B. Tech. in Automobile Engineering

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*				
BTMA201		APPLIED MATHEMATICS II	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 20 marks.

Course Educational Objectives (CEOs):

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

Course Outcomes (COs):

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

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, 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.

Unit - III

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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, 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.

Numerical Solution of Ode &Pde: Euler's Method for Numerical Solution of ODE; Modified

Reference Books:

1. *"Advanced Engineering Mathematics", by E. Kreyszig, 9th Edition, Wiley, 2005.*
2. *"Introduction to Real Analysis", by R. G. Bartle and D. R. Sherbert, 5th Ed, Wiley, 1999.*
3. *"Calculus: Early Transcendentals", by J. Stewart, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.*
4. *"Numerical Methods for Engineers and Scientists", by J. D. Hoffman, McGraw-Hill, 2001.*
5. *"Numerical methods for scientific and engineering computation", by M.K Jain, S.R.K Iyengar and R.K Jain, (Fourth Edition), New Age International (P) Limited, New Delhi, 2004."*
6. *"Linear Algebra and Its Applications", by G. Strang, 4th Edition, Brooks/Cole, 2006*
7. *"Differential Equations, S. L. Ross", by 3rd Edition, Wiley, 1984.*
8. *"An Introduction to Ordinary Differential Equations", by E. A. Coddington, Prentice Hall, 1995.*
9. *"Elementary Differential Equations and Boundary Value Problems", by W.E. Boyce and R.C. DiPrima, 7th Edition, Wiley, 2001.*
10. *B. S. Grewal, Higher Engineering Mathematics, Khanna Publishers, Delhi*

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*				
BTCH101		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 20 marks.

Course Educational Objectives (CEOs):

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

Course Outcomes (COs):

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

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 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,

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Kohlrausch's law, Solubility product, Redox reaction, Electrochemical and concentration cells.

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

(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 &Numerical- desalination - reverse osmosis and electro dialysis - 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", by O.P. Viramani, A.K. Narula, New Age Pub.*
2. *"Polymer Science", by Ghosh, Tata McGraw Hill.*

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

List of Experiments

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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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*				
BTEC102		FUNDAMENTAL OF ELECTRONICS ENGINEERING	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 20 marks.

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Course Educational Objectives (CEOs):

The subject aims to provide the student with an understanding of (A)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 (COs):

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. 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.

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

List of Experiments

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.

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6. Zener as a voltage regulator
7. Half-Wave and Full-Wave (Centre 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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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*				
BTCE103		APPLIED MECHANICS	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 20 marks.

Course Educational Objectives (CEOs):

The Students (A) Will Be Able to familiarize with different branches of mechanics (B) with emphasis on their analysis and application to practical engineering problems(C) efficiently & effectively

Course Outcomes (COs):

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. To apply knowledge of mathematics, science in engineering.
2. To identify, formulate, and solve engineering problems
3. Demonstrate various types of forces and their analysis.
4. Demonstrate shear force and bending moment on structural member i.e. beams
5. Demonstrate Centre of gravity and moment of inertia determination of different geometrical shaped figures.

Syllabus

Unit - I

Static Forces: Introduction to Engineering Mechanics, Classification of Engineering Mechanics, Statistics, Dynamics, Kinematics, Kinetics etc. Fundamental Laws of Mechanics Force, Pressure and Stress, Free Body Diagram, Bow's Notation, Characteristics and Effects of a Force, System of Forces, Resolution of a Force, Composition of Forces, Resultant / Equilibrant Force, Law of Parallelogram of Forces, Law of Triangle of Forces, Polygon Law of Forces, Lami's Theorem, Equilibrium of a Body Under Two / Three/More Than Three Forces. Law of Superposition of Forces.
Coplanar Concurrent Forces, Coplanar Non Concurrent Forces, Moment of a Force, Principle of Moments/ Varignon's Theorem, Parallel Forces, Resultant of Parallel Forces, Couple, Moment of a Couple, Resolution of Force into a Couple.

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Unit - II

Analysis of Framed Structure: Frame, Types of frame, Truss, Types of truss, Analysis of Truss, Various methods of Analyzing the truss, Numerical analysis of truss.

Unit - III

CG and MI: Centroid, Centre of Gravity, Determination of Centroid of Simple Figures, Centroid of Composite Sections. Centre of Gravity of Solid Bodies. Area Moment of Inertia: Basic Concept of Inertia, Definition of Moment of Inertia, Theorems of Moment of Inertia, Radius of Gyration, Polar Moment of Inertia of Standard Sections, Moment of Inertia of Composite Section, Principal Moment of Inertia, Mass Moment of Inertia.

Unit - IV

Beams: Types of Beams: Simply Supported Beam, Overhanging Beam, Cantilever Beam. Types of Supports of a Beam or Frame: Roller, Hinged and Fixed Supports. Load on the Beam or Frame: Different Types of Loading. Support Reaction of a Beam, Shear force, Bending Moment, Pure bending.

Unit - V

Introduction to Dynamics: Overview of Dynamics, Basic Concepts and Terms Used in Dynamics, Motion, Types of Motion, Newton's Laws of Motion, Newton's Law of Gravitation.

Reference Books:

1. *"Applied Mechanics", by Prasad I.B., Khanna Publication.*
2. *"Elements of Civil Engg & Engg. Mechanics", by Shesha Prakash and Mogaveer;; PHI*
3. *"Mechanics of stricture", by S. P. Timoshenko, East West press Pvt.Ltd.*
4. *"Engineering Mechanics: Statics & Dynamics", by R.C. Hibbler –*
5. *"Engineering Mechines- statics dynamics", by A. Boresi & Schmidt-, Thomson' Books*

List of experiments

1. To verify the law of Triangle of forces and Lami's theorem.
2. To verify the law of parallelogram of forces.
3. To verify law of polygon of forces
4. To find the support reactions of a given truss and verify analytically.
5. To determine support reaction and shear force at a given section of a simply Supported beam and verify in analytically using parallel beam apparatus.
6. To determine the moment of inertia of fly wheel by falling weight method.
7. To verify bending moment at a given section of a simply supported beam.
8. Study of Various Beams and their Loading conditions
9. Study of Newton's laws of motion
10. Study of Newton's law of Gravitation

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(Revised Syllabus)

SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT *	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT *				
BTME102		FUNDAMENTALS OF MECHANICAL ENGINEERING	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 20 marks.

Course Educational Objectives (CEOs):

To introduction with (A) Engineering Materials, (B) Thermodynamics, heat engines (C) Boiler and Steam (D) Refrigeration & Air conditioning, (E) Production.

Course Outcomes (COs):

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

1. Students would be able to understand the need of engineering materials, and its property, need and defects.
2. Students would be able to analyses basics of thermodynamics and able to understand various mechanical instruments.
3. Students would be able to understand I C engines, their working and operating conditions.
4. Students will be able to understand the basics of refrigeration & air conditioning.
5. Students would be able to recognize production methodology and their need.
6. Students would be able to demonstrate various case studies based on heat engines, basics of thermodynamics, productions.

Note: - Steam table is permit during examination.

Syllabus

Unit - I

Introduction to Engineering Materials: Introduction, classification materials, need of engineering materials, mechanical properties like strength, hardness, toughness, ductility, brittleness, malleability etc. of materials, Stress-strain diagram of ductile and brittle materials, Hooks law and Modulus of elasticity.

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Unit - II

Introduction to Thermodynamics: Definition of thermodynamics, thermodynamic systems, Macroscopic and Microscopic views, thermodynamic equilibrium, properties of system, point & path function, Zeroth, First and second law of thermodynamics, thermodynamic processes at constant pressure, volume, enthalpy & entropy.

Unit - III

Introduction to Heat Engines: Introduction, need of heat engines, types of heat engines.
IC Engines: Introduction, terminology of IC engine, Carnot, Otto and Diesel cycles P-V & T-S diagrams and its efficiency, two and four stroke engines, latest technologies used in engines of vehicle.
Boilers: Introduction, classification of boilers, working of Cochran, Lancashire, Locomotive and Babcock and Wilcox boilers, mountings & accessories.
Introduction of steam, steam formation, properties of steam, use of steam table.

Unit - IV

Introduction to Refrigeration: Introduction, need of refrigeration, reverse Carnot cycle, unit of refrigeration, coefficient of performance, Vapor compression cycle, P-h and T-S diagrams, deviations from theoretical cycle.
Air Conditioning: Introduction and need of air conditioning, air conditioning components and control.

Unit-V

Introduction to Manufacturing: Introduction of basic manufacturing process, introduction to casting, Rolling, Extrusion, Arc and Gas welding, Brazing, Soldering. Introduction to Lathe and Drilling machines and their various operations.

Reference Books:

1. *"Mechanical Engineering", by R. K. Rajput*
2. *"Basic Mechanical Engineering", by D. K. Gupta*
3. *"Basic Mechanical Engineering (MP",) by Domkundwar*
4. *"Mechanical Engineering", Handbook (CRC Press)*
5. *"Mechanical Engineering Reference Book", by E.H. Smith*
6. *"An Introduction to Mechanical Engineering", by Wickert/Lewis*
7. *"Engineering Fundamentals: An Introduction to Engineering:, by Moaveni*

List of Experiments

1. To perform tensile test, plot the stress-strain diagram and evaluate the tensile properties of a given metallic specimen.
2. To calculate Mechanical Advantage, Velocity ratio and efficiency of various temperature and pressure measuring devices and plot graphs.
3. To study Two-Stroke and Four-Stroke Diesel Engines.

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4. To study Two-Stroke and Four-Stroke Petrol Engines.
5. To study Cochran and Babcock and Wilcox boilers.
6. To study Lancashire and Locomotive boilers.
7. To study working and function of mountings and accessories in boilers.
8. To study the Refrigeration System.
9. To study the functioning of Window Room Air Conditioner.
10. To Study Lathe & Drilling Machines and various operation.
11. To perform Arc and Gas Welding operation on metal.

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SUBJECT CODE	Category	SUBJECT NAME	TEACHING & EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*				
BTME104		INTRODUCTION TO CAD & SOLID MODELLING	0	0	0	0	50	0	0	2	**1**

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 20 marks.

.

Course Educational Objectives (CEOs):

To paraphrases with (A) CAD, related applications with it and its need, (B) 2-D and 3-D modeling terms, draw and editing commands and utility commands.

Course Outcomes (COs):

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. Student would be able to understand CAD, its application and limitations.
2. Students would be able to use 2-D drawing, editing commands and its applications.
3. Student would be able to use solid modelling commands, and to understand various modelling methods.
4. Students would be able to solve assembly related problems.
5. Students would be able to draw various 2-D, solid models and analyze various machine assemblies.

Syllabus

Unit - I

Introduction to Cad: Introduction, history of 2D and solid modeling, menus, toolbars, pointing device, command prompt, function keys

Unit - II

2-D Drawing& Editing Commands: Introduction, line commands, coordinate systems, orthogonal lines, circle and arc commands, etc
Editing Commands: Introduction, erase and selection commands, move commands, copy commands, extend command, trim command, mirror command, etc
Layers & Linotypes: Introduction, layers status line weights, object properties.

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Unit - III

Solid modelling

Types of Modelling: Solid modeling, surface modeling and wire frame modeling
Draw Commands: Introduction, polygon, cuboids, donut, ellipse, multiline, conic sections, etc
Editing Commands: Introduction, extrudes, revolve, sweep, etc

Unit - IV

Assembly Drafting: Introduction, constraints, exploded views, interference check, layout, standard and section views, dimensioning, detailing and plotting.

Unit - V

Part Design: Introduction, 2-d model (triangle, rectangle, circle, etc), solid models (nut, bolts, small machine parts), machine assemblies

Reference Books:

1. *"An Introduction to Computer Aided Design (CAD)", by A. Mustun*
2. *"Mastering AutoCAD 2016 and AutoCAD LT 2016", by G. Omura*
3. *"AutoCAD 3D Training Manual", by K.S. Kurland*
4. *"CAD/CAM: Principles and Application", by Rao*
5. *"Computer Aided Manufacturing", by Rao*
6. *"CAD/CAM: Theory and Practices", by Zeid*
7. *"Mastering CAD/CAM (SIE",) by Zeid*

List of Experiments

1. To study various software for Computer Aided drafting.
2. To study various drawing commands for 2-D drawing in AutoCAD.
3. To study various editing commands from 2-D drawing in AutoCAD.
4. To draw various 2-D drawing using AutoCAD.
5. To study various solid modelling commands in AutoCAD.
6. To draw various solid models using AutoCAD.
7. To study various utility commands in AutoCAD.
8. To study various assemblies and drafting used in machine components.

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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*				
BTCS101		COMPUTER PROGRAMMING I	0	0	0	30	20	0	0	2	**1**

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 20 marks.

Course Educational Objectives (CEOs):

To understand the concepts of (A) programming languages (object oriented programming and its implementation). (B) Program design, program coding, debugging, testing for development. (C)To describe the concepts of loops, arrays.(D)To understand the concepts of memory, pointers, functions, variables.(E)To understand the concepts of class, constructor, destructor.

Corse Outcomes (COs):

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

1. Student will able to explain and implement the object oriented programming concepts.
2. Student will design, develop & test program for development.
3. Student will able to apply loop concept in program and design an array program.
4. Student will able to apply & implement the concept of class, constructor & destructor.

Syllabus

Unit -I

Introduction, History Types of languages Structured Language Object oriented programming OOPS terminology and features, Algorithms Definition, needs and characteristics Flow Charts Rules, Advantages and implementation Concepts of loping and counting.

Unit - II

Program Development Program Identification Analysis Program Design Coding Debugging Testing Documentation Maintenance Characteristics of a Good Program Data Types: Primary data types Tokens Variables and literals Keywords and operators C++ Data Types Operators and Expressions Types of operators Precedence of operators.

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Unit - III

Decision Making, Branching and Looping branching if, if- else, if-else-if statement switch Statement Conditional operator got statement looping while, do- while, for statements nesting of loops, jumping in loops. Arrays: One dimensional array two dimensional arrays, Multidimensional arrays.

Unit -IV

Pointers, Introduction Dynamic and Static allocation of memory Pointer Variable Pointer and arrays of pointers Dynamic memory allocation operators this pointer, User defined functions, Functions, arguments and return values Recursion of functions Variables in functions Automatic, External, Static and register variables.

Unit -V

Structures and Unions, Definition of class and object OOPs properties Member variable and member functions Friend Functions Class member access- private, public and protected Array of class objects Structured union, nested class, Constructors and Destructors, Polymorphism, Inheritance and file handling.

Reference Books:

1. *"Fundamentals of Computers", by E Balagurusamy, TMH*

2. *"Basic Computer Engineering: Silakari and Shukla", by Wiley India*

3. *"Fundamentals of Computers", by V Rajaraman, PHI*

4. *"Information Technology Principles and Application", by Ajoy Kumar Ray & Tinku Acharya PHI.*

List of Experiments

1. Introduction to different generations of languages (Structured Language Object oriented programming), OOPS terminology and features.
2. Study of procedural programming paradigm and object-oriented programming paradigm.
3. To demonstrate use of data types, simple operators (expressions).
4. To demonstrate decision making statements (switch case) decision making statements (if and if-else, nested structures).
5. To demonstrate use of simple loops and nested loops.
6. To demonstrate menu driven programs and use of standard library functions.
7. To demonstrate writing C programs in modular way (use of user defined functions
8. To demonstrate recursive functions.
9. To demonstrate use of 1D array and multidimensional array (2-d arrays).
10. To demonstrate use of pointers and concept of strings (strings and pointers).
11. Write a program to illustrate functions.
12. [Classes and Objects] write a program that uses a class where the member functions are defined inside a class.

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13. [Classes and Objects] write a program to demonstrate the use of static data members.
14. [Constructors and Destructors] Write a program to demonstrate the use of zero argument and parameterized constructors.
15. [Constructors and Destructors] write a program to demonstrate the use of dynamic constructor.
16. [Constructors and Destructors] write a program to demonstrate the use of explicit constructor.
17. [Operator Overloading] Write a program to demonstrate the overloading of increment and decrement operators.
18. [Operator Overloading] Write a program to demonstrate the overloading of binary arithmetic operators.
19. [Typecasting] Write a program to demonstrate the typecasting of basic type to class type.
20. [Typecasting] Write a program to demonstrate the typecasting of class type to basic type.
21. [Inheritance] Write a program to demonstrate the multilevel inheritance.
22. [Inheritance] Write a program to demonstrate the multiple inheritances.
23. [Inheritance] Write a program to demonstrate the virtual derivation of a class.
24. [Polymorphism] Write a program to demonstrate the runtime polymorphism.
25. [Exception Handling] Write a program to demonstrate the exception handling.
26. [File Handling] Write a program to demonstrate the reading and writing of objects.

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