Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Electrical and Electronics Engineering)

SEMESTER II (w.e.f. Batch 2018-19)

COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTMA201		APPLIED MATHEMATICS - II	3	1	0	4	60	20	20	0	0

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Objectives:

To introduce the students with the Fundamentals of the Calculus of Matrices, Differential Equations and Numerical Analysis

Course Outcomes:

After the successful completion of this course students will be able to

1. Understand and apply the basics of the calculus of matrices.
2. Solve the fundamental problems of the ordinary differential equations.
3. Apply the advanced techniques to find the solution of the ordinary differential equations.
4. Know the techniques of the numerical analysis.
5. Find the numerical solution of the ODE and PDE.

Syllabus:

UNIT I

Calculus of Matrices

Systems of linear equations and their solutions.Matrices, determinants, rank and inverse.Linear transformations. Range space and rank, null space and nullity. Eigenvalues and eigenvectors. Similarity transformations.Diagonalization of Hermitian matrices.Bilinearandquadraticforms.

UNIT II

Differential Equation

Ordinary Differential Equations: First order linear and nonlinear ordinary differential equations, exactness and integrating factors. Ordinary linear differential equations of n-th order, solutions of homogeneous and non-homogeneous equations.Operator method.Method of undetermined coefficients and variation of parameters.

UNIT III Differential Equation

Power series methods for solutions of ordinary differential equations. Legendre equation and Legendre polynomials, Bessel equation and Bessel functions of first and second kind.

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UNIT IV

Numerical Analysis

Interpolation and Curve Fitting: Introduction to Interpolation; Calculus of Finite Differences; Finite Difference and Divided Difference Tables; Newton-Gregory Polynomial Form; Lagrange Polynomial Interpolation; Theoretical Errors in Interpolation; Spline Interpolation; Approximation by Least Square Method.**Numerical Differentiation and Integration:** Discrete Approximation of Derivatives: Forward, Backward and Central Finite Difference Forms, Numerical Integration, Simple Newton-Cotes Rules: Trapezoidal and Simpson's (1/3) Rules; Weddle's Rule, Gaussian Quadrature Rules: Gauss-Legendre, Gauss-Laguerre, Gauss-Hermite, Gauss-Chebychev.

UNIT V

Numerical Solution of ODE & PDE: Euler's Method for Numerical Solution of ODE; Modified Euler's Method; Runge-Kutta Method (RK2, RK4), Error estimate; Multistep Methods: Predictor-Corrector method, Adams-Moulton Method; Boundary Value Problems and Shooting Method; finite difference methods, numerical solutions of elliptic, parabolic, and hyperbolic partial differential equations.

Text Books:

1. G. Strang, Linear Algebra And Its Applications, 4th Edition, Brooks/Cole, 2006
2. S. L. Ross, Differential Equations, 3rd Edition, Wiley, 1984.
3. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall, 1995.
4. W.E. Boyce and R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 7th Edition, Wiley, 2001.
5. K. E. Atkinson, Numerical Analysis, John Wiley, Low Price Edition (2004).
6. S. D. Conte and C. de Boor, Elementary Numerical Analysis - An Algorithmic Approach, McGraw-Hill,2005.
7. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi

Reference Books:

1. E. Kreyszig, Advanced Engineering Mathematics, 9th Edition, Wiley, 2005.
2. R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 5th Ed, Wiley, 1999.
3. J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.
4. J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in Applied Mathematics, Vol. 12, Springer Verlag, 2002.
5. J. D. Hoffman, Numerical Methods for Engineers and Scientists, McGraw-Hill, 2001.
6. M.K Jain, S.R.K Iyengar and R.K Jain, Numerical methods for scientific and engineering computation (Fourth Edition), New Age International (P) Limited, New Delhi, 2004.
7. S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw-Hill 2008.

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							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCH101		**APPLIED CHEMISTRY**	3	1	2	5	60	20	20	30	20

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Course Objectives:

To give basic knowledge of polymer science.
(B) To understand and apply the knowledge of electrochemistry and its laws. (C) To give basic knowledge of corrosion and control over it. (D) To understand the various sophisticated instrumental techniques. (E)To give basic knowledge of water, lubricants and different properties of water.

Course Outcomes:

After the successful completion of this course students will be able to

1. Understand of various high polymers and their properties.
2. Understand the importance of electrochemistry and its laws in the field of technology and dealing with its numerical approach.
3. Understand metal corrosion and control over it.
4. Implement instrumental techniques as powerful tool for qualitative and quantitative analysis of compounds.
5. Analyze boiler feed water for industrial use and drinking water for domestic use.

Syllabus:

UNIT I

POLYMERS AND REINFORCED PLASTICS

Classification of polymers - types of polymerization reactions - mechanism of addition polymerization: free radical, ionic and Ziegler - Natta - effect of structure on the properties of polymers - strength, plastic deformation, elasticity and crystallinity - Preparation and properties of important resins: Polyethylene, PVC, PMMA, Polyester, Teflon, Bakelite and Epoxy resins - compounding of plastics - moulding methods - injection, extrusion, compression

UNIT II

(a) ELECTROCHEMISTRY: Arrhenius theory of electrolytic dissociation, Transport number, Kohlrausch's law, Solubility product, Redox reaction, Electrochemical and concentration cells.

(b) CORROSION AND ITS CONTROL: Corrosion: Basic concepts - mechanism of chemical, electrochemical corrosion - Pilling Bedworth rule – Types of Electrochemical corrosion - galvanic corrosion - differential aeration corrosion - pitting corrosion - stress

corrosion – Measurement of corrosion (wt. loss method only) - factors influencing corrosion.

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Corrosion control: Cathodic protection - sacrificial anodic method – corrosion inhibitors. Protective coatings: surface preparation for metallic coatings - electro plating (copper plating) and electroless plating (Nickel plating) - chemical conversion coatings - anodizing, phosphating& chromate coating

UNIT III

a) BASIC INSTRUMENTAL TECHNIQUES: Basic principles, instrumentation and applications of potentiometry, UV - visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy and flame photometry.

(b) ENGINEERING MATERIALS: Cement, Refractories etc.

UNIT IV

a) WATER TREATMENT: Water quality parameters: Physical, Chemical & Biological significance - Hardness of water - estimation of hardness (EDTA method) - Dissolved oxygen – determination (Winkler's method), Alkalinity - determination - disadvantages of using hard water in boilers: Scale, sludge formation - disadvantages - prevention - treatment: Internal conditioning - phosphate, carbon and carbonate conditioning methods - External: Zeolite, ion exchange,Lime Soda methods &Numericals- desalination - reverse osmosis and electrodialysis - domestic water treatment.

(b) Surface Tension: Introduction; Origin of Surface Tension; Surface energy; Laplace & Young-Laplace Equation, Capillarity; Contact Angle; Measurement of Surface Tension by Capillary rise method; Variation of Surface Tension of a liquid with Temperature and Concentration.

(c) Lubricants: Mechanism of lubrication, Classification of lubricants, Properties & testing of lubricating oil. Definition of viscosity of a liquid; Determination of Viscosity; Shear Viscosity; Intrinsic Viscosity; Molecular weight from Viscosity measurement & Numerical problems based on viscosity index.

UNIT V

Metal in Industry

Structure of coordination compounds corresponding to coordination number up to 6, Types of ligands, Isomerism [geometrical, optical, ionization, linkage and coordination], Theories of bonding in coordination compounds- crystal field theory, Valence bond theory, Chelation

Reference Books:

1. Applied Chemistry – Theory and Practice, O.P. Viramani, A.K. Narula, New Age Pub.
2. Polymer Science – Ghosh, Tata McGraw Hill.
3. Chemistry for Environmental Engineering – Sawyer, McCarty and Parkin –McGraw Hill, International.
4. Basic Lubrication theory – Alistair Cameron
5. Engineering chemistry- Dr. JyotiMitna
6. Engineering chemistry- Dr. SunitaRatan
7. Applied Chemistry – S.M. Khopkar
8. Polymer Science- V.R. Gowawriker
9. Introduction of polymer science- G.S. Mishra

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List of Practicals:

1. To estimate the strength of the given unknown solution of Mohr's salt (Ferrous ammonium sulphate ($FeSO_4(NH_4)_2SO_4.6H_2O$) using $KMnO_4$ solution as an intermediate.
2. Estimation of hardness by EDTA method.
3. Conduct metric titration - determination of strength of an acid
4. Estimation of iron by potentiometry.
5. Determination of molecular weight of polymer by viscosity average method
6. Determination of Na / K in water sample by Flame photometry (Demonstration)
7. Determination of total alkalinity and acidity of a water sample
8. Estimation of calcium ions present in tap water. (TDS)
9. To determine the viscosity of a given liquid (30% sugar solution) at room temperature using Ostwald's viscometer.
10. Testing of Flash point of lubricating oil by Pensky Martins apparatus.
11. To determine the viscosity index by Red wood Viscometer 1 & 2.

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							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE 101		INTRODUCTION TO ELECTRICAL ENGINEERING	3	1	2	5	60	20	20	30	20

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Course Objectives:

To introduce the students with the different profiles in Electrical Engineering like A C Fundamentals, Electrical Machines, Power System, Measurements, and concepts related to shock and earthing

Course Outcomes:

After the successful completion of this course students will be able to:

1. Understand the basics of Electrical Engineering.
2. Understand the A C fundamental, and apply them.
3. Measure the Electrical parameters and understand the safety measures.
4. Know about the basics of power system.
5. Understand the working theory of Electrical Machine.

Syllabus:

UNIT-I

Introduction to Power system: Structure & Growth of Indian Power Systems, Generation, Transmission and Distribution.

UNIT-II

Introduction to electrical measuring instruments: Methods of Measurement, Measurement System, Classification of Instrument System, Characteristics of Instruments & Measurement System, Errors in Measurement & Its Analysis. Analog and digital instruments- classification

UNIT-III

Safety & protection: Safety precautions in handling electrical appliances; Electric shock, First aid for electric shock other hazards of electrical laboratories & safety rules; Grounding & Earthing– Importance.

UNIT-IV

Introduction to Power Electronics and control system.

Types of Batteries, Important characteristics for Batteries, Elementary calculations for energy consumption, power factor improvement and battery backup.

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UNIT-V

Components of LT switchgear: Switch Fuse Unit(SFU),MCB, ELCB, MCCB, Types of wires and Cables. Load and Load characteristics, Load curves and Load-duration Curves.

Text books:

1. Basic Electrical Engineering, Vincent Deltoro.
2. A Course In Power Systems, J B Gupta, Kataria and Sons.
3. Solar Photovoltaic Technology and Systems. Chetan Singh Solanki,PHI.
4. Electrical Power Distribution Systems, V Kamaraju, Mc Graw Hill Education.

List of Experiments:

1. Analysis of Three phase AC Transmission.
2. Measurement of power in a three phase circuit by two wattmeter method.
3. Measurement of various line & phase quantities for a 3-phase circuit.
4. Analyze the Basic safety precautions in Electrical lab.
5. Analysis of earthing styles like plate and pipe earthing.
6. Residential House Wiring Using switches, Fuse, Indicator, Lamp and Energy Meter.
7. Measurement of the Insulation Resistance.
8. Analyze different types of measuring instruments.
9. Identification of Electronics Components.
10. Identification of different types of circuit breakers

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COURSE CODE	CATEGORY	COURSE NAME	L	T	P	CREDITS	TEACHING & EVALUATION SCHEME				
							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEC 102		FUNDAMENTALS OF ELECTRONICS ENGINEERING	3	0	2	4	60	20	20	30	20

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***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

(A) An understanding of basic Electronics Engg. abstractions on which analysis and design of electronic circuits and systems are based, basic devices(analog and digital) and instrumentation abstractions. (B) The capability to use abstractions to analyze and design simple electronic circuits. (C) The ability to formulate and solve the different logic circuits and Boolean equations. (D) An understanding of how devices such as semiconductor diodes, rectifiers, and bi-polar junction transistors are working and how they are used in the design of useful circuits.

Course Outcomes:

1. Students will: Learn how to develop and employ circuit models for elementary electronic components, e.g., resistors, sources, inductors, capacitors, diodes and transistors;
2. Become adept at using various methods of circuit analysis, including simplified methods such as series-parallel reductions, voltage and current dividers, etc.
3. Develop the capability to analyze and design simple circuits containing non-linear elements such as transistors using the concepts of load lines, operating points and incremental analysis;
4. Learn how the primitives of Boolean algebra are used to describe the processing of binary circuits and to use electronic components as building blocks in electronically implementing binary functions.

Syllabus:

UNIT I

Evolution and Impact of Electronics in industries and in society, Familiarization of Resistors, Capacitors, Inductors, Transformers and Electro mechanical components, PN Junction diode: Structure, Principle of operation, Photo diode, LED, Solar cell.

UNIT II

Rectifiers and power supplies: Half wave and full wave rectifier, capacitor filter, Zener voltage regulator, Bipolar Junction Transistors: Structure, Principle of operation, characteristics Amplifiers.

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UNIT III

Basic Instruments, electrical measurement – measurement of voltage , current , power & energy, voltmeters & ammeter , wattmeter , energy meter , , electronics instrument – multimeter, CRO (analog & digital),An overview of voltage regulator.

UNIT IV

Number System: Introduction to binary, octal, decimal & hexadecimal systems, representation of negative numbers, 1's, 2's, 9's, 10's complement and their arithmetic. Introduction, Definitions, Principle of Duality, Basic Theorems, Applications of Boolean Algebra, Boolean Functions, Complement of Boolean Function. Logic Gates (Symbol, Truth Table, Logic Diagram): And, OR, NOT, NAND, NOR, XOR, XNOR. Universal Gates: NAND Gate and NOR Gate implementation.

UNIT V

SIGNALS: Introduction, Representation of Discrete-time Signals: Graphical Representation, Functional Representation, Tabular Representation, Sequence Representation. Elementary Signals: Unit Step Function, Unit Ramp Function, Unit Parabolic Function, Unit Impulse Function, Sinusoidal Signal, Real Exponential Signal, Complex Exponential Signal, Rectangular Pulse Function, Triangular Pulse Function.

Reference Books:

1. Bell, D. A., Electronic Devices and Circuits, Oxford University Press
2. Boylested, R. L. and Nashelsky, L., Electronic Devices and Circuit Theory, Pearson Education
3. Digital Design M. Morris Mano and Michael D. Ciletti, Pearson Education
4. AAnand Kumar, Signals and Systems, PHI.
5. Vijay Baru, RajendraKaduskar, Sunil T. Gaikwad, Basics of Electronics Engineering, Wiley India Pvt. Ltd

List of Practicals:

1. Familiarization with Laboratory Instruments (Oscilloscope, Function Generator, Digital Multimeter, DC Power Supply)
2. Characterization of Passive Circuit Elements (R, L, C)
3. Time & Frequency Response of RC and RL Circuits
4. V-I curve for P-N Junction Diodes.
5. V-I curve for Zener Diode.
6. Zener as a voltage regulator
7. Half-Wave and Full-Wave(Center tapped and Bridge) Rectifiers
8. Bipolar Junction Transistor (BJT) Circuits (Inverter, Common Emitter Amplifier)
9. Conversion of number system
10. Basic Combinatorial Circuits.

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							THEORY		PRACTICAL		
							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTCE 101	DCS	FUNDAMENTALS OF CIVIL ENGINEERING	3	0	2	4	60	20	20	30	20

Legends: **L** - Lecture; **T** - Tutorial/Teacher Guided Student Activity; **P** – Practical; **C** - Credit;
***Teacher Assessment** shall be based following components: Quiz/Assignment/ Project/Participation in Class, given that no component shall exceed more than 10 marks.

Course Educational Objectives (CEOs):

The Students (A) Will Be Able to identify various civil engineering aspects (B) with emphasis on civil engineering materials, various surveys and major structures in civil engineering (C) efficiently & effectively

Course Outcomes:

After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes

The students will be able to

1. Understand and identify various building materials
2. Perform various surveys required to carry civil engineering work
3. Identify various aspects of remote sensing.
4. Get knowledge about various aspects of roads and dams.

Syllabus:

UNIT I

Building Materials

Stones, bricks, concrete, cement, lime, mortar ,timber-types, properties & uses. Nominal proportion of Concrete preparation of concrete, compaction, curing.

UNIT II

Construction Elements

Elements of Building Construction- Types and their suitability Foundations & footings, brick masonry walls, floors, roofs, Doors, windows, lintels, staircases.

UNIT III

Surveying

Introduction to surveying Instruments – levels, Theodolite, plane tables and related devices.. Measurement of distances –by EDM, measurement of directions by different methods, measurement of elevations by different methods. Reciprocal leveling.

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UNIT IV

Mapping & Sensing:

Mapping details and contouring, measurement of areas, volumes, application of measurements in quantity computations, Introduction of remote sensing and its applications.

UNIT V

Roads: Types of Roads, Nagpur Road Plan, Components of Road and their function; Bridges: types and Important parts of bridges.

Reference Books:

1. S. Ramamrutam & R.Narayanan; Basic Civil Engineering, Dhanpat Rai Pub. Punmia, B.C., Surveying, Standard book depot.
2. Surveying by Duggal – Tata McGraw Hill New Delhi.
3. Building Construction by S.C. Rangwala- Charotar publications House, Anand.
4. Building Construction by Grucharan Singh- Standard Book House, New Delhi.
5. Global Positioning System Principles and application- Gopi, TMH

List of Practicals:

Students are expected to perform experiments from the list suggested
Below by preferably selecting experiments from each unit of syllabus.

S. No. Title

1. To perform traverse surveying with prismatic compass, check for local attraction and determine corrected bearings and to balance the traverse by Bowditch's rule.
2. To perform leveling exercise by height of instrument of Rise and fall method.
3. To determine (a) normal consistency (b) Initial and Final Setting time of a cement Sample.
4. To determine the workability of fresh concrete of given proportions by slump test or compaction factor test.
5. To determine the Compressive Strength of brick.
6. To determine particle size distribution and fineness modulus of course and fine Aggregate.

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							END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*
BTEE 103		ELECTRICAL WORKSHOP	0	0	4	2	0	0	0	50	50

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Course Educational Objectives (CEOs):

The objective of this course is to familiarize the students with commonly used components, accessories and measuring equipment in Electrical installations. The course also provides hands on experience in setting up of simple wiring circuits

Course Outcomes:

After the successful completion of this course students will be able to

1. Understand different Electrical components.
2. Understand different wiring practices.
3. Understand different Earthing Practices.
4. Understand different Lighting System.

Syllabus:

1. Study of various electrical components.
a) Domestic.
b) Industrial.
2. Study of different wiring pratices.
a) Domestic.
b) Industrial.
3. Study of earthing practices.
a) Domestic.
b) Industrial
4. Study of various lighting systems.
   (1) Flourescent lamp
   (2) HPMV lamp
   (3) SV lamp
   (4) Metal Hallide lamp
   (5) Hallogen lamp
   (6) Igniters various lamps
   (7) Compare Flourescent lamps
5. Study of Electrical Motor starter
   (a) DOL
   (b) Semi-automatic stardelta
   (c) Fully automatic stardelta
   (d) Slip ring motor starter
   (e) Auto-transformer motor starter

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(f) DC motor starter

6. Study of motor protection system
   (a) Thermal overload relay
   (b) Single phasing preventor
   (c) Static protection relay against over heating
7. Study of following
   (a) ELCB
   (b) MCB
   (c) Fusess

Reference Books:

1. S.L.Uppal Electrical, estimating and costing.
2. J.B.Gupta Electrical estimating and costing and other reference books (National Electric codes)

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