Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
B.Tech. (EC/ECIOT/EI/RA/MTX)
(2021-2025)

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*				
BTEC303	DCC	Electronic Measurement and Instrumentation	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 10 marks.

Course Educational Objectives (CEOs):

The objective of this course is to-

1. Identify the different measurement techniques available for specific engineering applications.
2. Understand the errors in measurements and their rectification.
3. Understand the construction and working of different types of Analog and Digital Instruments.

Course Outcomes (COs):

The students will be able to:

1. Understand the different types of Analog and Digital Instruments.
2. Define the errors and their elimination.
3. Measure different quantities like voltage, current, resistance etc.
4. Understand principle and working of various instruments.
5. Operate different measuring instruments like Multimeter, CRO, DSO, Transducers etc.

Syllabus

UNIT I **9 Hrs.**

Principles of Measurements: Principles of Measurement, Static/dynamic characteristics of measurement systems, Types of Errors, Statistical analysis, Measurement of resistance, inductance and capacitance, Wheatstone's bridge, Maxwell's bridge, Hay's bridge, De Sauty's bridge, Schering Bridge Wien's bridge, Wagner's earth connection, Q meter.

UNIT II **8 Hrs.**

Analog and Digital Measuring Instruments: Comparison of Analog & Digital techniques, Analog Instruments, DC ammeters, Multirange voltmeter, AC voltmeter using Rectifiers, Half wave and full wave, Chopper type, Peak responding and True RMS voltmeters, Series and Shunt Type Ohmmeter, Digital Instruments: Digital voltmeter, Multimeter.

UNIT III **9 Hrs.**

Oscilloscopes: Introduction, CRT, Principle of signal display, Dual Trace & Dual Beam Oscilloscopes, Measurement of voltage, frequency and phase by CRO, Sampling Oscilloscope, Storage Oscilloscope: Analog and Digital Storage Oscilloscopes, DSO Applications.

Chairperson	Chairperson	Controller of Examinations	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
B.Tech. (EC/ECIOT/EI/RA/MTX)
(2021-2025)

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*				
BTEC303	DCC	Electronic Measurement and Instrumentation	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 10 marks.

UNIT IV **9 Hrs.**

Transducers: Introduction, Electrical transducers, Resistive transducer, Resistive Strain gauges, Resistance thermometer, Inductive transducer, LVDT & RVDT, Thermistor, Piezoelectric transducer, Photoelectric transducer, Photovoltaic transducer, Temperature transducers-RTD, Thermocouple.

UNIT V **9 Hrs.**

Signal Generators: Sine Wave Generator, Sweep Frequency Generator, Function Generator, Pulse and Square wave Generator,

A/D and D/A Converters: D/A conversion: Variable Resistance network, Binary Ladder, R/2R ladder DAC, A/D conversion: Successive approximation method, Flash type and dual slope,

Text Books:

1. H. S. Kalsi, "Electronic Instrumentation", Tata McGraw Hill Publishing Company Ltd., 3rd Edition, 2017.
2. A.K. Sawhney, "Electronic Instrumentation", Dhanapat Rai & Sons, 2016.

References:

1. Albert.D. Helfrick and William. D. Cooper, "Modern Electronic Instrumentation and Measurement Techniques", Pearson education, 2016.
2. A.J. Bouwens, "Digital Instrumentation", McGraw Hill, 16th reprint 2008.

List of Experiment:

1. To study and test the operation of different types of Ammeters and Voltmeters.
2. To learn the technique of measurement of Inductance by using Maxwell's bridge.
3. To learn the technique of measurement of Inductance by using Hay's bridge.
4. To learn the technique of measurement of Capacitance by using Schering's bridge.
5. Learning the techniques of measurement of Q Factor by using Q Meter.
6. Demonstration of Cathode Ray Oscilloscope.
7. To study the use of CRO for measurements
8. To learn the construction and operation of LVDT.
9. To study Load measurement using Strain Gauge.
10. Study of Function Generator.

Chairperson	Chairperson	Controller of Examinations	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Technology and Science

Choice Based Credit System (CBCS) Scheme in light of NEP-2020

B. Tech/B.Tech+MBA in Mechanical Engineering

(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*				
BTME303	DCC	STRENGTH OF MATERIALS	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):

(A)To gain knowledge of different types of stresses, strain and deformation induced in the mechanical components due to external loads. (B)To study the distribution of various stresses in the mechanical elements such as beams, shafts etc. (C) To study effect of various loading conditions of column and gain knowledge of theories of failure.

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. Define and memorize mechanical properties of material & select appropriate material for a given working Conditions.
2. Explain simple stresses, bending stress, shear stress, torsion stress, principle stresses, thin and thick cylinder, shaft, springs, columns and theories of failures.
3. Calculate and design structural members subjected to tension, compression, torsion, bending and combined stresses using the fundamental concepts of stress, strain and elastic behavior of materials.
4. Design of shaft and pressure vessels.
5. Justify bending equation and torsion equation and use it to solve the numerical.

Syllabus

Unit – I **(8 Hrs)**

Introduction: Stress-Strain, uni-axial, bi-axial and tri-axial stresses, tensile & compressive stresses, shear stress, Stress Strain Diagram, Ratio, Modulus of elasticity, Modulus of rigidity, Bulk modulus, Factor of safety.

Unit – II **(9 Hrs)**

Simple & Compound Stresses: Deformation due to self-weight, bars of varying sections, composite sections, principle of superposition, strain energy, Transformation of stress and strain, principal stresses, normal and shear stress, Mohr's circle and its application to two and three dimensional analyses, Thermal Stress.

Chairperson	Chairperson	Controller of Examinations	Joint Registrar
Board of Studies	Faculty of Studies		
Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Technology and Science

Choice Based Credit System (CBCS) Scheme in light of NEP-2020

B. Tech/B.Tech+MBA in Mechanical Engineering

(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*				
BTME303	DCC	STRENGTH OF MATERIALS	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.

Unit – III **(10 Hrs)**

Bending and Deflection: Symmetric member, Deflection of beams, deformation and stress, bending of composite sections, Macaulay's method and Area moment method for deflection of beams

Unit – IV **(8 Hrs)**

Torsion: Torsion of circular shafts-solid and hollow, Strength of Shaft and composite shaft, combined bending and torsion, strain energy due to torsion.

Unit – V **(10 Hrs)**

Columns and Theories of Failure: Buckling load, Types of end conditions for column, Euler's column theory and its limitations, Rankine- Gordon Formula, Theories of failures: Maximum principal stress theory, Maximum principal strain theory, maximum shear stress theory; maximum strain energy theory, maximum shear strain energy theory; Application of theories to different materials and loading conditions.

Text and Reference Books:

1. Strength of Materials, Dr. R.K. Bansal, Lakshmi Publications, New Delhi, 2015
2. Strength of Materials, Basavarajaiah and Mahadevappa, Khanna Publishers, New Delhi, 2013
3. Mechanics of Materials, James M. Gere (5th Edition), Thomson Learning, 2005
4. Strength of Materials—S. Ramamrutham, Dhanpat Rai Pvt. Ltd.
5. Mechanics of Materials—S. S. Rattan, TMH Pvt. Ltd., 2010
6. Strength of Materials, Subramanyam, Oxford University Press, Edition 2005
7. Elements of Strength of Materials, Timoshenko and Young Affiliated East-West Press, 2012
8. Strength of Materials, Singer Harper and Row Publications, 2005
9. Mechanics of Structures—S. B. Junnarkar, Charotar Publication, 2015

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Technology and Science

Choice Based Credit System (CBCS) Scheme in light of NEP-2020

B. Tech/B.Tech+MBA in Mechanical Engineering

(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*				
BTME303	DCC	**STRENGTH OF MATERIALS**	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.

10. Mechanics of Materials, B.C Punmia Ashok Jain, Arun Jain, Lakshmi Publications, New Delhi, 2014
11. Strength of Materials—W. Nash, Schaum's Outline Series, McGraw Hill Publication, 2014
12. Strength of Materials, S.S. Bhavikatti, Vikas Publishing House Pvt Limited, 2016

List of Experiments

1. Perform Brinell hardness tests to find BHN for given metallic material.
2. Perform Rockwell hardness tests to find RHN for given metallic material
3. Perform Izod/ Charpy impact test.
4. Perform Fatigue test.
5. Perform bending test.
6. Perform Torsion test.
7. To find tensile strength of given specimen by tensile test on MS and CI using UTM.
8. Perform Direct/cross Shear test on MS and CI by UTM.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
B.Tech.(EC/ECIOT /EE/EX/EI/MTX/RA)
(2021-2025)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assess-ment*	END SEM University Exam	Teachers Assess-ment*				
BTEC304	DCC	Electronic Devices and Circuits	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 objectives of this course are to introduce students with

1. Fundamental electronic devices, e.g. PN junction, BJT, MOSFETs, Op-Amp and Multivibrators.
2. Construction, V-I characteristic, principles of operation, and applications.
3. Standard circuits, and their overall performance.

Course Outcomes (COs):

After completion of this course the students are expected to be able to:

1. Understand the fundamentals of operation of the main semiconductor electronic devices.
2. Analyze the basic parameters of electronic devices, their performance, and limiting factors.
3. Apply the basic principles of electronic device operation for various applications.

Syllabus

UNIT I **9 Hrs.**

PN Junction Diode: PN junction diode in forward and reverse bias, temperature dependence of V-I characteristics, diode resistances, diode junction capacitance, Clipper and clampers, Zener diode as voltage regulator.

Bipolar Junction Transistor: Construction, basic operation, current components and equations, CB, CE and CC configuration, input and output characteristics, Early effect, Region of operations: active, cut-off and saturation region. BJT as an amplifier.

UNIT II **9 Hrs.**

Transistor Biasing Circuits and Analysis: Introduction, various biasing methods: Fixed bias, Self bias, Voltage Divider bias, Collector to base bias, Load-line analysis: DC and AC analysis, Operating Point and Bias Stabilization and Thermal Runaway. Transistor as a switch.

Small Signal Analysis: Small signal Amplifier, Amplifier Bandwidth, Hybrid model, analysis of transistor amplifier using h-parameter, Multistage Amplifier: Cascading amplifier, Boot-strapping Technique, Darlington amplifier, Current Mirror circuits.

Chairperson	Chairperson	Controller of Examinations	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
B.Tech.(EC/ECIOT /EE/EX/EI/MTX/RA)
(2021-2025)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assess-ment*	END SEM University Exam	Teachers Assess-ment*				
BTEC304	DCC	Electronic Devices and Circuits	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.

UNIT III **9 Hrs.**

FET: Construction, n-channel and p-channel transistors, drain and transfer characteristics, parameters, Equivalent model and voltage gain, analysis of FET in CG, CS and CD configuration. Enhancement and Depletion MOSFET drain and transfer Characteristics.

Power Amplifiers: Class A, Class B, Class AB, Class C, Class D, Transformer coupled and Push-Pull amplifier

UNIT IV **9 Hrs.**

Feedback and Oscillator Circuits: Effect of positive and negative feedback, basic feedback topologies and their properties, Sinusoidal Oscillators, Operation of Oscillators, types of Transistor Oscillators, Multivibrators: Monostable and Astable Multivibrator, basic operation of 555 timer.

UNIT V **9 Hrs.**

Op Amps: Block diagram of Op-Amp, ideal and practical Op-Amp circuit, Input offset voltage, offset current, Bias Current, thermal drift, Effect of variation in power supply voltage, common-mode rejection ratio, Slew rate and its Effect

Linear Applications of Op-Amp: Op-Amp configurations: inverting, non-inverting and differential amplifier configurations, Feedback amplifiers, Voltage follower, Summing amplifier,Integrators and differentiators, Instrumentation amplifier.

Text Books:

1. Jacob Millman, Christos Halkias, Chetan Parikh, "Integrated Electronics", 2nd Edition TMH, 2017.
2. Boylested, R. L. and Nashelsky, L., "Electronic Devices and Circuit Theory", 11th Edition, Pearson Education, 2013.
3. Ramakanth A. Gayakwad, "Op-Amps and Linear Integrated Circuits", Pearson, 4th Edition, 2015.

References:

1. Adel S.Sedra, Kenneth C.Smith, Tony Chan Carusone, Vincent Gaudet, " Microelectronic Circuits", Oxford Press, 2020.

Chairperson	Chairperson	Controller of Examinations	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
B.Tech.(EC/ECIOT /EE/EX/EI/MTX/RA)
(2021-2025)

COURSE CODE	CATE-GORY	COURSE NAME	TEACHING &EVALUATION SCHEME								
			THEORY			PRACTICAL		L	T	P	CREDITS
			END SEM University Exam	Two Term Exam	Teachers Assess-ment*	END SEM University Exam	Teachers Assess-ment*				
BTEC304	DCC	Electronic Devices and Circuits	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.

2. David A. Bell, "Electronic Devices and Circuits", 5th Edition, Oxford Press, 2008.
3. D. Roy Chowdhury, Shail B. Jain " Linear Integrated Circuits", New Age International (P) Ltd, 4th Edition, 2018.

List of Experiments:

1. To determine and analyze the V-I characteristics of PN Junction diode.
2. To determine and analyze the V-I characteristic of Zener diode and its load regulation capability.
3. To design clipper and clamper circuits.
4. To determine input and output characteristics of transistor amplifiers in CE, CC and CB configurations.
5. To determine the frequency response of CE amplifier, direct coupled and RC coupled amplifier.
6. To determine Drain and Transfer Characteristics of JFET.
7. To determine Drain and Transfer Characteristics of MOSFET Amplifier.
8. To determine characteristics of class A and B power amplifiers.
9. Measurements of Op-Amp parameters- CMRR, slew rate, open loop gain.
10. To develop an understanding of Inverting and non-inverting Op-Amp.
11. To analyze the characteristics of Integrator and Differentiator.
12. To analyze the working of Multivibrators.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Technology and Science

Choice Based Credit System (CBCS) Scheme in light of NEP-2020

B. Tech/B.Tech+MBA in Mechanical Engineering

(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*				
BTME310	DCC	KINEMATICS OF MACHINES	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 10 marks.

Course Educational Objectives (CEOs):

This course provides comprehensive knowledge of (A) Mechanism and machine (B) Kinematics of plane motion, (C) Cam and Follower, (D) Gears and Gear Train, (E) Gyroscope.

Course Outcomes (COs):

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

1. Students will be able to define systematically design and develop mechani[illegible] perform a specified task and demonstrate an understanding of the concepts of various mechanisms and pairs.
2. Students will be able to do the velocity and acceleration analysis of simple mechanisms.
3. Students will be able to explain effectively present written, oral, and graphical solutions to design problems & develop ability to come up with innovative ideas and design a layout of cam for specified motion.
4. Students will be able demonstrate an understanding of principle of gears.
5. Students will be able to synthesis simple gyroscopic forces and couple, and gyroscopic effect in airplanes, ship and vehicle.

Syllabus

Unit – I **(9 Hrs)**

Mechanisms and Machines: Mechanism, machine, plane and space mechanism, kinematic pairs, kinematic chains their classification, degrees of freedom, Grubler's criterion, kinematics inversions four bar mechanism and slider crank mechanism, equivalent linkages, pantograph straight line motion mechanism, Devis and Ackermann's steering mechanism, Hooke;s joint.

Unit – II **(10 Hrs)**

Motion: kinematics of Plane motion, Absolute & Relative motion, Displacement, Velocity and Acceleration Analysis by Graphical & Analytical methods, Velocity image, Velocity of rubbing, Kennedy's Theorem, Acceleration image, Acceleration polygon, Coriolis acceleration component, Klein's construction, Velocity and Acceleration Analysis using complex Raven's methods..

Chairperson	Chairperson	Controller of Examinations	Joint Registrar
Board of Studies	Faculty of Studies		
Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore	Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Technology and Science

Choice Based Credit System (CBCS) Scheme in light of NEP-2020

B. Tech/B.Tech+MBA in Mechanical Engineering

(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*				
BTME310	DCC	KINEMATICS OF MACHINES	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 10 marks.

Unit – III **(9 Hrs)**

Cams: Classification of Cams and Followers, Radial Cam Terminology, Analysis of Follower motion (uniform, modified uniform, simple harmonic, parabolic, cycloidal), Pressure Angle, Radius of Curvature, Cam Profile for radial and offset followers Synthesis of Cam Profile by Graphical Approach.

Unit – IV **(9 Hrs)**

Gears: Classification of gears and its type, Gear Terminology, Law of gearing, Tooth profiles, velocity of sliding, Path of contact, Arc of contact, Contact Ratio, Interference and Undercutting, Conjugate action.

Gear Trains: Simple, compound, reverted and epi-cyclic gear trains. Velocity ratio and torque calculation in gear trains

Unit – V **(8 Hrs)**

Gyroscope: Gyroscopic Action in Machines, Angular Velocity and Acceleration, Gyroscopic torque/ couple, Gyroscopic effect on Naval Ships, Stability of Two and Four Wheel Vehicles, Rigid disc at an angle fixed to a rotating shaft.

Text and Reference Books:

1. "Mechanism and Machine Theory" by Ambekar AG; PHI. Eastern Economy Edition 2015
2. " Theory of machines & Mechanism " by Uicker & Shigley, Second Edition, Oxford University Press, 2010.
3. "Theory of Machines" by S.S. Ratan, 3rd Ed., TMH, 2012.
4. "Theory of Machines" by Dr. Jagdish Lal; Metropolitan Book Co; Delhi, 2015
5. " Mechanism and Machine Theory " by Rao J S and Dukkipati; New Age, 2014
6. "Mechanics of Machines" by V. Ramamurti, 3rd Ed. Alpha Science, 2010.

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore

Shri Vaishnav Institute of Technology and Science

Choice Based Credit System (CBCS) Scheme in light of NEP-2020

B. Tech/B.Tech+MBA in Mechanical Engineering

(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*				
BTME310	DCC	KINEMATICS OF MACHINES	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 10 marks.

List of Experiments

1. To synthesize and demonstrate the inversion of four bar mechanism through animation and model.
2. To synthesize and demonstrate the inversion of single slider and double slider crank mechanism through animation and model.
3. To construct and demonstrate the steering mechanism based on Davis & Ackermann's Steering mechanisms principles.
4. To find out velocity & acceleration of slider crank mechanism by Klein's Construction.
5. To draw Involutes profile of a gear by generating method.
6. To find out velocity ratio of various gear trains.
7. To study working of sun and planet epicycle gear train mechanism using models
8. To study various types of belt drives & find out the velocity ratio of the drive.
9. To finds out gyroscopic couple

Chairperson
Board of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Chairperson
Faculty of Studies
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Controller of Examinations
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Joint Registrar
Shri Vaishnav Vidyapeeth
Vishwavidyalaya, Indore

Shri Vaishnav Vidyapeeth Vishwavidyalaya, Indore
Shri Vaishnav Institute of Technology and Science
Choice Based Credit System (CBCS) in the Light of NEP-2020
B.Tech. in Mechatronics
(Common to MX/EI)
(2021-2025)

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*				
BTMT302	SEC	PCB Designing Lab	0	0	0	30	20	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 10 marks.

Course Educational Objectives (CEOs):
The subject aims to provide the student with:
1. Familiarization of PCB Circuit Terminology and able to design a circuit and create a schematic Capture
2. Become proficient with computer skills for drawing Schematic and PCB Layout.

Course Outcomes (COs):
Student will be able to:
1. Apply the process of PCB manufacturing, assembling and testing.
2. Demonstrate various electronic components.
3. Use circuit design tools, PCB manufacturing and assembling knowledge.
4. Design Basic Electronic circuits.

List of Experiments:
1. Identification and introduction of various electronics components (R, L, C etc).
2. Introduction and Comparison of various types of PCBs.
3. Demonstration of various measuring instruments (CRO, Multimeter etc).
4. Design of basic circuits using Breadboard (Rectifier, Clippers, Clampers etc.).
5. Introduction and comparison of Software tool s used for PCB Designing.
6. Designing of basic circuit layout using software tools.
7. Study of PCB design technique.
8. Design of Power Supply
9. Design of Various logic Gates.
10. Design of basic circuits using PCB.

Text Books:
1. R. S. Khandpur ,"Printed Circuit Boards: Design, Fabrication, Assembly and Testing" , Tata McGraw-Hill Education, 2005.

References:
1.Coombs ,"Printed Circuits Handbook", McGraw Hill Professional, 2007.

Chairperson	Chairperson	Controller of Examinations	Joint Registrar
Board of Studies	Faculty of Studies	Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth
Shri Vaishnav Vidyapeeth	Shri Vaishnav Vidyapeeth	Vishwavidyalaya, Indore	Vishwavidyalaya, Indore
Vishwavidyalaya, Indore	Vishwavidyalaya, Indore		