Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER I

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTMA 101	BS	APPLIED MATHEMATICS - I	60	20	20	0	0	3	1	0	4

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 Differential, Integral, Vector Calculus 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 differential calculus.
2. Know the fundamental principles of the integral calculus and apply them.
3. Apply the techniques in the numerical analysis.
4. Know the numerical solution of the system of linear algebraic equations.
5. Understand and apply the basics of the vector calculus.

Syllabus:

UNIT I
Differential Calculus: Limits of functions, continuous functions, uniform continuity, montone and inverse functions. Differentiable functions, Rolle's theorem, mean value theorems and Taylor's theorem, power series. Functions of several variables, partial derivatives, chain rule, Tangent planes and normal's. Maxima, minima, saddle points, Lagrange multipliers, exact differentials

UNIT II
Integral Calculus: Riemann integration, fundamental theorem of integral calculus, improper integrals. Application to length, area, volume, surface area of revolution. Multiple integrals with application to volume, surface area, Change of variables.

UNIT III
Numerical Analysis
Number Representation and Errors: Numerical Errors; Floating Point Representation; Finite Single and Double Precision Differences; Machine Epsilon; Significant Digits.
Numerical Methods for Solving Nonlinear Equations: Method of Bisection, Secant Method, False Position, Newton-Raphson's Method, Multidimensional Newton's Method, Fixed Point Method and their convergence.

UNIT IV

Numerical Analysis

Numerical Methods for Solving System of Linear Equations: Norms; Condition Numbers, Forward Gaussian Elimination and Backward Substitution; Gauss-Jordan Elimination; FGE with Partial Pivoting and Row Scaling; LU Decomposition; Iterative Methods: Jacobi, Gauss Siedal; Power method and QR method for Eigen Value and Eigen vector.

UNIT V

Vector Calculus: Gradient and directional derivative, Divergence and Curl of Vector point function, line and surface integrals. Green's, Gauss' and Stoke's theorems and their applications.

Text Books:

1. T. M. Apostol, Calculus, Volume I, 2nd Ed, Wiley, 1967.
2. T. M. Apostol, Calculus, Volume II, 2nd Ed, Wiley, 1969.
3. K. E. Atkinson, Numerical Analysis, John Wiley, Low Price Edition (2004).
4. S. D. Conte and C. de Boor, Elementary Numerical Analysis - An Algorithmic Approach, McGraw-Hill,2005.
5. B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi

Reference Books:

1. R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 5th Ed, Wiley, 1999.
2. J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.
3. J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in Applied Mathematics, Vol. 12, Springer Verlag, 2002.
4. J. D. Hoffman, Numerical Methods for Engineers and Scientists, McGraw-Hill, 2001.
5. 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.
6. S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw-Hill 2008.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER I

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCH 101	**BS**	**ENGINEERING CHEMISTRY**	**60**	**20**	**20**	**30**	**20**	**3**	**1**	**2**	**5**

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Course Objectives:

1. To give basic knowledge of polymer science.
2. To understand and apply the knowledge of electrochemistry and its laws.
3. To give basic knowledge of corrosion and control over it.
4. To understand the various sophisticated instrumental techniques.
5. To give basic knowledge of water, lubricants and different properties of water.

Course Outcomes: After completion of this course the students are expected to be able to demonstrate following knowledge, skills and attitudes. The student will demonstrate capability of

1. Theoretical understanding of various high polymers and their properties.
2. Became aware of the importance of electrochemistry and its laws in the field of technology and dealing with its numerical approach.
3. Understanding metal corrosion and control over it.
4. Implementing instrumental techniques as powerful tool for qualitative and quantitative analysis of compounds.
5. Analyzing 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 crystalline -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

Electrochemistry: Arrhenius theory of electrolytic dissociation, Transport number, Kohlrausch's law, Solubility product, Redox reaction, Electrochemical and concentration cells and their applications, Ion selective electrodes..

Corrosion And Its Control: Corrosion: Basic concepts - mechanism of chemical, electro

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

UNIT III

Basic Instrumental Techniques: Basic principles, instrumentation and applications of potentiometer, UV - visible spectroscopy, infrared spectroscopy, atomic absorption spectroscopy and flame photometry.General introduction of chromatography.

UNIT IV

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 & Numerical- desalination - reverse osmosis and electro dialysis - domestic water treatment.

UNIT V

(A) 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.

(B)Engineering Materials

Cement and Refectories

References

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. Jyoti Mitna
6. Engineering chemistry- Dr. Sunita Ratan
7. Applied Chemistry – S.M. Khopkar
8. Polymer Science- V.R. Gowawriker
9. Introduction of polymer science- G.S. Mishra

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER I

List of Practical's:

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. Conductometric 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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Bachelor of Technology (Civil Engineering)

SEMESTER I

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			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME 101	**ODS**	**ENGINEERING DRAWING**	**60**	**20**	**20**	**30**	**20**	**3**	**0**	**4**	**5**

***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:

1. To familiarize with concepts of scale, conic sections and engineering curves.
2. To familiarize with the concepts related to the projections of points and line in all quadrants; construction of geometrical figures & solids, with its orientation on horizontal and vertical planes, and its projection; section of solid, development of solid and isometric projection view.

Course Outcomes:

1. Student would be able to draw scale, conic sections and engineering curves.
2. Student would be able to draw projection of point and line; indentify the use of these concepts in practical life.
3. Students would be able to understand plain &3D model at various orientations and draw their projection.
4. Student would be able to draw the projections of with and without sectioning of solid models and surface development.
5. Students would be able to understand the difference between orthographic view and isometric projections.

Syllabus:

UNIT I

Scales, Conic Section & Engineering Curves

Scales: Representative Factor, types of scales, principle and construction of different scales

Conic Section: Construction of ellipse, parabola and hyperbola by different methods; Normal and Tangent

Engineering Curves: Cycloid, Epicycloids, Hyper cycloid, Involutes, Archimedean and Logarithmic spirals.

UNIT II

Projection of Points & Line

Projection: Introduction to projection, Types of projection, terminology, first angle and third angle

Projection Of Points: Introduction of point, conventional representation

Projection Of Lines: Introduction of straight line, orientation of straight line, true inclination and true length, concepts of end projectors, plan and traces and auxiliary planes

UNIT III

Projection of Planes & Solids

Projections Of Planes- Introduction of planes, types of planes, orientation of planes, projection of planes in different positions, traces of planes

Projection Of Solids- Introduction of solids, classification of solids, recommended naming of corners of solids, orientation of solids

UNIT IV

Section of Solids & Development of Surfaces

Section Of Solids- Introduction of section of solids, terminology, types of section planes, section of prisms, section of pyramid and section of composite solids

Development Of Surfaces- Introduction of development of surfaces, classification of surfaces, methods of development, development of prisms, pyramids, cylinder and cone, anti-development

UNIT V

Isometric Projections

Isometric Projections- Introduction of isometric projection, terminology, isometric projections and isometric views, isometric views of planes, right solids, truncated solids and composite solids.

Text Books:

1. Engineering Drawing by N.D. Bhatt.
2. Engineering Drawing by C. Agarwal & Basant Agarwal.
3. Engineering Drawing by P.S. Gill.

Reference Books:

1. Engineering Drawing by Leonel Zurbito
2. Engineering Drawing by Nor Azlan Ramli
3. Engineering Drawing by Ninad Watve

List of Practical's:

1. Drawing various types of scales using representative fraction.
2. Drawing various conics section.
3. Drawing various engineering curves like Cycloid, Epicycloids, Hyper cycloid, Involutes, Archimedean and Logarithmic spirals.
4. Projection of points in all quadrants.
5. Projection of straight lines in all quadrants in various orientations.
6. Projection of geometrical planes with various orientations.
7. Projection of solid models with various orientations.
8. Projection of section of solids by using various types of cutting planes.
9. Drawing development of surface using various methods of prisms, pyramids, cone, cylinder, etc.
10. Drawing anti- development of surfaces.
11. Drawing isometric projections using various methods and isometric views.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER I

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COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTEC 102	ODS	FUNDAMENTAL OF ELECTRONICS ENGINEERING	60	20	20	30	20	3	1	2	5

***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: The subject aims to provide the student with:

1. 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.
2. The capability to use abstractions to analyze and design simple electronic circuits.
3. The ability to formulate and solve the different logic circuits and Boolean equations.
4. 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

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 Practical's:

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

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

SEMESTER I

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTCE 101	**DCS**	**FUNDAMENTALS OF CIVIL ENGINEERING**	**60**	**20**	**20**	**30**	**20**	**3**	**1**	**2**	**5**

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Course Objectives:
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 (D)

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.

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.

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Reference Books:

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

List of Practical's:

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.

Shri Vaishnav Vidyapeeth Vishwavidyalaya

Bachelor of Technology (Civil Engineering)

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			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME 103	ODS	WORKSHOP PRACTICES	0	0	0	30	20	1	0	2	2

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Course Objectives:

1. To paraphrases with workshop technology, industrial safety, and understand material properties.
2. To paraphrases with carpentry shop, fitting shop, welding and sheet metal shops.

Course Outcomes:

1. Student would be able to understand the need of workshop, technology related to it, and industrial safety and precautions.
2. Student would be able to use carpentry tools, analyse various wood joints and their properties.
3. Students would be able to use fitting tools to make various shapes and design.
4. Student would be able to recognize various welding techniques and their needs.
5. Students would be able to design various shapes by using sheet metals and tools related to it.

Syllabus:

UNIT I
Introduction to Workshop Technology & Industrial Safety
Workshop Technology- Introduction, Need Of Workshop And Types Of Workshop
Industrial Safety- Introduction, objective of industrial safety, causes of accidents, common sources of accidents, preventive measures, and common safety methods.

UNIT II
Carpentry Shop
Carpentry- Introduction, types of timbers, defects in timbers, timber prevention, characteristics of good timber, common tools used in carpentry shop (marking and measuring tools; cutting tools and striking tools), and common wood joints (cross-lap, corner-lap, dovetail and bridle joints).

UNIT III
Fitting Shop
Fitting- Introduction, tools used in fitting shop (measuring tools, holding tools, cutting tools, striking tools and supporting tools) and operation performed in fitting work.

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UNIT IV
Welding Shop
Welding- Introduction, terminological elements of welding process, welding joints (lap joints and butt weld joint), welding positions, advantages and disadvantages of welding, classification of welding, gas welding processes and safety recommendation for gas welding.

UNIT V
Sheet Metal Shop
Sheet Metal- Introduction, metal used in metal work, sheet metal tools (hand shears or snips**,** hammers, stakes, cutting tools and measuring tools), folding terminology of metal sheet joint, folded sheet metal joints and sheet metal operations.

Text Books:
1. Manufacturing Technology by P. N. Rao
2. Workshop Technology by B.S. Raghuvansi

Reference Books:
1. Production Technology by R.K. Jain
2. Principles of Manufacturing Material & Process - Campbeu

List of Practical's:
1. To study various industrial safety precautions & preventive measures.
2. To study the various timber properties, its defects and its prevention.
3. To make various joints (L-joint, T-joint, Cross joint, etc.) using carpentry tools.
4. To perform various fitting shop operations using fitting tools.
5. To study various welding methods and its safety precaution.
6. To make various welding joints (Butt joints, Lap, joints, corner joints, etc).
7. To study sheet metal properties and safety precautions.
8. To make various shapes using sheet metal tools and terminologies.