



Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Program Name: Bachelor of Technology

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		Th	T	P	CREDITS
			END SEM	MST	Q/A	END SEM	Q/A				
BTMA201	BS	Applied Mathematics II	60	20	20	-	-	3	1	-	4

Course Objective

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 solve of the ordinary differential equations.
4. Know and apply the techniques of the numerical analysis for the solution of the ODE and PDE.

Course Content:

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. Bilinear and quadratic forms.

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.

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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.

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

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, finite difference methods, numerical solutions of elliptic, parabolic, and hyperbolic partial differential equations.

Texts:

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

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BTMA201	BS	Applied Mathematics II	60	20	20	-	-	3	1	-	4

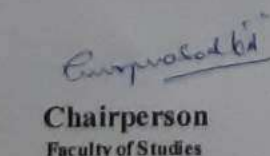
- B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi

References:

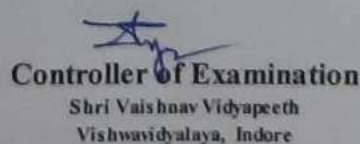
- E. Kreyszig, Advanced Engineering Mathematics, 9th Edition, Wiley, 2005.
- R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 5th Ed, Wiley, 1999.
- J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.
- J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in Applied Mathematics, Vol. 12, Springer Verlag, 2002
- 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.
- S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw-Hill 2008.
- J.D.Hoffman, Numerical Methods for Engineers and Scientists, McGraw-Hill, 2001.


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Shri Vaishnav Institute of Science

Name of Program: B.Tech. (All streams)

(2021-2025)

COURSE CODE	CATEGORY	COURSE NAME	TEACHING & EVALUATION SCHEME									
			THEORY			PRACTICAL			L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*					
BTCH101	BEC	Applied Chemistry	60	20	20	30	20	3	1	2	5	

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 subject aims to provide the student with:

1. To bring adaptability to new developments in Engineering Chemistry to acquire the skills required to become a perfect engineer.
2. To include the importance of water analysis and treatment in industrial usage, significance of corrosion control to protect the structures, structure, and applications of electrochemical cells.
3. To acquire required knowledge about engineering materials like cement, refractories, and lubricants and to understand the instrumentation techniques used in industries.
4. To acquaint the students with practical knowledge of the basic concepts of chemistry.

Course Outcomes (COs):


1. Students will gain the basic knowledge of chemical procedures related to polymerization, redox reactions and corrosion and its control.
2. They learn the use of fundamental principles to make predictions about the general properties of materials like lubricants, cement and refractories and the instrumentation techniques used in industries.
3. They can understand the basic properties of water and its treatment to overcome the boiler related problems in industries and power plants.
4. They can predict potential applications of chemistry and practical utility to become good engineers and entrepreneurs.


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.


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Shri Vaishnav Institute of Science

Name of Program: B.Tech. (All streams)

(2021-2025)

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Unit-II

(A) 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.

(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. 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

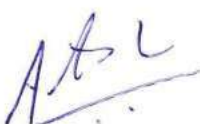
BASIC INSTRUMENTAL TECHNIQUES


Basic principles, instrumentation, and applications of UV - visible spectroscopy, Infrared spectroscopy, and flame photometry. General introduction of Chromatography.


Unit-IV

WATER ANALYSIS AND 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.


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Shri Vaishnav Institute of Science

Name of Program: B.Tech. (All streams)

(2021-2025)

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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 Refractories.

References

1. Engg. Chemistry- Rath cengage learning.
2. Chemistry for Environmental Engineering – Sawyer, McCarty and Parkin McGraw Hill, International.
3. Basic Lubrication theory – Alistair Cameron
4. Engineering chemistry- Dr. Jyoti Mitna
5. Engineering chemistry- Dr. Sunita Ratan
6. Applied Chemistry – S.M. Khopkar
7. Polymer Science- V.R. Gowawriker
8. Introduction of polymer science – G.S. Mishra.

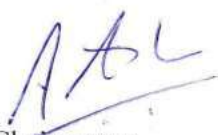
List of Experiments


Exp. 01. To estimate the strength of the given unknown solution of Mohr's salt (Ferrous ammonium sulphate ($\text{FeSO}_4(\text{NH}_4)_2\text{SO}_4 \cdot 6\text{H}_2\text{O}$) using KMnO_4 solution as an intermediate.


Exp.02 Estimation of hardness by EDTA method.

Exp.03. Conductometric titration - determination of strength of an acid.

Exp.04. Estimation of iron by potentiometry.


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Name of Program: B.Tech. (All streams)

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Exp.05. Determination of molecular weight of polymer by viscosity average method.

Exp.06. Determination of Na / K in water sample by Flame photometry (Demonstration).


Exp.07. Determination of total alkalinity and acidity of a water sample.


Exp.08 Estimation of calcium ions present in tap water. (TDS).


Exp.09 To determine the viscosity of a given liquid (30% sugar solution) at room temperature using Ostwald's viscometer.

Exp.10 Testing of Flash point of lubricating oil by Pensky Martins apparatus.

Exp.11 To determine the viscosity index by Red wood Viscometer 1 & 2.


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B. Tech/B.Tech+MBA in Mechanical Engineering
(2021-2025)

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME201	BEC	FUNDAMENTALS OF MECHANICAL MEASUREMENT	60	20	20	30	20	3	0	2	4

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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Course Educational Objectives (CEOs):

1. Develop fundamental understanding of mechanical measurements
2. Impart knowledge of measurement concepts and their practice.
3. Develop knowledge of measurement errors and their causes.

Course Outcomes (COs):

After learning the course the students should be able to:

- (1). Students will describe basic concepts of mechanical measurement
- (2). Students will understand linear and angular measuring instrument for measurement of various components
- (3). Students will be able to measure force, torque and strain.
- (4). Students will be able to measure displacement, velocity, acceleration etc.
- (5). Students will be able to measure temperature, pressure and surface finish.

Syllabus

Unit - I

(10 Hrs)

Mechanical Measurement

Need of mechanical measurement, Basic Terminology and Definition: Hysteresis, Linearity, Resolution of measuring instruments, Threshold, Drift, Zero stability, loading effect and system response. Measurement methods, Generalized Measurement system, limit-gauging, various systems of limits, fits and tolerance, interchangeability, ISI and ISO system, basic principles and design of standards of measuring gauges; types of gauges and their design, accuracy and precision, calibration of instruments, principles of light interference, interferometer, measurement and calibration; Static performance characteristics, Errors and their classification.

Unit – II

(9 Hrs)

Linear and Angular Measurements:

Linear Measurement Instruments, Vernier calliper, Micrometer, Interval measurements: Slip gauges, checking of slip gauges for surface quality, Optical flat, Limit gauges, Problems on

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measurements with gauge. angular measuring instruments; sine bar, angle gauges; spirit level, autocollimators, clinometers; measurement of straightness, flatness and squareness.

Unit – III **(9 Hrs)**

Measurement of Force, Torque and Strain:

Force measurement: load cells, cantilever beams, proving rings, differential transformers.
Measurement of torque: Torsion bar dynamometer, servo controlled dynamometer, absorption dynamometers. Power Measurements.
Measurement of strain: Mechanical strain gauges, electrical strain gauges, strain gauge: materials, gauge factors, theory of strain gauges and method of measurement, bridge arrangement, temperature compensation.

Unit – IV **(8 Hrs)**

Displacement, Velocity/Speed, and Acceleration, Measurement:

Working principal of Resistive Potentiometer, Linear variable differential transducers, Electro Magnetic Transducers, Mechanical, Electrical and Photoelectric Tachometers, Piezoelectric Accelerometer, Seismic Accelerometer.

Unit - V **(9 Hrs)**

Temperature Measurement:

Temperature Measuring Devices: Thermocouples, Resistance Temperature Detectors, Thermistor, Liquid in glass Thermometers, Pressure Thermometers, Pyrometer, Bimetallic strip. Calibration of temperature measuring devices

Pressure Measurement: Relative pressure scales, pressure reference instruments, barometer, manometer, deadweight tester, pressure gauges and transducers etc.

Measurement of surface finish: Surface finish definitions, types of surface texture, surface roughness measurement methods, comparison, profile-meters, pneumatic and replica, measurement of run out and concentricity.

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BTME201	BEC	FUNDAMENTALS OF MECHANICAL MEASUREMENT	60	20	20	30	20	3	0	2	4

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Text and Reference Books:

1. Engineering Metrology and Measurement, N V Raghavendra and Krishnamurthy, Oxford University Press, 2013.
2. Metrology and Measurement, Anand Bewoor & Vinay Kulkarni McGraw-Hill, 2009.
3. Instrumentation, Measurement and Analysis, B.C. Nakra, K.K. Chaudhry McGraw-Hill, 2017.
4. A course in Mechanical Measurements and Instrumentation, A K Sawhney, Dhanpat Rai Publications, 2005.
5. Mechanical Measurements and Instrumentations, Er. R K Rajput, Kataria Publication (KATSON), 2012.
6. Mechanical Measurement & Control by D.S. Kumar, Metropolitan Book Co. 2017.
7. Mechanical Measurement and Metrology by R K Jain, Khanna Publisher, 1994.

List of Experiments:

1. Basic understanding of measurements: concepts, application, advantage and future aspects
2. Linear measurement of various objects and check different characteristics of measurements.
3. Angular measurement of various objects and check different characteristics of measurements.
4. Temperature measurements and check different characteristics of measurements and also do calibration
5. Temperature measurements and calibration of thermocouple.
6. Performance on Stress, strain and force measurements and check different characteristics of measurements and also do calibration
7. Performance on Speed/Velocity, acceleration measurements.
8. Performance on surface measurements

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COURSE CODE	CATE-GORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
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BTAU201	BEC	Automobile Engineering and Vehicle Safety	60	20	20	0	0	3	0	0	3

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Course Educational Objectives (CEOs):

The objectives of the course is to develop knowledge of (A) Chassis layout (B) Transmission Systems (C) Control Systems (D) Suspension Systems (E) Vehicle Safety and Motor Vehicle Act

Course Outcomes (COs):

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

1. The students will be able to describe the function of a given part of the specified automobile chassis/frame/ body.
2. Students will be able to explain design considerations and features of special purpose vehicles and classify special type of vehicles based on the need and purpose.
3. The students will be able to describe the function and able to select the type of clutch, gear box and transmission system for the given application.
4. The students will be able to select relevant procedure, tool and equipment for wheel alignment and balancing for the given vehicle.
5. The students will be able to Identity different safety systems of vehicles and understanding the motor vehicle act-related terms.

Syllabus

UNIT I

Introduction, Vehicle Layout and Chassis

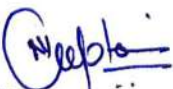
(10 Hrs)


Introduction: Definition, Classification of automobiles, Major components of Automobiles with their function and location.

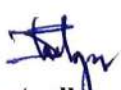
Vehicle Layout: Definition Significance of Vehicle Layout, Different types of vehicle layouts (FEFWD, FERWD, RERWD, 4WD), Advantages, Disadvantages, Applications and comparisons of different types of vehicle layouts.

Chassis: Requirement, Function, Classification, Advantages, Disadvantages and applications of Chassis, Basic body nomenclature.

Special Purpose Vehicles: Classification of Special Purpose Vehicles based on applications, Wheel type & Track type vehicle, Power Plants, Transmission, Final Drive, Multi-axle vehicles.


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BTAU201	BEC	Automobile Engineering and Vehicle Safety	60	20	20	0	0	3	0	0	3

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P – Practical; C - Credit;

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UNIT II

(9 Hrs)

Automobile Transmission Systems

Clutch: Function, Requirement, Working principle and classification of clutch, Construction and working of single plate, Multiplate and Centrifugal clutch.

Gear Box: Function, Necessity, Classification of Gear Box, Construction and working of Constant Mesh and Synchro mesh gear box; Epicyclic gear train.

Transmission: Function, Construction and working of Automatic transmission and Semi Automatic transmission, Flywheel, Torque Converter, Propeller Shaft, Universal and Slip joint, Differential, Stub axle, Semi floating and fully floating rear axle

UNIT III

(9 Hrs)

Automobile Control Systems

Braking System: Principle of Braking, Function and requirement of Braking System: Basic Terms related to Braking (Stopping Distance, Braking Efficiency, Fading of Brakes); Types of Braking System: Layout, Construction, Working of Drum, Disc, Hydraulic and Air Brakes. Master Cylinder, Wheel Cylinder, Tandem Master Cylinder, Significance and general procedure of Bleeding of Brake. Anti lock braking System.

Steering System: Function and requirements of steering system, Basic terms related to steering (Steering ratio, Turning radius, Under steering and Over steering), Basic components of steering linkages. Types of steering gear boxes, Working of hydraulic and electronic power steering. steering geometry, significance and ranges of caster (Positive, Megative), Camber (Positive, Negative), Toe-in, Toe out, King pin inclination (KPI), steering axis inclination (SAI)

UNIT IV

(9 Hrs)

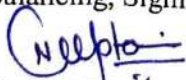
Automobile Suspension, Wheels, Rims and Tyres

Automobile Suspension: Function and Requirement of rigid suspension System: Basic terms related with suspension system: (Jounce, Rebound, Sprung and Unsprung Weight, Spring rate, Elasticity), Constructional features of leaf Springs. Types of suspension systems: Independent Suspension System, Mac-Pherson Strut Type, Wishbone type. and air suspension system; Shock Absorbers: Principle, Function and Types of shock absorber with construction and working

Wheels, Rims and Tyres:

Function, Necessity, Requirement and types of wheel, Rim and Tyres; Tyre Economy: Consideration in Tyre Tread Design, Factors affecting to Tyre Life, Tyre Wear and Rotation, Tyre designation.

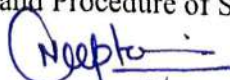
Wheel Alignment and Balancing: Purpose and Procedure of Wheel Alignment, Purpose of Wheel Balancing, Significance and Procedure of Static and Dynamic Balancing.



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COURSE CODE	CATE-GORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTAU201	BEC	Automobile Engineering and Vehicle Safety	60	20	20	0	0	3	0	0	3

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.

UNIT V

(9 Hrs)

Vehicle Safety and Motor Vehicle Act

Vehicle Safety: Survival Space Requirements, Restraints Systems Used Automobiles, Types of Safety Belts, Head Restraints, Air Bags Used in Automobiles, Use of Energy Absorbing Systems in Automobiles, Impact Protection from Steering Controls, Design of Seats for Safety, Types of Seats Used in Automobiles. Importance of Bumpers in Automobiles, Damageability Criteria in Bumper Designs. Introduction to the Types of Safety Glass and their Requirements and Rearward Field of Vision in Automobiles, Types of Rear View Mirrors and their Assessment. Warning Devices, Hinges and Latches etc.

Motor Vehicle Act: Introduction, Objectives, and Salient Features of M. V. Act 1988 or latest M. V. Act. (after the amendment of M. V. Act 1988), latest Central Motor Vehicle Rules. Important transport terms (Definitions) in M. V. Act (Motor Vehicle, Motor Cycle, HGV, MG, LGV, Public service vehicle, transport Vehicle, Driver Passenger Accident) Organization Structure of Motor Vehicle (RTO) Department, Duties and Responsibilities of RTO, AIMV.

Text Books:

1. "A Text Book of Automobile Engineering", Rajput R. K., Laxmi Publications Pvt. Ltd., New Delhi, 2008.
2. "Automobile Engineering", Kamaraju Ramakrishna, PHI Learning Pvt. Ltd., New Delhi, 2012
3. "Automobile Engineering (Vol I and II)", Dr. Kirpal Singh, Standard Publishers, New Delhi, 2004.
4. "Automotive Mechanics", Crouse W.H., Anglin D.W Tata McGraw Hill Publications, Delhi, 1965.

Reference Books:

1. "Construction Equipment Operation & Maintenance", Y. Pokras and M. Tushnyakov, MIR, Moscow.
2. "Truck Cranes", A. Astskhov, MIR, Moscow.
3. "Motor Graders", E.G. Poninson, MIR, Moscow.
4. "Motor Vehicle Act, 1988", CMV Rules Eastern Book Company, Mumbai.
5. "Compendium of Transport Terms", CIRT, Pune Central institute of Road Transport, CIRT Publications. Bhosari Pune, 2007.
6. "The Drivers Manual", Pasricha P. S. Nasha Publications, Mumbai, 1994
7. "Road Safety Guide", Pasricha P. S. Nasha Publications, Mumbai, 1994

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COURSE CODE	CATEG ORY	COURSE NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assessment*	END SEM University Exam	Teachers Assessment*				
BTME101	BEC	ENGINEERING DRAWING	60	20	20	30	20	2	0	4	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.

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 **(9 Hrs)**

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 **(8 Hrs)**

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 **(7 Hrs)**

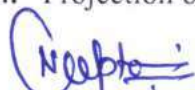
Isometric Projections: Introduction of isometric projection, terminology, isometric projections and isometric views, isometric views of planes, right solids, truncated solids and composite solids.

Text and Reference Books:

1. "Engineering Graphics" by P.I. Varghese, McGraw Hill Edu., 2012.
2. "Engineering Drawing and graphics" by K. Venugopal, New Age (I) Pub., 2004.
3. "Engineering Drawing" by N.D. Bhatt, Charotar Publishing House, 2014.
4. "Engineering Drawing" by Basant Agarwal & C.M. Agarwal, McGraw Hill Edu., 2013.
5. "Engineering Drawing" by P.S. Gill, S.K. Kataria & Sons, 2013.

List of Experiments:

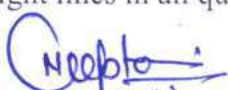
1. Drawing various types of scales using representative fraction.
2. Drawing various conics section.
3. Projection of points in all quadrants.
4. Projection of straight lines in all quadrants in various orientations.



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BTME101	BEC	ENGINEERING DRAWING	60	20	20	30	20	2	0	4	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.

5. Projection of geometrical planes with various orientations.
6. Projection of solid models with various orientations.
7. Projection of section of solids by using various types of cutting planes.
8. Drawing development of surface using various methods of prisms, pyramids, cone, cylinder, etc.
9. Drawing anti- development of surfaces.
10. Drawing isometric projections using various methods and isometric views.

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BTME103	BEC	WORKSHOP PRACTICES	0	0	0	30	20	0	0	2	1

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Course Educational Objectives (CEOs):

To paraphrases with (A) workshop technology, industrial safety, and understand material properties. (B) Carpentry shop, fitting shop, (C) welding and casting.

Course Outcomes:

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

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, analyses 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 casting technologies.

Syllabus:

UNIT I

(6 Hrs)

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

(6 Hrs)

Carpentry Shop:

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).

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BTME103	BEC	WORKSHOP PRACTICES	0	0	0	30	20	0	0	2	1

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UNIT III **(6 Hrs)**

Fitting Shop:

Introduction, tools used in fitting shop (measuring tools, holding tools, cutting tools, striking tools and supporting tools) and operation performed in fitting work.

UNIT IV **(6 Hrs)**

Welding Shop:

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 **(6 Hrs)**

Casting:

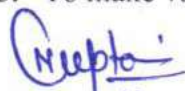
Pattern making and sand casting, Pattern materials, Types of pattern, Pattern allowances. Core prints. Moulding sand, ingredients, classification, sand additives, properties of moulding sand, sand preparation and testing. Green sand mould preparation. Cores and core making – Types of cores.

Text and Reference Books:

1. "Workshop Technology (Part-I)" by W.A.J. Chapman, CBS Pub, 2001.
2. "Production Technology (Vol-I)" by R.K. Jain, Khanna Publishers, 19th ed. 2019.
3. "Principles of Manufacturing Material & Process" by J.S. Campbell McGraw Hill, 1984.
4. "Welding: Principles & Practices" by Edward R. Bonhart, McGraw Hill Edu. India
5. "Welding and Welding Technology" by Richard L. Little, McGraw Hill, 2017.
6. "Principles of Foundry Technology" by P.L. Jain, McGraw Hill, 2017.
7. "Manufacturing Technology (Vol-I)" by P. N. Rao, McGraw Hill, 2017.
8. "Workshop Technology (Vol-I)" by B.S. Raghuvanshi, Dhanpat Rai & Co. 2015.

List of Experiments:

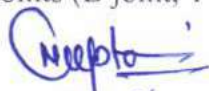
1. To study various industrial safety precautions & preventive measures.
2. To study the various timber properties, its defects and its prevention.
3. To make various joints (L-joint, T-joint, Cross joint, etc.) using carpentry tools.



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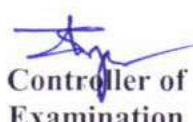
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BTME103	BEC	WORKSHOP PRACTICES	0	0	0	30	20	0	0	2	1	

Legends: L - Lecture; T - Tutorial/Teacher Guided Student Activity; P - Practical; C - Credit;
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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 various types of patterns and pattern allowances.
8. To study properties of moulding sand and prepare a mould.
9. To study various types of cores and its application in casting.

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