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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*				
BTMA201	ODS	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

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

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Unit - IV

Numerical Analysis Interpolation and Curve Fitting: Introduction to Interpolation; Calculus of Finite Differences; Finite Difference and Divided Difference Tables; Newton-Gregory Polynomial Form; Lagrange Polynomial Interpolation; Theoretical Errors in Interpolation; Spline Interpolation; Approximation by Least Square Method.

Numerical Differentiation and Integration: Discrete Approximation of Derivatives: Forward, Backward and Central Finite Difference Forms, Numerical Integration, Simple Newton-Cotes Rules: Trapezoidal and Simpson's (1/3) Rules; Weddle's Rule, Gaussian Quadrature Rules: Gauss-Legendre, Gauss-Laguerre, Gauss-Hermite, Gauss-Chebychev.

Unit - V

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

References

1. *E. Kreyszig, Advanced Engineering Mathematics, 9th Edition, Wiley, 2005.*
2. *R. G. Bartle and D. R. Sherbert, Introduction to Real Analysis, 5th Ed, Wiley, 1999.*
3. *J. Stewart, Calculus: Early Transcendentals, 5th Ed, Thomas Learning (Brooks/ Cole), Indian Reprint, 2003.*
4. *J. Stoer and R. Bulirsch, Introduction to Numerical Analysis, 2nd Edition, Texts in Applied Mathematics, Vol. 12, Springer Verlag, 2002.*
5. *J. D. Hoffman, Numerical Methods for Engineers and Scientists, McGraw-Hill, 2001.*
6. *M.K Jain, S.R.K Iyengar and R.K Jain, Numerical methods for scientific and engineering computation (Fourth Edition), New Age International (P) Limited, New Delhi, 2004.*
7. *S. C. Chapra, Applied Numerical Methods with MATLAB for Engineers and Scientists, McGraw-Hill 2008.*
8. *G. Strang, Linear Algebra and Its Applications, 4th Edition, Brooks/Cole, 2006*
9. *S. L. Ross, Differential Equations, 3rd Edition, Wiley, 1984.*
10. *E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall, 1995.*
11. *W.E. Boyce and R.C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 7th Edition, Wiley, 2001.*
12. *K. E. Atkinson, Numerical Analysis, John Wiley, Low Price Edition (2004).*
13. *S. D. Conte and C. de Boor, Elementary Numerical Analysis - An Algorithmic Approach, McGraw-Hill,2005.*
14. *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*				
BTAX201	DCS	FUNDAMENTALS OF AUTOMOTIVE 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 familiarize with concepts of(A) Automotive frames (B) Steering and transmission systems (C) Suspension system (D) Electrical and Control Systems.

Corse 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 different types of frames used in various Automobiles.
2. Students would be able to Understand the basic knowledge of steering systems
3. Student would be able to Understand the transmission system and suspension system.
4. Gain knowledge about the constructional feature of wheels and tyres.
5. Student would be able to Understand automotive electrical basics and emission standards.

Unit-I

Chassis & Body Engineering: Types, Technical details of commercial vehicles, types of chassis, lay out, types of frames, vehicle body and their construction, safety aspects of vehicles, vehicle aerodynamics, optimization of body shape, drivers cab design, body materials, location of engine, front wheel and rear wheel drive, four wheel drive.

Unit-II

Steering System: front axle beam, stub axle, front wheel assembly, principles of types of wheel alignment, front wheel geometry viz. camber, Kingpin inclination, castor, toe-in and toe out, condition for true rolling motion, centre point steering, directional stability of vehicles, steering gear, power steering, slip angle, cornering power, over steer & under steer.

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Unit-III

Transmission System: Function and types of clutches, single plate, multi-plate clutch, roller & spring clutch, clutch lining and bonding, double declutching, types of gear Boxes, synchroniser, gear materials, determination of gear ratio for vehicles, gear box performance at different vehicle speed, automatic transmission, torque converters, fluid coupling, principle of hydrostatic drive.

Unit-IV

Suspension system : Basic suspension movements, Independent front & rear suspension, shock absorber, type of springs: leaf spring, coil spring, air spring, power & torque curve, torque & mechanical efficiency at different vehicle speeds, weight transfer, braking systems, disc theory, mechanical, hydraulic & pneumatic power brake systems, performance, self-ignition , air bleeding of hydraulic brakes, types of wheels and tyres, tyre specifications, construction and material properties of tyres & tubes.

Unit-V

Electrical and Control Systems: storage battery, construction and operation of lead acid battery, testing of battery, principle of operation of starting mechanism, different drive systems, starter relay switch, regulator electric fuel gauge, fuel pump, horn, wiper, Lighting system, head light dazzling, signaling devices, battery operated vehicles, choppers. importance of maintenance, scheduled and unscheduled maintenance, wheel alignment.

Unit-VI

Emission standards and pollution control: Indian standards for automotive vehicles Bharat I and II, Euro-I and Euro-II norms, fuel quality standards, environmental management systems for automotive vehicles, catalytic converters, fuel additives, and modern trends in automotive engine efficiency and emission control.

References

1. *Crouse , Automotive Mechanics TMH.*
2. *Srinivasan S; Automotive engines; TMH*
3. *Gupta HN; Internal Combustion Engines; PHI;*
4. *Joseph Heitner, Automotive Mechanics, Principles and Practices, CBS Pub.*
5. *Kripal Singh, Automotive Engineering Khanna Pub.*
6. *Newton & Steeds , Automotive Engineering*
7. *Emission standards from BIS and Euro I and Euro- Grading System 2013 - 14*

List of Experiments (please expand it):

Study of chassis, suspension, steering mechanisms, transmission, gear-box, differential systems, and electrical systems of various light and heavy automotive vehicles;

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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*				
BTEC102	ODS	FUNDAMENTALS OF ELECTRONICS ENGINEERING	60	20	20	30	20	3	0	2	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):

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,

References

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. *Anand Kumar, Signals and Systems, PHI.*
5. *Vijay Baru, Rajendra Kaduskar, Sunil T. Gaikwad, Basics of Electronics Engineering, 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.
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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			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM UNIVERSITY EXAM	TWO TERM EXAM	TEACHER ASSESSTMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSTMENT*				
BTAX202	DS	SENSORS AND TRANSDUCERS	60	20	20	30	20	2	0	2	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 20 marks.

Course Educational Objectives (CEOs):

The subject aims to provide the student with an understanding of (A) transducers .(B) sensors their .(C) types and .(D) characteristics

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 different types of Resistive and Inductive Transducers.
2. Students would be able to Understand the basic knowledge of Capacitive, Elastic and Active Transducers.
3. Student would be able to Understand the knowledge of types of Sensors and their characteristics

Syllabus

Unit - I

Introduction:

Introduction: Measurement systems, Basic electronic measuring system, Transduction principles, Classification of transducers, General transducers characteristics, Criteria for transducer selection.

Unit - II

Resistive and Inductive Transducers: Principles of operation, construction, theory, advantages and disadvantages, applications of Potentiometers, strain gauges, (metallic and semi-conductor type), Resistance Thermometer, Thermistors. Types of Inductive transducer, Principles of operation, construction, Advantages & disadvantages and applications. Various variable Inductive Transducers, LVDT (Linear variable differential transformer).

Unit - III

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Capacitive, Elastic and Active Transducers: Types of capacitive transducer, Principles of operation, construction, theory, advantages and disadvantages and applications, of capacitive transducers based upon familiar equation of capacitance. Types of Elastic Transducers: Spring bellows, diaphragm, bourdon tube – their special features and application. Types active Transducers, Thermocouple, Piezo-electric transducer, Magneto-strictive transducer, Hall effect transducer, Photo-voltaic transducer and Electrochemical transducer. Optical transducers: photo-emissive, photo-conductive and Photo-voltaic cells, Digital Optical encoder, Shaft encoder. Feedback fundamentals, introduction to Inverse transducer.

Unit - IV

Sensors: Sensor evaluation and selection Piezoelectric sensors linear position and displacement sensing, revolvers, encoders, velocity measurement, proximity, tactile, compliance and range sensing. Image Processing and object recognition

Unit - V

Signal Conditioning: Concept of signal conditioning, Introduction to AC/DC Bridges. Op-amp circuits used in instrumentation, Instrumentation amplifiers, analogue-digital sampling, introduction to A/D and D/A conversion, signal filtering, averaging, correlation, Interference, grounding , and shielding.

References

1. *Murty D V S, "Transducers & Instrumentation", PHI, New Delhi (2000)*
2. *Sawhney A K, "Electrical and Electronics Measurements and Instrumentation", Dhanpat Rai and Sons, New Delhi (2000).*
3. *Kalsi H S, "Electronic Instrumentation " Tata McGraw Hill, New Delhi, 4th Ed. (2001). Patranabis D, "Sensors and Transducers", PHI, New Delhi (2003).*
4. *Doebelin Ernest O, "Measurement Systems: Application and Design", Tata McGraw Hill Ltd., New Delhi (2004).*

List of Experiments (please expand it):

1. Familiarization with Transducers and their types.
2. Characterization of Transducers.
3. Familiarization with Sensors and their types.
4. Characterization of sensors.

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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 ASSESSMENT*	END SEM UNIVERSITY EXAM	TEACHER ASSESSMENT*				
BTME102	DCS	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 20 marks.

Course Educational Objectives (CEOs):

To familiarize with concepts of(A) scale, conic sections and engineering curves (B) projections of points and line in all quadrants; (C)construction of geometrical figures& solids, with its orientation on horizontal and vertical planes, and its projection; section of solid, (D)development of solid and isometric projection view.

Course Outcomes (COs):

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 draw scale, conic sections and engineering curves.
2. Student would be able to draw projection of point and line; identify 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.

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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

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

References

1. *Engineering Graphics by Varghese*
2. *Engineering Drawing by Leonel Zurbito*
3. *Engineering Drawing by Nor Azlan Ramli*
4. *Engineering Drawing by Ninad Watve*
5. *Engineering Drawing by N.D. Bhatt.*
6. *Engineering Drawing by C. Agarwal & Basant Agarwal.*
7. *Engineering Drawing by P.S. Gill.*

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.
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.

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9. Drawing anti- development of surfaces.
10. Drawing isometric projections using various methods and isometric views.

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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*				
BTME103	DCS	WORKSHOP PRACTICES	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 paraphrases with (A)workshop technology, industrial safety, and understand material properties. (B) carpentry shop, fitting shop, (C) welding and casting.

Corse 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 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 casting technologies.

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).

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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.

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

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.

References

1. *Production Technology by R.K. Jain*
2. *Principles of Manufacturing Material & Process by Campbeu*
3. *Welding: Principles & Practise by Bonhart*
4. *Welding and Welding Technology by Little*
5. *Principles of Foundry Technology by Jain*
6. *Manufacturing Technology by P. N. Rao*
7. *Workshop Technology by B.S. Raghuvansi*
8. *Introduction to Manufacturing Processes by Schey*

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.
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.

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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*				
BTAX203	DCS	AUTOCAD DRAFTING LAB	0	0	0	0	30	0	0	4	2

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 Text, dimension, Layers & block in 2d drawing .

Syllabus

- **Introduction to CAD :** Introduction, history of 2D and solid modeling, about AutoCAD, menus, toolbars, pointing device, command prompt, function keys
- **Coordinate System :** Introduction, coordinate systems and Types .
- **Inquiry Commands**
- **Draw Commands:** Introduction, line commands, orthogonal lines, circle and arc commands, polygon, cuboids, donut, ellipse, multiline, conic sections, etc
- **Editing Commands:** Introduction, erase and selection commands, move commands, copy commands, extend command, trim command, mirror command, etc
- **Properties:** Layers, layers status, Line types, line weights, Colors.
- Dimension & Dimension Style , Multi leaders.
- **Hatching & Gradient.**
- **Block : Static block, dynamic block, tool pallets**
- **Layouts, Printing, & Plotting**

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References

1. *An Introduction to ComputerAided 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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B.Tech in Automotive Electronics 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*				
BTAX204	DS	AUTOMOTIVE SKETCHING LAB	0	0	0	0	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 introduce the students with the (A) Fundamentals of the sketching & Conceptual design.

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. Prepare of lines and curves through sketching and improve hand mind coordination.
2. Improve observation and visual memory through sketching techniques.
3. Apply automotive concepts through automotive parts sketching.

Syllabus

Exercises on lines, curves to improve the hand mind coordination.

1 , 2 and 3 point perspective. Theory and examples from nature.

Drawing of objects from outdoor.

Exercises for improving observation and visual memory.

Automotive parts Sketching.

References

1. *Edwards, Betty; New Drawing on the Right Side of the Brain, Publisher; Tarher; 1 Nov. 2012.*
2. *Powell, Dick; Design Rendering Techniques: A Guide to Drawing and Presenting Design Ideas, Publisher: North Light Books, 1986*
3. *Caplin, Steve; Banks, Adam; The Complete Guide to Digital Illustration, Publisher: Watson – Guptill Publications, 2003.*
4. *Demers, Owen; Digital Texturing &Paintin, Publisher: New Riders Press; Bk & CD – Rom edition, 2001.*
5. *Pogany, Willy; The Art of Drawing, Publisher: Madison Books, 1996.*

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