language Skills and Presentation Skills Enhancement **[07 Hrs.]**

Listening, Speaking, Reading and Writing, Making an Effective Presentation, Group Discussion: Dos and Don'ts of Group Discussion

Unit III: . .Business Writing **[07 Hrs.]**

Letter Writing, Resume Writing, Report Writing, Email Writing

Unit IV: Job Readiness **[07 Hrs.]**

Professional Etiquette, SWOC Analysis, Types of Interviews, Interview Skills, Mock Interview, Facing an Interview

Term Work/Assignments:

Term work will consist of the record of the following assignments.

1. Letter/Application writing
2. Resume writing
3. Group Discussion
4. Report Writing

Textbooks:

- *Communication Skills for Technical Students* by T. M. Farhatullah, Orient Longman, 2002.
- *Communication for Business: A Practical Approach* by Shirley Tailor and V Chandra, Pearson, 2010.

Reference Books:

- Corporate Communication by Jaishri Jethwaney, Sage, 2018.
- Written Communication in English by Saran Freeman, Orient Longman, 2010.
- Business Correspondence and Report Writing, R. C. Sharma and Krishna Mohan, Tata McGraw Hill, 2017.
- A Foundation Course in Human Values and Professional Ethics, R R Gaur and R Sangal and G P Bagaria, Excel Books, 2010.
- Functional Grammar and Spoken and Written Communication in English, Bikram K Das, Orient Blackswan, 2006.
- 77 Ways to Perfect Your Communications Skills: Enhancing Your Personal and Professional Relationships, Frank H Leone, 2020.
- Handbook of Pronunciation of English Words, J Sethi, Eastern Economy Edition, 2010.

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HS23103 B - Physical Education - Exercise and Field Activities-II		
Teaching Scheme: **Theory: --** **Practical: 2 Hour/Week**	**Credits: 01**	**Examination Scheme:** **Practical: 30 Marks**

Prerequisites:

Introduction to sports and yoga.

Course Objectives:

- To impart the students with basic concepts of Physical Education, Sports and Yoga for health and wellness.
- To familiarize the students with health related Exercise, Sports and Yoga for Overall growth & development.
- To impart the basic knowledge and skills to teach Physical Education, Sports & Yoga activities.

Course Outcomes (COs): The students will be able to

CO1: To understand the basic principles and practices of Physical Education, Sports and Yoga.

CO2: To be able to practice Physical Activities, Sports and Yoga.

Course Contents

1. **Introduction to Sports and Health.** **(04 Hours)**

   Need and Importance, History, Types, Typical equipment and other requirements, Precautions, Benefits, Rules and regulations, and Modern trends of Physical Education, Sports and Yoga (Through class room videos interaction/Self learning videos)

2. **Physical Fitness Practice:** **(12 Hours)**

   - Importance of Yoga & Fitness.
   - Fundamental Principles of Yoga & Fitness Training.
   - Components of Fitness and Fitness Equipment.
   - Types of Yoga Practices – Yogic Asanas, Pranayama and Meditation
   - Introduction to Nutrition and Balanced Diet for Fitness

3. Sports and Games **(12 Hours)**

- Student should select one unique game out of the following in each Semester:
  - Outdoor Games: Cricket, Volleyball, Basketball, Kabbadi, Khokho, Handball, Netball, Softball, Football, Baseball, Skating.
  - Indoor Games: Badminton, Table Tennis, Ball badminton, Lawn Tennis, Wrestling, Squash..
  - Athletics: Track Events, Long Jump, High Jump, Triple Jump, Shot put, Discus Throw, Hammer, Javelin Throw, Archery, Pole Vault.
  - Gymnastics: Mallakhamb, Rope Mallakhamb .
  - Swimming: Swimming Events, Diving, Water polo.
  - Other Indoor Games:
    (A) Weight Lifting, Power Lifting, Body Building.
    (B) Board Games: Chess, Bridge.
  - Martial Arts: Boxing, Judo, (Taekwondo, Fencing, Karate)

Text Books:

1. DK (2021) Know your sport,DK India.
2. J Bains (2019),Essential of physical education,Kalyani publication.
3. Swami Vivekananda Yoga Prakashana

Reference Books:

1. William Martin (2023),the book of sports.
2. Om book editorial team (2016),Encyclopedia:Sports Encyclopedia Om book international.
3. Yogacharya Swami Omkareshwarananda (2019),Yogasanas,Pranayama and Meditation,Pigeon books.
4. V.K.Sharma (2022),Health and physical education,New sarawati house India Pvt.Ltd.
5. You tube and other online resourses.

Guidelines for Practical Conduction:

1. Physical Education
   - General & Specific warm up exercises
   - Recreation Games and Fitness
   - Any one Major Game
2. Yoga
   - Suryanamaskara
   - Basic Set of Yoga Asanas
   - Basic Set of Pranayama & Meditation

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FY B. Tech Semester II Subject Name: Cocurricular course – II Subject Code: -HS23104 -B		
Teaching Scheme: **TH:** - **PR:** 02 Hrs./Week	**Credits: 01**	**Examination Scheme:** **Course Activity:** **In-Semester Exam:** - **End-Semester Exam:** -
		PR 30 Marks

Introduction:

The Cocurricular course is designed to introduce students to the world of performing arts by combining dance, drama, and various art forms. Students will learn to express themselves creatively, collaborate with peers, and develop a deeper understanding of storytelling through movement, acting, and visual arts.

Companion Course, if any: Practical

Course Objectives:

The course aims to foster creativity, collaboration, and a holistic understanding of performing arts and their integration.

Course Outcomes:

On completion of the course, learner will be able to –

CO1: express themselves creatively.

CO2: demonstrate teamwork, and collaboration with peers.

CO3: develop a deeper understanding of storytelling through movement, acting, and visual arts.

CO4: enhance experiential learning through use of technology for effective communication.

Course Contents

Unit I: Introduction to Co-curricular Activities **(6 Hrs.)**

Types, Theory (of Music, Dance, Theater, Literary, Fine Art, Applied and Other Forms), Programmes and Competitions, Benefits, Professional Aspects

Unit II: Performing Activities/Practicing – Demos etc. **(10Hrs.)**

Student **must Join one / one from each group** of the following clubs and perform activities on given theme in group or Individual.

Group I:

(a) Music and Singing: Singing and Instrumental (Percussion Group: Keyboard, Tabla, Flute etc.) and String Group: (Tambora, Veena, Guitar, Violin, Banjo etc.), Folk Type: Dafali, Ektari, Dholki. Types: Classical, Semi-classical, and Westerns

(b) Dance: Types: Classical, Semi-classical, Contemporary

(c) Theater: Drama, One-act-play, Mono-act, Skit, Mime, Mimicry,

Group II:

(d) Literary: Poetry, Elocution, Quiz, Debate

(e) Art & Craft and Fine Art: Drawing, Painting, Rangoli, Cartooning, Knitting, Weaving,

Embroidery, Quilling, Paper Folding, Clay Modeling Tattoo Making Photography, Videography, Digital Art (Related to Computers, Media)
(f) Other Activities: NSS, Gardening, Cooking.

Unit III: Post Activity **(6 Hrs)**

Report preparation/ performance video/ Participation/ Group Activities/ Professional Certification.
Sample Topics in each Performing Activity: Performing, Choreography/Composing/Direction, Backstage Management (Lighting, ...) Literary: Script Writing.

Guidelines for Laboratory - Practical Assessment:

1. The distribution of weightage of practical marks should be informed to students before start of the semester.
2. Student progress should be observed on a continuous basis. At frequent intervals students are expected to inform about their progress/lagging. Practical examinations will be conducted at the end of semester.

LIST OF ACTIVITIES (to be performed by the student)

1. Students should prepare a short video of his/her own art form. (3-4 min)
2. Student should participate in any of the competition conducted in the institute or outside the institute as an outcome of the course and to show evidence of the same.
3. Student should prepare a portfolio report of his/her work for submission.

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course co-ordinator

H.P. Borade

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