



Shri Vile Parle Kelavani Mandal's
Institute of Technology, Dhule

Approved by AICTE & Affiliated to DBATU

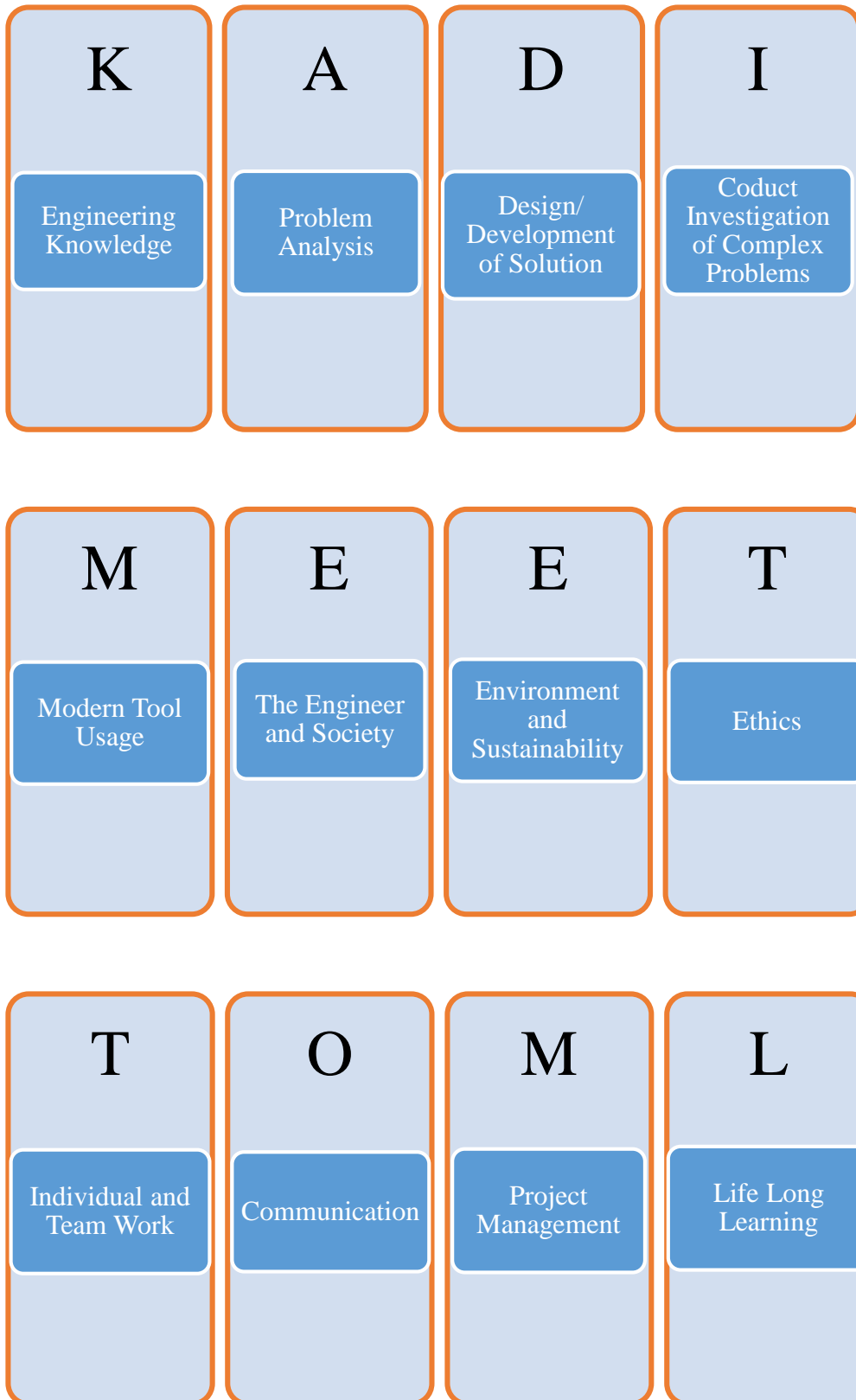
2.6.1 Programme outcomes and Course outcomes

Index

Sr. No.	Particulars	Page No
1	Process Flow	1
2	Programme outcomes of B.Tech in Civil Engineering	4
3	Course outcomes of B.Tech in Civil Engineering	8
4	Programme outcomes of B.Tech in Computer Engineering	18
5	Course outcomes of B.Tech in Computer Engineering	22
6	Programme outcomes of B.Tech in Electrical Engineering	27
7	Course outcomes of B.Tech in Electrical Engineering	31
8	Programme outcomes of B.Tech in Information Technology	35
9	Course outcomes of B.Tech in Information Technology	37
10	Programme outcomes of B.Tech in Mechanical Engineering	43
11	Course outcomes of B.Tech in Mechanical Engineering	46

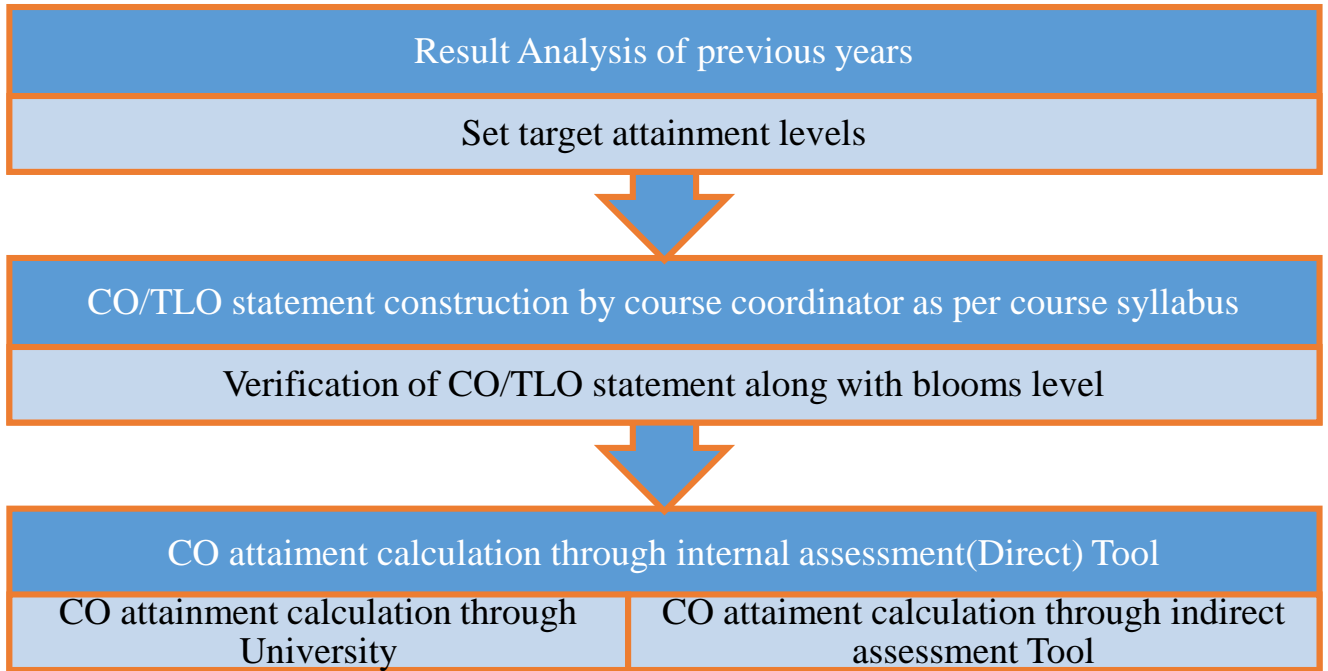


**Shri Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Electrical Engineering**





Attainment of Course Outcome



% students scored more than the target value	Attainment level
0-50%	1
50-60%	2
>60%	3

If Attainment level is less than 3

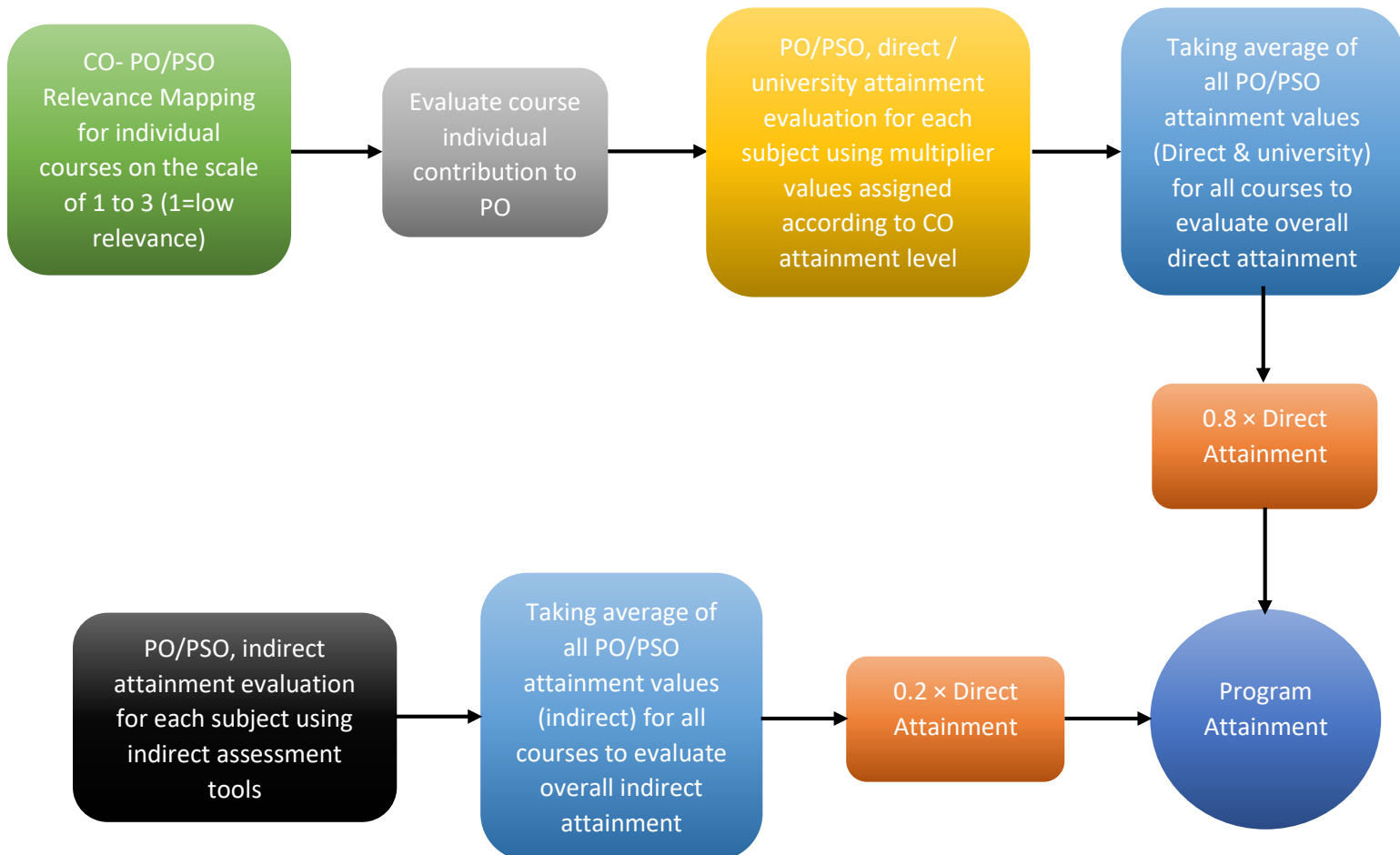
- Reason for low attainment
- Remedial action plan for that sem to cover up
- Action plan for next academic session in order to achieve target value

If Attainment level is equal to 3

- Revision of target for next academic session



Attainment of Program Outcome



If Attainment level is less than target

- Reason for low attainment
- Remedial action plan for that sem to cover up
- Action plan for next academic session in order to achieve target value

If Attainment level is equal to or greater than target

- Revision of target for next academic session

Shri Vile Parle Kelavani Mandal's Institute of Technology, Dhule

PROGRAMME: B.Tech. (CIVIL ENGINEERING)

Program Outcomes, Program Specific Outcomes, and Course Outcomes of all courses offered by the department (UG) for 2019-20, 2020-21, 2021-22 and 2022-23.

Website Link for Course Outcomes, Program Outcomes, and Program Specific Outcomes

Program Outcomes and Program Specific Outcomes (2019-20)

1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

SVKM's Institute of Technology, Dhule
www.svkm.ac.in


H.O.D. Civil Dept.
SVKM's Institute of Technology, Dhule

10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Outcomes and Program Specific Outcomes (2020-21to 2022-23)

Program Outcomes:

Engineering Graduates will be able to:

1. **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
2. **Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. **Design/development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. **Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. **Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. **The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. **Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

SVKM's Institute of Technology,Dhule
H.O.D. Civil Dept.


H.O.D. Civil Dept.
SVKM's Institute of Technology,Dhule

8. Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of engineering practice.

9. Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10. Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO) addressed by the Course:

A graduate of the Civil Engineering Program will be able to -

PSO1: Work in civil engineering sector which involves various aspects of planning, designing and construction of structures.

PSO2: Undertake higher studies, identify complex problems of civil engineering, and formulate research thinking.

PSO3: Use comprehended knowledge in the broad domain of civil engineering to undertake various competitive examinations.

Course Outcomes for 2019 20 , 20 20 21 , 20 21 22 and 20 22 23 : [2.6.1.pdf](#)

500 words description

Program Outcomes (POs) as approved by All India Council of Technical Education and Dr. Babasaheb Ambedkar Technical University, motivating undergraduate engineering program students to think about what they should learn and how they should apply their knowledge in the time allotted for graduation. The POs are not specific to any single program. On the college website, total twelve POs have been prescribed. All POs are designed as per the need of modern engineering practice and requires a very good knowledge of mathematics, physics and basic engineering sciences

Program Specific Outcomes (PSOs) are program specific and written by the Head of the department in coordination with all the faculty members of the respective department. It




H.O.D. Civil Dept.
SVKM's Institute of Technology, Dhule

describes what graduates of a particular undergraduate engineering program should be able to do once they have completed their curriculum.

Course outcomes are statements clearly describing the meaningful, observable and measurable knowledge, skills and/or dispositions students will learn in this course. These statements clearly describing the specific type and level of new learning students will have achieved and can reliably demonstrate by the end of a course. It clearly identifies what (and how much or how well) the student will know and be able to do after successfully completing this course the essential knowledge, abilities, and attitudes that constitute the basic learning needed by a graduate of this course.

All courses are divided into three broad groups in Civil Engineering under Structure group, Environment group and Transportation group. One module coordinator is appointed for each group from faculty team of same department and course coordinators are appointed for each course. Course outcomes are either predefined by the university or defined by the course coordinator and further verified by the module coordinator. It is desirable that all CO should attained their target value set by the college, all the course coordinators use various direct and indirect measures as assessment methods to check the attainment level of each CO.

It is the standard practice of institute to display all POs, PSOs and COs, for all departments on its websites for teacher or student reference. It is also made mandatory for all teaching staff to refer POs, PSOs, and COs while teaching any particular course, so that, student get to know about them in a better manner. This practice also helps students to fill course exit surveys and program exit surveys which are conducted by department from time to time.


H.O.D. Civil Dept.
SVKM's Institute of Technology, Dhule


H.O.D. Civil Dept.
SVKM's Institute of Technology, Dhule



**Shree Vile Parle Kelavani Mandal's
Institute of Technology, Dhule**
Approved by AICTE & Affiliated to DBATU
DEPARTMENT OF CIVIL ENGINEERING

Class	Subject Code	Subject Name		
	BTMA101	Engineering Mathematics –I	CO101.1	Apply the matrix technique (Linear algebra) to find solutions of system of linear equations arising in many engineering problem
			CO101.2	Demonstrate the concept of partial derivatives and their applications to Maxima/ Minima, series expansion of multi valued functions & Compute Jacobian of functions of several variables.
			CO101.3	Identify and sketch of curves in various coordinate system & Evaluate multiple integrals and their applications to area and volume
	PHY1202	Engineering Physics	CO102.1	Apply the concept of types of oscillations in engineering.
			CO102.2	Apply the fundamentals of interference, polarization in LASER, and optical fiber in engineering.
			CO102.3	Determine the application of the trajectory of charge particles in the electromagnetic field, with basic principles of quantum physics.
			CO102.4	Determine the different types of crystal structures using the X-ray diffraction technique, and study the fundamentals of material science and its application in Magnetic material, Superconductors, and semiconductors.
	EG1203	Engineering Graphics	CO103.1	Use of drawing instruments effectively for drawing and dimensioning
			CO103.2	Explain conventions and methods of engineering drawing
			CO103.3	Apply concepts of projections of points, lines, planes, solids and section of solids
			CO103.4	Construct isometric and orthographic views of given objects
	BTHM104	Communication Skills	CO104.1	Apply Verbal and Non-Verbal communication in professional and social situations
CO104.2			Apply communication skills for presentations, group discussion, interpersonal interactions, public speaking, report writing and business correspondence	
CO104.3			Apply phonetics and grammar in communication to develop a neutral accent	
	Energy and Environmental Engineering	CO105.1	Identify conventional, non-conventional energy sources.	
		CO105.2	Know and discuss power consuming and power developing devices for effective utilization and power consumption	
		CO105.3	Identify various sources of air, water pollution and its effects.	
		CO105.4	Know and discuss noise, soil, thermal pollution and Identify solid, biomedical and hazardous waste.	
	Basic Civil and Mechanical Engineering	CO106.1	Identify various Civil Engineering materials and choose suitable material among various options.	
		CO106.2	Apply principles of surveying to solve engineering problem.	
		CO106.3	Identify various Civil Engineering structural components and select appropriate structural system among various options.	
		CO106.4	Explain and define various properties of basic thermodynamics, materials and manufacturing processes.	
		CO106.5	Know and discuss the working principle of various power consuming and power developing devices.	
			CO1202L.1	Determine the mechanical & electrical properties of matter.



H.O.D. Civil Dept.
SVKM's Institute of Technology, Dhule

PHY1202L	Engineering Physics Lab	CO1202L.2	Determine the wavelength of He-Ne Laser and numerical aperture of optical fibre.
		CO1202L.3	Determine the various properties of semiconducting materials.
EG1203L	Engineering Graphics Lab	CO1203L.1	Use of drawing instruments effectively for drawing and dimensioning
		CO1203L.2	Implement various fundamental geometrical constructions
		CO1203L.3	Apply concepts of projections of points, lines, planes, solids and section of solids
		CO1203L.4	Construct isometric and orthographic views of given objects
BTHM109L	Communication Skills Lab	CO209L.1	To illustrate the process of introduction with RP exercising Transcription, Stress and Intonations
		CO209L.2	To apply Verbal and Non-Verbal communication through Extempore, GD, Debate, Presentation and Interviews.
BTMA201	Engineering Mathematics – II	CO201.1	Discuss the need and use of complex variables to find roots, to separate complex quantities and to establish relation between circular and hyperbolic functions.
		CO201.2	Solve first and higher order differential equations and apply them as a mathematical modeling in electric and mechanical systems.
		CO201.3	Determine Fourier series representation of periodic functions over different intervals.
		CO201.4	Demonstrate the concept of vector differentiation and interpret the physical and geometrical meaning of gradient, divergence & curl in various engineering streams. Apply the principles of vector integration to transform line integral to surface integral, surface to volume integral & vice versa using Green's, Stokes and Gauss divergence theorems
CHM1202	Engineering Chemistry	CO1202.1	Develop the importance of water in industrial and domestic usage.
		CO1202.2	Interpret the knowledge of phases, components, degree of freedom and apply it in various phase diagrams.
		CO1202.3	Describe various methods of metallurgy, types of fuels and lubricants, and also able to define various concepts of electrochemistry.
BTES203	Engineering Mechanics	CO203.1	Know and apply fundamental Laws of Engineering Mechanics
		CO203.2	Know and apply conditions of static equilibrium to analyze given force system
		CO203.3	Compute Centre of gravity and Moment of Inertia of plane surfaces
		CO203.4	Compute the motion characteristics of a body /particle for a Rectilinear and Curvilinear motion.
		CO203.5	Know and discuss relation between force and motion characteristics
	Computer Programming in C		
WS1205	Workshop Practices	COWS1205.1	Perform carpentry operations like planning, cutting, fitting of joints using hand and power tools
		COWS1205.2	Perform fitting operations such as marking, cutting, filling, drilling and tapping using hand and power tools and also basic plumbing Operations.
		COWS1205.3	Perform sheet metal operations such as marking, shearing, bending, punching, and soldering using hand and power tools and Welding operations like joint preparations, electrode selections.
		COWS1205.4	Understand the simple machining skills on lathe machine operations and its use during their project work

BTES206	Basic Electrical and Electronic Engineering	CO206.1	Apply basic ideas and principles of electrical engineering
		CO206.2	Identify protection equipment and energy storage devices
		CO206.3	Differentiate electrical and electronics domains and explain the operation of diodes and transistors.
		CO206.4	Acquire knowledge of digital electronics
		CO206.5	Design simple combinational and sequential logic circuits.
CHM1202 L	Engineering Chemistry Lab	CO1202L.1	Test the quality of water sample by determination of hardness, acidity, alkalinity and dissolve oxygen present in it.
		CO1202L.2	Examine chemical or physical property of given sample material.
		CO1202L.3	Determine the concentration of specific ions present in the solution using titration methods.
	Engineering Mechanics Lab	CO208L.1	Calculate beam reaction by Parallel Force apparatus and graphics static method and forces in truss.
		CO208L.2	Evaluate co-efficient of friction and centroid of irregular shaped bodies.
		CO208L.3	Evaluate mechanical advantage, Velocity ratio, efficiency and mass moment of inertia.
BTBSC301	Mathematics – III	C301.1	Find Laplace transform of functions using various formulas and properties. Evaluate particular types of integration.
		C301.2	Find Inverse Laplace transform of functions using various formulas and properties. Solve linear differential/simultaneous linear differential equation using Laplace and inverse Laplace transform.
		C301.3	Find Fourier and inverse Fourier transform, Fourier sine and inverse Fourier sine transform. Cosine transform and inverse Fourier cosine Transform of functions.
		C301.4	Form PDE by eliminating arbitrary constant, solve PDE and use PDE to solve one and two dimensional heat flow equation.
		C301.5	Determine Analytic functions//Bilinear transformation/ apply Cauchy's theorem/Cauchy's integral formula and Residue theorem to solve contour integration.
BTCVC302	Mechanics of Solids	C302.1	Perform the stress strain analysis
		C302.2	Draw the force distribution diagram for members and determinant beams
		C302.3	Find deflection in determinant beam
		C302.4	Visualize force deformation behaviour of bodied
BTCVC303	BTCVC303	C303.1	To determine the properties of fluid and pressure and their measurement
		C303.2	To interpret the types of forces acting on fluid at rest and in moving condition.
		C303.3	To differentiate between laminar and turbulent flow condition.
		C303.4	To analyze the laws of similarity for fluid model studies.
		C303.5	To understand fundamentals of pipe flow, losses in pipe flow.
BTCVC304	Surveying I	C304.1	Perform measurements in linear/angular methods.
		C304.2	Perform plane table surveying in general terrain.
		C304.3	Know the basics of leveling and theodolite survey in elevation and angular measurements.
BTCVC305	Building	C305.1	Understand types of masonry structures.
		C305.2	Understand composition of concrete and effect of various parameters affecting strength.



H.O.D. Civil Dept.
SVKM's Institute of Technology, Dhule

SE 3rd Sem	5	Construction	C305.3	Comprehend components of building and there purposes.
			CO305.4	Comprehend the precast and pre-engineered building construction techniques
	BTCVC306	Engineering Geology	C306.1	Recognize the different land forms which are formed by various geological agents.
			C306.2	Identify the origin, texture and structure of various rocks and physical properties of mineral.
			C306.3	Emphasize distinct geological structures which have influence on the civil engineering structure.
			C306.4	Understand how the various geological conditions affect the design parameters of structures.
	BTCVL307	Hydraulics Laboratory I	C307.1	Calculate the viscosity of fluid and metacentric height of ship model
			C307.2	Examine the application of Bernoulli's theorem for pipe flow
			C307.3	Demonstrate the calibration of flow measurement devices in pipe flow.
	BTCVL308	Surveying Laboratory I	C308.1	To Use the theodolite along with chain/tape, compass on the field.
			C308.2	Apply geometric and trigonometric principles of basic surveying calculations.
			C308.3	Plan a survey, taking accurate measurements, field booking, and adjustment of errors.
			C308.4	Apply field procedures in basic types of surveys, as part of a surveying team AND Employ drawing techniques in the development of a topographic map.
	BTCVL309	Building Construction Drawings Laboratory	C309.1	Draw plan, elevation and sections of various structures
			C309.2	Apply the principles pf planning and bye-laws used for building planning
			C309.3	Prepare detailed working drawing for doors and windows
	BTCVL310	Engineering Geology Lab	C310.1	Calculate the linear measurement on surface.
			C310.2	Find out engineering properties of various geological materials.
			C310.3	Draw subsurface lithologs.
			C310.4	Identify minerals and rocks by studying physical properties.
BTCVS311	Seminar on Topic of Field Visit to Foundation Work	C311.1	Understand and prepare chronological order of execution of superstructure construction works	
		C311.2	Interpreted the collected data and present it in form of technical information	
		C311.3	Prepare technical report based on field data of execution of superstructure construction works	
BTCVF312	Field Training / Internship/Industrial Training Evaluation (from semester II)	C312.1	To identify the challenges and future potential in internship problem and solve the problem during the internship period.	
		C312.2	To test the theoretical learning and research-based knowledge in practical situations by completing assigned tasks during the internship period.	
		C312.3	To apply various soft skills such as time management, positive attitude and communication skills during presentation in the internship program.	
BTHM303	Soft Skills Development			
BTCVC401	Hydraulics II	C401.1	Design open channel sections in a most economical way.	
		C401.2	Know about the non-uniform flows in open channel and the characteristics of hydraulic jump.	
		C401.3	Apply application of momentum principle of impact of jets on plane.	
BTCVC402	Surveying –	C402.1	Understand basics different types of curves on roads and their preliminary survey.	
		C402.2	Perform setting of curves, buildings, culverts and tunnels.	

SE 4th Sem	2	II	C402.3	Comprehend different geodetic methods of survey such as triangulation, trigonometric leveling.
			C402.4	Comprehend modern advanced surveying techniques.
	BTCVC403	Structural Mechanics-I	C403.1	Describe the concept of structural analysis and degree of indeterminacy
			C403.2	Calculate slopes and deflection at various locations for different types of beams
			C403.3	Analyze indeterminate beams, frames and trusses
	BTCVE404A	Numerical Methods in Engineering	CO404-1	Solve differential equations using different methods under different conditions
			CO404-2	Solve differential equations using different numerical methods through the theory
			CO404-3	Apply various interpolation methods and finite difference concept
			CO404-4	Apply numerical method techniques to find approximate value of definite integrals
			CO404-5	Apply statistical methods for regression analysis and fitting of curve for given statistical data & Write algorithm
	BTCVE404B	Planning for Sustainable Development	C404.1	Apply principles of sustainable development in engineering works
			C404.2	Develop innovation strategies for sustainable development
			C404.3	Analyze role of government in Policies for environmental degradation
	BTID405	Product Design Engineering	C405.1	Create simple design of components or a system as whole
			C405.2	Create design documents for knowledge sharing
			C405.3	Manage own work to meet design requirements
			C405.4	Work effectively in a team
	BTCVC406	Engineering Management	C402.1	Demonstrate the nuances of management functions.
			C402.2	Analyse the framework of a business organization.
			C402.3	Adopt an empirical approach toward business situations.
			C402.4	Apply various Management techniques.
	BTHM3401	Basic Human Rights	C3401.1	Discuss the significance of human rights to utilize in daily activities.
			C3401.2	Understand worker's rights at the workplace to avoid exploitation.
			C3401.3	Apply ethical and management principles as per the Indian Constitution for life-long learning in the larger perspective of technological modifications.
	BTCVL407	Hydraulics Laboratory II	C407.1	To understand various properties of fluids and measurement techniques.
			C407.2	To carry out calibrations of various flow measuring devices.
			C407.3	To understand mechanism of hydraulic jump, various jets and pumps.
	BTCVL408	Surveying Laboratory II	C408.1	Determine contour level of field.
			C408.2	Determine the tachometric constants and grade of a line.
			C408.3	Use sub tense bar for distance measurement
BTCVL409	Mechanics of Solids Laboratory	C401.1	Evaluate Young Modulus, torsional strength, hardness and tensile strength of given specimens.	
		C409.2	Evaluate compressive characteristics or column action of structural members.	
		C409.3	Analyze bending action of structural members under transverse loads.	
BTCVM410	Mini Project	C410.1	Apply reasoning informed by the contextual knowledge to assess societal issues	
		C410.2	Understand the impact of the professional engineering solutions in societal contexts	
		C410.3	Demonstrate knowledge and understanding of the engineering and management principles as a member and leader in a team	
BTCVF411	Seminar on Topic of Field Visit to works involving Superstructure	C411.1	Understand and prepare chronological order of execution of superstructure construction works	
		C411.2	Interpreted the collected data and present it in form of technical information	
		C411.3	Prepare technical report based on field data of execution of superstructure construction works	



TE 5th Sem	BTCVC 501	Design of Steel Structures	C501.1	Identify and compute the design loads and the stresses developed in the steel member considering BIS Provision
			C501.2	Analyze and design the various connections and identify the potential failure modes considering BIS Provision
			C501.3	Analyze and design various tension, compression and flexural members considering BIS Provision
	BTCVC 502	Structural Mechanics-II	C502.1	Have a basic understanding of matrix method of analysis and will be able to analyze the determinate and indeterminate structures
			C502.2	Have a basic understanding of the principles and concepts related to finite difference and finite element method.
			C502.3	Have a basic understanding of concept of influence line.
	BTCVC 503	Soil Mechanics	C503.1	Understand different soil properties and behavior
			C503.2	Understand stresses in soil and permeability and seepage aspects
			C503.3	Develop ability to take up soil design of various foundations.
	BTCVC 504	Environment al Engineering	C504.1	Apply the water treatment concept and methods
			C504.2	Prepare basic process designs of water and wastewater treatment plants.
			C504.3	Apply the wastewater treatment concept and methods
			C504.4	Illustrate the solid waste management and air pollution concepts
	BTCVC 505	Transportatio n Engineering	C505.1	Comprehend various types of transportation systems and their history of the development
			C505.2	Comprehend to various types of pavements
			C505.3	Design the pavements by considering various aspects associated with traffic safety measures.
	BTCVE50 6A	Materials, Testing & Evaluation	C506A.1	To provide an overview to the students about various types of civil engineering materials used in constructions along with their properties.
			C506A.2	To enable students to know details of various tests to be performed on civil engineering materials to evaluate their quality to know their suitability for use in construction.
			C506A.3	To test the materials under the sustainability conditions of an environment as per the site suitability.
	BTCVE50 6C	Development Engineering	C506C.1	Explain the concept of development engineering and sustainable design.
			C506C.2	Comprehend the basics of development plans for urban and rural areas.
C506C.3			Demonstrate the applications of geoinformatics for planning and development of urban and rural areas.	
BTHM50 7	Essence of Indian Traditional Knowledge	M3057.1	Ability to understand, connect up and explain basics of Indian traditional knowledge, modern scientific Perspective	
		M3057.2	Imparting basic principles of thought process, reasoning and inferencing	
		M3057.3	Importance of holistic science with rapid technological advancement and societal disruptions	
		M3057.4	Development of amenities for society	
BTCVL50 8	Soil Mechanics Laboratory	C508.1	Determine different engineering properties of soil.	
		C508.2	Identify and classify soils based on standard geotechnical engineering practices	
		C508.3	C508.3 Perform Laboratory compaction and Shear strength of soil	
BTCVL50 9	Environment al Engineering Laboratory	C509.1	Quantify the pollutant concentration in water, wastewater and ambient air.	
		C509.2	Recommend the degree of treatment required for the water and wastewater.	
		C509.3	Analyze the survival conditions for the microorganism and its growth rate.	
		Transportation	CVL510..1	Perform tests on various road construction materials.



TE 6th Sem	BTCVL510	Transportation Engineering Laboratory	CVL510..2	Perform CBR tests on local soils to determine subgrade properties needed for roadways.
			CVL510..3	Identify and apply the design, based on the physical overview of the site.
	BTCVS511	Seminar on Topic of Field Visit to works related to Building Services	C511.1	Understand and prepare chronological order of execution of Building Services
			C511.2	Interpreted the collected data and present it in form of technical information
			C511.3	Prepare technical report based on field data of execution of Building Services
	BTCVC601	Design of Concrete Structures I	C601.1	Comprehend to the various design philosophies used for design of reinforced concrete.
C601.2			Analyze and design the reinforced concrete slab using limit state and working state method	
C601.3			Analyze and design the reinforced concrete beam using limit state and working state method	
C601.4			Analyze and design the reinforced concrete column using limit state and working state method.	
BTCVC602	Foundation Engineering	C602.1	To predict soil behavior under the application of loads and come up with appropriate solutions to foundation design queries.	
		C602.2	Analyze the stability of slope by theoretical and graphical methods	
		C602.3	Analyze the results of in-situ tests and transform measurements and associated uncertainties into relevant design parameters	
		C602.4	Synthesize the concepts of allowable stress design, appropriate factors of safety, margin of safety, and reliability..	
BTCVC603	Concrete Technology	C603.1	Apply principles of sustainable development in Engineering works	
		C603.2	Develop innovation strategies for sustainable development	
		C603.3	Analyse role of government in Policies for environmental degradation	
BTCVC604	Project Management	C604.1	Understand various steps in project Management, different types of charts	
		C604.2	Construct network by using CPM and PERT method	
		C604.3	Determine the optimum duration of project with the help of various time estimates	
		C604.4	Know the concept of engineering economics, economic comparisons, and linear break even analysis problems	
		C604.5	Understand the concept of total quality Management including Juran and Deming's philosophy	
BTCVE605A	Waste Water Treatment	C605A.1	Determine the sewage characteristics and design various sewage treatment plants.	
		C605A.2	Understand municipal water and wastewater treatment system design and operation.	
		C605A.3	Apply environmental treatment technologies and design processes for treatment of industrial waste water.	
		C605A.4	Understand the rural sanitation schemes.	
BTCVE605C	Geographic Data Analysis and Applications	C605C.1	To infer about GIS data types for working under digital environment.	
		C605C.2	To explain the techniques used in GIS data processing.	
		C605C.3	To understand GIS and remote sensing integration in data creation.	
		C605C.4	To identify the application of GIS in civil engineering.	
BTCVC606	Building Planning and	C606.1	Apply principles of sustainable development in Engineering works	
		C606.2	Develop innovation strategies for sustainable development	

	Design	C606.3	Analyse role of government in Policies for environmental degradation
BTCVL607	Concrete Technology Laboratory	C607.1	Demonstration with performance of testing of cement and aggregates
		C607.2	Demonstration with performance of fresh concrete test and hardened concrete test
		C607.3	Understand the effect of admixtures and non-destructing testing of concrete.
		C607.4	Design and validate the concrete mix with help of different concrete mix design methods.
BTCVL608	Building Planning, Design and Drawing Laboratory	C608.1	Draw plan, elevation and section of load bearing and framed structures.
		C608.2	Draw plan, elevation and section of public structures.
		C608.3	Understand, create and apply appropriate IT tools for drawing purpose
BTCVL609	Community Project (Mini Project)	C609.1	Apply reasoning informed by the contextual knowledge to assess societal issues
		C609.2	Understand the impact of the professional engineering solutions in societal contexts
		C609.3	Demonstrate knowledge and understanding of the engineering and management principles as a member and leader in a team
BTCVS610	Seminar on Topic of Field Visit Road Construction	C610.1	Understand and prepare chronological order of execution of Road Construction works
		C610.2	Interpreted the collected data and present it in form of technical information
		C610.3	Prepare technical report based on field data of execution of Road Construction works
BTCVC701	Design of Concrete Structures II	CO701.1	Able to identify the behavior, analyze and design of the beam sections subjected to torsion.
		CO701.2	Able to analyze and design of axially and eccentrically loaded column and construct the interaction diagram for them.
		CO701.3	Understand various concepts, systems and losses in pre-stressing.
		CO701.4	Able to analyze and design the rectangular and symmetrical I-section pre-stressed beam/girders
BTCVC702	Infrastructure Engineering	CO702.1	Know about the basics and design of various components of railway engineering
		CO702.2	Understand the types and functions of tracks, junctions and railway stations.
		CO702.3	Know about the aircraft characteristics, planning and components of airport
		CO702.4	Understand the types and components of docks and harbors.
BTCVC703	Water Resources Engineering	CO703.1	Understand need of Irrigation in India and technical terms like delta, duty related to water requirement in farming practice.
		CO703.2	Demonstrate planning and design for types of dams, selection criterion for spillways and gates.
		CO703.3	Comprehend the classification of wells, components used in construction of wells.
		CO703.4	Estimate values required to plot unit hydrograph, flood hydrograph, S-curve hydrograph.
		CO703.5	Apply curative measures for water logging and techniques for water conservation.
		CO704.1	Understand the importance of preparing the types of estimates under different conditions for various structures

SVKM's Institute of Technology, Dhule
H.O.D. Civil Dept.



H.O.D. Civil Dept.
SVKM's Institute of Technology, Dhule

BE 7th Sem	BTCVC704	Professional Practices	CO704.2	Evaluate the quantity of materials required and approximate estimates for Civil engineering works as per specifications
			CO704.3	Evaluate and file tenders in construction industry
			CO704.4	Estimate the valuation of land, various structures, existing and proposed buildings using various methods
	BTCVE705F	Engineering Economics	CO705F.1	To learn the economics behind any constructional activities
			CO705F.2	To Emphasis upon develop interest in investment evaluation and financing projects.
	BTCVOE706E	Town and Urban Planning (Audit Course)	CO706.1	Discuss town and urban planning with essential attributes
			CO706.2	Provide information of various aspects involved town and urban planning
			CO706.3	Make students familiar with various standards, acts, laws and guidelines
	BTCVL707	Design & Drawing of RC & Steel Structures	CO707.1	Design and draw steel structures using IS 800 1984 or 2007
			CO707.2	Design and draw industrial structures.
			CO707.3	Design and draw RC structures
	BTCVL708	Professional Practices	CO803.1	Prepare detailed and approximate estimates for two storied RCC or load bearing wall building
			CO803.2	Present the valuation report including valuation certificate
			CO803.3	Evaluate detailed specification for any civil engineering items
BTCVL709	Field Training /Internship/Industrial	C709.1	To identify the challenges and future potential in internship problem and solve the problem during the internship period.	
		C709.2	To test the theoretical learning and research-based knowledge in practical situations by completing assigned tasks during the internship period.	
		C709.3	To apply various soft skills such as time management, positive attitude and communication skills during presentation in the internship program.	
BTCVS710	Seminar	CO710.1	Understand Recent Developments in Civil Engineering area and interdisciplinary area	
		CO710.2	Interpreted the collected data and present it in form of technical information	
		CO710.3	Prepare technical report based on field data collected	
BTCVP711	Project Stage-1	CO711.1	Recommend gaps in literature survey on particular topic	
		CO711.2	Develop methodology for chosen work	
		CO711.3	Generate Solutions for Recommended gaps by Applying modern tools and techniques	
		CO711.4	Formulate detailed report on selected work	
BE 8th Sem	BTCVSS801D	Maintenance and Repair of Concrete Structures	C801D.1	Identify various deterioration or damage mechanisms in concrete structures.
			C801D.2	Assess the condition of the structure by using various non-destructive, partially-destructive tools.
			C801D.3	Select measurable parameters that are useful in deciding the further repair and maintenance practices.
	BTCESS802B	Environmental Remediation of Contaminated Sites	C802B.1	Understand integrated approaches to remediating contaminated sites.
			C802B.2	Screen, choose and design appropriate technologies for remediation.
			C802B.3	Demonstrate Laws/Regulations for remediation of contaminated sites.
			C802B.4	Perform risk assessment due to contamination.
	BTCEP803	In-house Project or Internship and Project in Industry*	CO803.1	Demonstrate sound technical knowledge of their selected work
			CO803.2	Design sustainable solutions for chosen work
			CO803.3	Communicate findings beneficial to community at large in written and oral forms



U.S. Civil Service
Federal Bureau of Investigation



**Shri Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Computer Engineering**

PROGRAMME: B.Tech. (COMPUTER ENGINEERING)

1) Program Outcomes, Program Specific Outcomes, and Course Outcomes of all courses offered by the department (UG) for 2019-20, 2020-21, 2021-22 and 2022-23.

- **Program Outcomes and Program Specific Outcomes (2019-20)**

PO 1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.



**Shri Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Computer Engineering**

PO 10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

• **Program Outcomes and Program Specific Outcomes (2020-21 to 2022-23)**

PO 1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.



**Shri Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Computer Engineering**

PO 9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO):

PSO1: Professional Skills-To gain the ability to comprehend, analyze, design and implement computer programs in the fields of computer algorithms, web development, data science, computer network and security, software design, system software cloud computing and allied fields.

PSO2: Problem-Solving Skills- Capability to provide computer based solutions to a variety of problems by applying standard practices, problem solving strategies and methodologies.

PSO3: Professional Career - The ability to create an innovative career path by utilizing modern computer tools and technologies.

Program Outcomes (POs) as approved by All India Council of Technical Education and Dr.Babasaheb Ambedkar Technical University, motivating undergraduate engineering program students to think about what they should learn and how they should apply their knowledge in the time allotted for graduation. The POs are not specific to any single program. On the college website, total twelve POs have been prescribed. All POs are designed as per the need of modern engineering practice and requires a very good knowledge of mathematics, physics and basic engineering sciences.



**Shri Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Computer Engineering**

Program Specific Outcomes (PSOs) are program specific and written by the Head of the department in co-ordination with all the faculty members of the respective department. It describes what graduates of a particular undergraduate engineering program should be able to do once they have completed their curriculum.

Course outcomes(CO) are statements clearly describing the meaningful, observable and measurable knowledge, skills and/or dispositions students will learn in this course. These statements clearly describing the specific type and level of new learning students will have achieved – and can reliably demonstrate – by the end of a course. It clearly identify what (and how much or how well) the student will know and be able to do after successfully completing this course – the essential knowledge, abilities, and attitudes that constitute the basic learning needed by a graduate of this course.

All courses are divided into three broad groups (for eg: Systems, Programming and Design, Computer Hardware, Networking and Security, Soft Skill and Employable Skill group in case of Computer Engineering department). One module coordinator is appointed for each group from faculty team of same department and course coordinators are appointed for each course. Course outcomes are either predefined by the university or defined by the course coordinator and further verified by the module coordinator. It is desirable that all CO should attained their target value set by the college, all the course coordinators use various direct and indirect measures as assessment methods to check the attainment level of each CO.

It is the standard practice of institute to display all POs, PSOs and COs, for all departments on its websites for teacher or student reference. It is also made mandatory for all teaching staff to refer POs, PSOs, and COs while teaching any particular course, so that, student get to know about them in a better manner. This practice also helps students to fill course exit surveys and program exit surveys which are conducted by department from time to time.

Dr. Makarand Shahade

HOD, Dept. of Computer Engg.

H.O.D. Computer Dept.
SVKM's Institute of Technology Dhule



**Shree Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Computer Engineering**

Course outcome Statements A.Y. 2021-2022 (ODD Semester)

Subject Code	Subject Name	CO Number	Course outcome Statement
BTBS301	Engineering Mathematics – III	C301.1	Find Laplace transform of functions using various formulas and properties. Evaluate particular types of integration.
		C301.2	Find Inverse Laplace transform of functions using various formulas and properties. Solve linear differential/simultaneous linear differential equation using Laplace and inverse Laplace transform.
		C301.3	Find Fourier and inverse Fourier transform, Fourier sine and inverse Fourier sine transform. Cosine transform and inverse Fourier cosine Transform of functions.
		C301.4	Form PDE by eliminating arbitrary constant, solve PDE and use PDE to solve one and two dimensional heat flow equation.
		C301.5	Determine Analytic functions//Bilinear transformation/ apply Cauchy's theorem/Cauchy's integral formula and Residue theorem to solve contour integration.
BTCOC302	Discrete Mathematics	C302.1	To Understand the basic principles of sets and operations in sets and Interpret mathematical properties formally via the formal language of propositional logic and predicate logic
		C302.2	To perform operations on various discrete structures such as functions, relations, and sequences. To solve problems using counting techniques, permutation and combination, recursion and generating functions.
		C302.3	To Use graphs as tools to visualize and simplify situations.
		C302.4	To Use trees as tools to visualize and simplify situations
		C302.5	To solve problems using algebraic structures and understand the concept of morphism
BTCOC303	Data Structures	C303.1	Understand linear, non-linear data and hashing functions and analyze programs.
		C303.2	Implementation of stack and queue using sequential and linked allocation.
		C303.3	Understand concepts of link list and implement singly and doubly linked list.
		C303.4	Understand concept in trees and graphs and implement binary tree, Heap, Balanced Tree, Graph.
		C303.5	Understand the concept of dictionaries, file handling, and implement different skip list operations such as insertion, deletion and searching, sorting.
BTCOC304	Computer Architecture and Organization	C304.1	To Illustrate the concept of computer organization and architecture
		C304.2	To Describe instruction sets
		C304.3	To Perform arithmetic operation
		C304.4	To Illustrate the concept of memory organization
		C304.5	To Describe role of control unit and Input / Output organization
BTCOC305	Object - oriented Programming in C++	C305.1	To appreciate and understand the concept of object oriented programming and their utility
		C305.2	To apply the Object oriented approach to design software
BTCOC305	Object - oriented Programming in C++	C305.3	To analyze and solve the ambiguity and membership problems using static and dynamic polymorphism.
		C305.4	To use different file systems operation and apply different design methodologies based on the problem specification and objectives.
		C305.5	To Analyze and solve different features of Object Oriented Methodology with templates, exception handling etc.
BTCOL306	Data Structures Lab	L306A.1	Understand and implement various concepts in stacks and Evaluate polish notation for given expression.
		L306A.2	Implement concepts in queue such as circular queue as well as dequeue using array
		L306A.3	Design a stack using queues and perform basic operations in linear and constant time. Design a queue using stacks and perform dequeue operations in linear as well as in constant.
		L306A.4	Implement data structures as single and double linked list. Design stack using link list and perform stack operations with time complexity $O(1)$.
		L306A.5	Understand and implement concepts in trees and graphs and Construct Search trees.
		L306A.6	Understand and implement concepts in hashing and different sorting algorithms.
BTCOL306	Object Oriented Programming Lab	L306B.1	To appreciate and understand the concept of object oriented programming and their utility
		L306B.2	To apply the Object oriented approach to design software
		L306B.3	To analyze and solve the ambiguity and membership problems using static and dynamic polymorphism.
		L306B.4	To use different file systems operation and apply different design methodologies based on the problem specification and objectives.
		L306B.5	To Analyze and solve different features of Object Oriented Methodology with templates, exception handling etc.
BTCOS307	Seminar-I (Java Programming Lab)	S307A.1	To Illustrate the concept of basics of Java programming.
		S307A.2	To Implement Java programs on Arithmetic Promotion and Method Calling
		S307A.3	To Implement java program using different java class.
		S307A.4	To Use the different java principles like inheritance, polymorphism, packaging and interface
BTCOS307	Seminar-I (Web Technology Lab)	S307.1	To design a web page using HTML5 semantic elements.
		S307.2	To Understand the role of CSS stylesheets and design a Lay out HTML elements using CSS.
		S307.3	To Implement program logic using JavaScript and design web page
		S307.4	To Understand and implement web page designing using PHP.
		S307.5	To Understand the role of Ajax in Web page Design.
BTCOC501	Database Systems	C501.1	To Identify the basic database management system concepts and entity relationship model.
		C501.2	To Describe database relational data model and relational calculus.
		C501.3	To Implement database concepts using SQL commands and join operations.
		C501.4	To Apply various Normalization techniques.
		C501.5	To Understand indexing and query processing and techniques involved in query optimization of databases.

		C501.6	To Describe the principles of transaction processing of databases.
BTCOC502	Theory of Computation	C502.1	To identify formal machines, computations, regular expression and Design finite state machines for acceptance of strings
		C502.2	To Explain Context Free Grammar and Classify different types of Grammars.
		C502.3	To Illustrate Regular Grammar, its types and translate to different normal forms
		C502.4	To Develop pushdown automata accepting strings
		C502.5	To Explain Turing machine and Distinguish between decidability and undecidability
BTCOC503	Machine Learning	C503.1	To recognize the characteristics of machine learning that makes it useful to real-world problems and Use different linear methods for regression and classification with their optimization through different regularization techniques.
		C503.2	To apply theoretical foundations of Instance based learning and probability to perform KNN and Bayesian classifier to label data points.
		C503.3	To describe and apply the different supervised learning methods of logistic regression and support vector machine.
		C503.4	To Select the appropriate type of neural network architecture and apply for learning non-linear functions.
		C503.5	To Compare and Apply different dimensionality reduction techniques.
		C503.6	To Illustrate and apply clustering algorithms and identify its applicability in real life problems.
BTCOE504(A)	Introduction to Research	C504(A).1	Develop Understanding on various kinds of research, objectives of doing research, research process, research designs and sampling.
		C504(A).2	To Understand & Apply of qualitative research methods.
		C504(A).3	To Understanding & Apply measuring and scaling procedures, as well as quantitative data analysis.
		C504(A).4	To Create and Develop Technical writing & Presentations.
		C504(A).5	To Apply Various Research Ethics while making research report.
BTCOE505(A)	Economics & Management	C505A.1	understand about market, demand, supply and cost.
		C505A.2	apply skills like decision making and process costing.
		C505A.3	implement financial management, accounting and handling financial risks.
		C505A.4	Understanding forecasting and capacity planning.
		C505A.5	Understand inventory management systems and entrepreneurship.
BTCOC506	Computer Programming-I	C506.1	Discuss the concepts of online Judges and feedback to solve the programming challenges.
		C506.2	Design and implement the basic programs of Strings, Sorting, Combinatorics, Arithmetic and Algebra etc on Hacker rank, Codechef websites.
		C506.3	Discuss the standard input output and Use the guidelines for designing the test cases for the various programs.
		C506.4	Practice and Participate in the programming challenges on competitive platforms like codechef.com, uva.onlinejudge.com and to succeed in such challenges of reputed recruiting organizations.
BTCOL507	Database System Lab	C507.1	To Implement database language commands for database concepts
		C507.2	To Analyze the data using queries to retrieve data from database.
		C507.3	To Apply PL/SQL for processing database.
		C507.4	To Develop solutions using database concepts for requirements.
BTCOL508	Machine Learning Laboratory	L508.1	To Understand the mathematical and statistical prospective of machine learning algorithms through python programming.
		L508.2	To evaluate the machine learning models pre-processed through various feature-engineering algorithms by python programming.
		L508.3	To Design and evaluate the supervised models through python in built functions.
		L508.4	To Design and evaluate the unsupervised models through python in built functions.
		L508.5	To Recognize and implement various ways of selecting suitable model parameters for different machine learning techniques.
BTCOS509	Seminar	S509.1	To study research papers for understanding of a new field, in the absence of a textbook, to summarize and review them.
		S509.2	To identify promising new directions of various cutting edge technologies.
		S509.3	To impart skills in preparing detailed report describing the project and results
		S509.4	To effectively communicate by making an oral presentation before an evaluation committee
BTCOC701	Software Engineering	C701.1	To understand and meet ethical standards and legal responsibilities in the field of software engineering discipline.
		C701.2	To provide the idea of decomposing the given problem into various process models and understand the functionality of SDLC models.
		C701.3	To Understand the importance of requirement engineering
		C701.4	To understand different modeling system with design & implementation using UML
		C701.5	To understand the importance of testing at different level and evaluate dependability properties
BTCOE702	Distributed System	C702B.1	To Understand the concept of architecture and communication systems in Distributed Systems.
		C702B.2	To Describe the remote procedure call in Distributed Systems.
		C702B.3	To Understand the Distributed shared memory concept and various distributed algorithms related to clock synchronization, deadlock detection.
		C702B.4	To Apply various distributed algorithm related to resource management
		C702B.5	To Analyze the design and functioning of existing distributed file systems.
BTCOE703A	Cloud Computing	C703A.1	To understand the basic terminologies of cloud computing.
		C703A.2	To identify various service models in cloud architecture.
		C703A.3	To know cloud usage and implementation for enterprise level.
		C703A.4	To deploy Aneka cloud platform
		C703A.5	Applying cloud applications and services to various domain specific platforms.

BTCOE703C	Natural Language Processing	C703C.1	To understand natural language processing and learn how to apply basic algorithms in this field.
		C703C.2	To understand the algorithmic description of the main language levels: morphology, syntax, semantics, and pragmatics
		C703C.3	To grasp basics of knowledge representation, inference, and their relations.
		C703C.4	To Design algorithms for natural language processing tasks.
		C703C.5	To Develop useful systems for language processing and related tasks involving text processing.
BTCOE702	Big Data Analytics	C702.1	To Understand the building blocks of Big Data.
		C702.2	To Analyze the various big data platform like Hadoop, Map Reduce.
		C702.3	To Illustrate the use of various Big Data Streaming Platforms.
		C702.4	To Perform big data application using machine learning and deep learning.
		C702.5	To Understand various big data modern database for web.
BTCOL707 (A)	Big Data Analytics Lab	C707.1	Execute Installing Hadoop in its two operating modes.
		C707.2	Execute and implement various file management tasks in Hadoop.
		C707.3	Understand the overall programming architecture using Map Reduce API.
		C707.4	various collection types such as List, Set and Map & a basic Word Count Map Reduce program to understand Map Reduce Paradigm.
		C707.5	Execute and implement HBase then use HbaseDDI and DML commands, Apache spark applications using Scala and CRUD operations in MongoDB.
		C707.6	Understand and implement concepts of Data analytics using Apache Spark on Amazon food dataset.
BTCOE704	Blockchain Technology	C704 A.1	Explain Public Ledger, Concepts of block and blockchain, hashing function and its properties
		C704 A.2	Demonstrate creation of coins in bitcoin along with double spending and explain different consensus algorithms
		C704 A.3	Compare different consensus algorithms for permissioned blockchain model and explain permissioned model and use cases.
		C704 A.4	Use different enterprise application of Blockchain such as cross border Payment, KYC, Food security, Blockchain Enabled trade
		C704 A.5	Examine and Experiment platforms for writing smart contracts using Hyper ledger, Ethereum, Ripple, Corda.
BTCOL705	Full Stack Development	C705.1	To learn advanced concepts in front-end web Development.
		C705.2	To design websites using HTML5 and CSS3.
		C705.3	To understand the basic and advanced concepts in JavaScript, AngularJS, ExpressJS
		C705.4	To be familiar with back-end development using Ajax, jQuery, ExpressJS, Nodejs and MongoDB.
BTCOL706	System Administration	L706.1	Demonstrating cross platform virtualization software.
		L706.2	Demonstrating installation and configuration of virtual terminal connection.
		L706.3	Demonstrating file transfer between client and server.
		L706.4	Demonstrating web server and networking protocol configuration.
BTCOL707(B)	Distributed system Lab	L707B.1	To implement the models for distributed processing and communication
		L707B.2	To Develop Client- server Communication model.
BTCOL707(B)	Distributed system Lab	L707B.3	To Apply shared memory concept on distributed system
		L707B.4	To Understand different election and Mutual Exclusion algorithms in distributed system.
BTCOL708A	Cloud Computing Laboratory	L708A.1	To develop PaaS using various cloud platforms.
		L708A.2	To use SaaS cloud services from various service providers.
		L708A.3	Design and develop IaaS to provide physical environment.
		L708A.4	Implement and use sample cloud services from various service providers.
BTCOL708C	Natural Language Processing Laboratory	L708C.1	Demonstrate the understanding of basic text processing techniques in NLP.
		L708C.2	Analyze morphological analyzers and stemmers.
		L708C.3	Build language models and demonstrate Word Sense Disambiguation using WordNet.
		L708C.4	Design, implement and evaluate part-of-speech taggers and parsers.
BTCOP709	Project Phase-I	709.1	To Analyse current trends in computer-related domains in order to uncover real-world issues and domain requirements.
		709.2	To Apply software engineering principles in planning, formulating an innovative design/ approach and computing requirements which are appropriate to solve the problem within the context of legal, global and environment constraint.
		709.3	To design and create projects using the proper methods, materials, and modern equipment while upholding integrity and moral conduct in engineering practices.
		709.4	Ability to schedule, monitor, and manage project's resources, finance and work assignments to assure timely completion and to validate and verify project's performance with respect to proposed solution.
		709.5	Ability to effectively communicate in both formal and informal environments with team members and mentors; professional performance as a team member; acceptance of responsibility, initiative, and leadership required to present and create technical documents for successful project.



Dr. Makarand Shahade
HOD, Dept. of. Computer Engineering

H.O.D. Computer Dept.
SVKM's Institute of Technology, Dabulgaon



**Shree Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Computer Engineering**

Course outcome Statements A.Y. 2021-2022 (Even Semester)

Subject Code	Subject Name	CO Number	Course outcome Statement
BTCOC401	Design & Analysis of Algorithms	C401.1	Examine the running time of an algorithm using asymptotic analysis and to check correctness of algorithm by solving recurrence relation.
		C401.2	Describe the Divide-and-Conquer paradigm and use this technique to solve different algorithms.
		C401.3	Describe the Backtracking, Branch and Bound paradigm and use this technique to solve different algorithms
		C401.4	Describe the Greedy paradigm and use this technique to solve different algorithms.
		C401.5	Describe the Dynamic Programming paradigm and use this technique to solve different algorithms and examine the classes of algorithms based on P, NP, and NP-Complete
BTCOC402	Operating System	C402.1	To Comprehend and Use basic concepts of Operating System with its structure
		C402.2	To Illustrate concepts of Process as well as Thread Management along with Implement concepts of CPU Scheduling algorithms.
		C402.3	To Illustrate concepts of Process Synchronization as well as deadlock along with Implement concepts of Synchronization primitives and banker's algorithms
		C402.4	To Comprehend concept of Memory Management along with Implement concepts of page replacement algorithms and memory allocation algorithms.
		C402.5	To Illustrate concepts of File System Manipulation as well as Disk Management along with Implement concepts of file allocation algorithms and disk scheduling algorithms
BTIM403	Basic Human Rights	C403.1	Discuss the importance, philosophical and historical perspectives of human rights.
		C403.2	Examine the challenges of the pluralistic society and the rising conflicts and tensions in the name of particular loyalties to caste, religion, region and culture.
		C403.3	Discuss prominent issues such as Economy, Poverty, Unemployment, Migrant workers and human rights violation and the responsibility of the government.
		C403.4	Discuss Fundamental Rights and Directive Principles of State Policy in the Constitution of India in context with the present situation
		C403.5	Discuss Universal declaration of human rights and provisions of India
BTBS404	Probability Theory and Random Processes	C404.1	Find probability of given events Using addition and multiplication theorem. Apply Bayes theorem. Translate real-world problems into probability models.
		C404.2	Find expectation and variance of discrete and continuous random variable. Find probability using Binomial, Poisson and Normal distribution.
		C404.3	Calculate and interpret the correlation coefficient between two variables.
		C404.4	Calculate the simple linear regression equation for a set of data.
		C404.5	Apply the concept of sampling theory to the engineering problems.
BTES405	Digital Logic Design & Microprocessors	C405.1	Illustrate the fundamental concepts of digital signal, positive and negative logic, Boolean algebra, logic gates, logical variables, the truth table, number systems, codes, and their interconversion, code error detection and correction.
		C405.2	Perceive, analyse and design various minimization techniques, combinational and sequential circuits, to develop skill to construct and troubleshoot digital circuits.
		C405.3	Perceive, the fundamentals and internal design of Microprocessors along with the features and their programming to build systems for real time applications.
BTCOL406A	Operating System Lab	L406A.1	To Comprehend and Use basic concepts of Operating System with its structure
		L406A.2	To Illustrate concepts of Process as well as Thread Management along with Implement concepts of CPU Scheduling algorithms.
		L406A.3	To Illustrate concepts of Process Synchronization as well as deadlock along with Implement concepts of Synchronization primitives and banker's algorithms
		L406A.4	To Comprehend concept of Memory Management along with Implement concepts of page replacement algorithms and memory allocation algorithms.
		L406A.5	To Illustrate concepts of File System Manipulation as well as Disk Management along with Implement concepts of file allocation algorithms and disk scheduling algorithms
BTCOL406B	Python Programming Lab	L406B.1	To Use the Python language syntax including control statements, loops and functions to write programs for a wide variety problem in mathematics, science, and games.
		L406B.2	To Examine the core data structures like lists, dictionaries, tuples and sets in Python to store, process and sort the data.
		L406B.3	To Determine the methods to handle the strings in python and to use string functions.
		L406B.4	To Interpret the concepts of Object-oriented programming as used in Python using encapsulation, polymorphism and inheritance.
		L406B.5	To Write a program to Read and write data from & to files in Python
BTCOS407A	Seminar – II: Design & Analysis of Algorithms Lab	L407.1	To Use divide-and-conquer strategy to implement searching and sorting algorithms
		L407.2	To Use Greedy methods to implement maximization and minimization problems
		L407.3	To Use a dynamic Programming to implement the overlapping sub problems.
		L407.4	To Use the distance matrix strategy to find the shortest path in connected graph.
BTCOS407B	Seminar – II: Mobile Application Development Lab	C407.1	To appreciate and understand the step for installing of required software and preparing the working environment
		C407.2	To apply the OObject-oriented approach to design layouts and views for mobile app
		C407.3	To analyze and solve the user interactions using input tools
		C407.4	To use of different API's or data sharing or data storing operation and apply different design methodologies based on the problem specification and objectives.
		C407.5	To Analyze and solve different features of mobile app development using error handling and passing data with real world problem etc.
BTCOC601	Compiler Design	C601.1	To explain the concepts and different phases of compilation with compile time error handling.
		C601.2	To Use regular expressions, context free grammar and finite automata to Represent language tokens and design lexical analyzer for a language.
		C601.3	To compare top down with bottom up parsers, and use appropriate parser to produce parse tree representation of the input.
		C601.4	To Design syntax directed translation schemes for a given context free grammar.
		C601.5	To Generate intermediate code for statements in high level language.
		C601.6	To Apply optimization techniques to intermediate code and generate machine code for high level language program.
BTCOC602	Computer Networks	C602.1.	To Understand the essential components of a network as well as network layered architecture.
		C602.2.	To Analyze various LAN Technologies.
		C602.3.	To Understand the data connection layer's design difficulties and Service provided to Network Layer.
		C602.4.	Understanding & Analyze the Congestion control and Quality of service in Data Traffic

		C602.5:	To Understand and Analyze Application Layer Protocols.
BTCOE603B	Artificial Intelligence	C603B.1	To discuss fundamental understanding of the history of artificial intelligence (AI) , its foundations and the design of intelligent agents.
		C603B.2	To use the most appropriate AI methods for problem solving.
		C603B.3	To discuss the core concepts CSP's and design good evaluation functions and strategies for game playing
		C603B.4	To examine the logical agents and use of first order logic in building logical agents.
		C603B.5	To describe knowledge in uncertain domain and semantics of Bayesian Networks.
BTCOE603C	Object-Oriented Analysis Design	C603C.1	Describe the concepts of object oriented approach and explain SDLC.
		C603C.2	Design and develop object oriented models using appropriate UML notations.
		C603C.3	Analyze different approaches of object oriented system
		C603C.4	Use the concept of design patterns for constructing software architectures.
		C603C.5	Discuss the applications of Object oriented concepts in programming, databases and other real world application.
BTCOE604	Internet of Things	C604.1	To Recognize different IoT Network Architecture and core concepts in IoT
		C604.2	To Examine communication criteria in IoT access Technologies and identify different elements in smart objects.
		C604.3	To Discuss and compare different protocols in IoT.
		C604.4	To Use of different tools and technologies for IoT.
		C604.5	To Demonstrate IoT Based system using IoT Physical Devices and endpoints
BTCOE605A	Development Engineering	C605A.1	To Demonstrate basics of Engineering and classify the concept of development engineering in detail
		C605A.2	To Analyze and illustrate the concept of poverty, and define the role of engineers in culture, global competence
		C605A.3	To Explain and Define social justice engineering in religious, secular perspective.
		C605A.4	To Use and apply different development strategies for society, economics, health and educational perspectives.
		C605A.5	To Define the engineering for sustainable community and humanitarian education.
		C605A.6	To Select and apply modern engineering tools like ICT, AI, Blockchain for social development.
BTCOC606	Competitive Programming-II	L606.1	Discuss the concepts of online Judges, feedback and the standard input output to solve the programming challenges based on number theory.
		L606.2	Design and Implement back tracking challenging problems on Hackerrank, Codechef websites.
		L606.3	Design and Implement graph based challenging problems
		L606.4	Design and implement the Dynamic Programming based challenging problems on Hackerrank, Codechef websites and use the guidelines for designing the test cases for the various programs.
BTCOL607A	Mobile Application Development	C607.1	To appreciate and understand the step for installing of required software and preparing the working environment
		C607.2	To apply the OObject-oriented approach to design layouts and views for mobile app
		C607.3	To analyze and solve the user interactions using input tools
		C607.4	To use of different API's or data sharing or data storing operation and apply different design methodologies based on the problem specification and objectives.
		C607.5	To Analyze and solve different features of mobile app development using error handling and passing data with real world problem etc.
BTCOL607B	Internet of Things Laboratory	L607B.1	To Identify different microcontrollers used in IoT systems and discuss the setup required to execute applications.
		L607B.1	To Write program to design applications in IoT using Raspberry Pi and IoT physical devices as sensors, actuators.
		L607B.1	To Assemble IoT Based system using IoT Physical Devices and endpoints.
BTCOL608	Computer Networks Laboratory	C608.1	COI-Study Understand the IP Forwarding and Working of Spanning Tree
		C608.2	Study Understand the working of "Connection Establishment" in TCP and Data Rate of a Wireless LAN (IEEE 802.11b) network
		C608.3	Study Understand Routing Information Protocol (RIP), Open Shortest Path First (OSPF) and characteristic curve throughput versus offered traffic for a Slotted ALOHA system
		C608.4	Study Understand the impact of bit error rate on packet error and the performance of networks based on Star, Bus and Ring topologies
		C608.5	To Understand Client Server Using TCP/IP sockets and calculate the shortest Path using Link State Routing Algorithms
BTCOE801B	Social Networks	C801.1	Understand the basic concepts and principles of different theoretical models of the social networks analysis
		C801.2	Understand the concepts of network models, network measures, graph representation, graph traversal algorithms, graph mining essentials.
		C801.3	Be able to analyze, and evaluate social communities.
		C801.4	To demonstrate proficiency and understanding of public sector media and privacy
		C801.5	To demonstrate proficiency in understanding concepts in social networking and utilizing these concepts for solving real-world social network issues.
BTCOE802A	Introduction to Industry 4.0 and Industrial Internet of Things	C802.1	To understand Industry 4.0 in sensing & actuation, Communication, networking and other global issues in industrial systems.
		C802.2	To understand and interpret the cybersecurity concepts in Industry 4.0
		C802.3	To understand and analyze Industrial IoT and its layers with Industry 4.0
		C802.4	To relate the Industrial IoT to various computer science-related technologies
		C802.5	To test the Industrial IoT for different application domains.
		C802.6	To examine Industrial IoT applications with different case studies
BTCOP803	Project phase - II	CO803.1	To Analyse current trends in computer-related domains in order to uncover real-world issues and domain requirements.
		CO803.2	To Apply software engineering principles in planning, formulating an innovative design approach and computing requirements which are appropriate to solve the problem within the context of legal, global and environment constraint.
		CO803.3	To design and create projects using the proper methods, materials, and modern equipment while upholding integrity and moral conduct in engineering practices.
		CO803.4	Ability to schedule, monitor, and manage project's resources, finance and work assignments to assure timely completion and to validate and verify project's performance with respect to proposed solution.
		CO803.5	Ability to effectively communicate in both formal and informal environments with team members and mentors; professional performance as a team member; acceptance of responsibility, initiative, and leadership required to present and create technical documents for successful project.

Dr. Manojram Shahade
HOD, Dept. of Computer Engg.

H.O.D. Computer Dept.
SVKM's Institute of Technology, Dhule



Shri Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Electrical Engineering

PROGRAMME: B.Tech. (Electrical ENGINEERING)

- 1) Program Outcomes, Program Specific Outcomes, and Course Outcomes of all courses offered by the department (UG) for 2019-20, 2020-21, 2021-22 and 2022-23.

• **Program Outcomes and Program Specific Outcomes (2019-20)**

PO 1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO 9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

H.O.D. Electrical Dept.
SVKM's Institute of Technology, Dhule


H.O.D. Electrical Dept.
SVKM's Institute of Technology, Dhule



**Shri Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Electrical Engineering**

PO 10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

• **Program Outcomes and Program Specific Outcomes (2020-21 to 2022-23)**

PO 1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

PO 2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO 8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.


**H.O.D. Electrical Dept.,
SVKM's Institute of Technology, Dhule**



**Shri Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Electrical Engineering**

PO 9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO):

PSO 1: Graduate will apply Electrical Engineering knowledge effectively in the context of environmental and social concerns.

PSO 2: Graduates will exhibit their understanding of electrical engineering for systems design and experimentation.

PSO 3: Graduates will strive to pursue lifelong learning and leadership prospects.

Program Outcomes (POs) as approved by All India Council of Technical Education and Dr. Babasaheb Ambedkar Technical University, motivating undergraduate engineering program students to think about what they should learn and how they should apply their knowledge in the time allotted for graduation. The POs are not specific to any single program. On the college website, total twelve POs have been prescribed. All POs are designed as per the need of modern engineering practice and requires a very good knowledge of mathematics, physics and basic engineering sciences

Program Specific Outcomes (PSOs) are program specific and written by the Head of the department in co-ordination with all the faculty members of the respective department. It describes what graduates of a particular undergraduate engineering program should be able to do once they have completed their curriculum.

Course outcomes(CO) are statements clearly describing the meaningful, observable and measurable knowledge, skills and/or dispositions students will learn in this course. These statements clearly describing the specific type and level of new learning students will have


**H.O.D. Electrical Dept.
SVKM's Institute of Technology, Dhule**



**Shri Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Electrical Engineering**

achieved – and can reliably demonstrate – by the end of a course. It clearly identify what (and how much or how well) the student will know and be able to do after successfully completing this course – the essential knowledge, abilities, and attitudes that constitute the basic learning needed by a graduate of this course.

All courses are divided into three broad groups (for eg: Machine group, Power system group and Multidisciplinary group in case of Electrical Engineering department). One module coordinator is appointed for each group from faculty team of same department and course coordinators are appointed for each course. Course outcomes are either predefined by the university or defined by the course coordinator and further verified by the module coordinator. It is desirable that all CO should attained their target value set by the college, all the course coordinators use various direct and indirect measures as assessment methods to check the attainment level of each CO.

It is the standard practice of institute to display all POs, PSOs and COs, for all departments on its websites for teacher or student reference. It is also made mandatory for all teaching staff to refer POs, PSOs, and COs while teaching any particular course, so that, student get to know about them in a better manner. This practice also helps students to fill course exit surveys and program exit surveys which are conducted by department from time to time.


**H.O.D. Electrical Dept.
SVKM's Institute of Technology, Dhule**

**H.O.D. Electrical Dept.
SVKM's Institute of Technology, Dhule**



**Shri Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Electrical Engineering
Course outcome Statements**

Subject Code	Subject Name	CO Number	Course outcome Statement
BTBS101	Engineering Mathematics – I	CO101.1	Apply the matrix technique (Linear algebra) to find solutions of system of linear equations arising in many engineering problem
		CO101.2	Demonstrate the concept of partial derivatives and their applications to Maxima/ Minima, series expansion of multi valued functions & Compute Jacobian of functions of several variables.
		CO101.3	Identify and sketch of curves in various coordinate system & Evaluate multiple integrals and their applications to area and volume
BTBS102	Engineering Chemistry	CO1202.1	Develop the importance of water in industrial and domestic usage.
		CO1202.2	Interpret the knowledge of phases, components, degree of freedom and apply it in various phase diagrams.
		CO1202.3	Describe various methods of metallurgy, types of fuels and lubricants, and also able to define various concepts of electrochemistry.
BTES103	Engineering Mechanics	CO103.1	Know and apply fundamental Laws of Engineering Mechanics
		CO103.2	Know and apply conditions of static equilibrium to analyze given force system
		CO103.3	Compute Centre of gravity and Moment of Inertia of plane surfaces
		CO103.4	Compute the motion characteristics of a body /particle for a Rectilinear and Curvilinear motion.
		CO103.5	Know and discuss relation between force and motion characteristics
BTES104	Computer Programming in C	CO103.1	To illustrates the Process of programming, Fundamental Basic and various operators in c
		CO103.2	To illustrate and implement various decision statement ,loops and Function in c
		CO103.3	To Explain and implement Derived Data type -Array, String and User defined Data type –Structure
BTES105L	Workshop Practices	COWS1205.1	Perform carpentry operations like planning, cutting, fitting of joints using hand and power tools
		COWS1205.2	Perform fitting operations such as marking, cutting, filing, drilling and tapping using hand and power tools and also basic plumbing Operations.
		COWS1205.3	Perform sheet metal operations such as marking, shearing, bending, punching, and soldering using hand and power tools and Welding operations like joint preparations, electrode selections.
		COWS1205.4	Understand the simple machining skills on lathe machine operations and its use during their project work
BTES106	Basic Electrical and Electronic Engineering	CO106.1	Apply basic ideas and principles of electrical engineering
		CO106.2	Identify protection equipment and energy storage devices
		CO106.3	Differentiate electrical and electronics domains and explain the operation of diodes and transistors.
		CO106.4	Acquire knowledge of digital electronics
		CO106.5	Design simple combinational and sequential logic circuits.
BTBS108L	Engineering Chemistry Lab	CO1202L.1	Test the quality of water sample by determination of hardness, acidity, alkalinity and dissolve oxygen present in it.
		CO1202L.2	Examine chemical or physical property of given sample material.
BTES109L	Engineering Mechanics Lab	CO1202L.2	Determine the concentration of specific ions present in the solution using titration methods.
		CO108L.1	Calculate beam reaction by Parallel Force apparatus and graphics static method and forces in truss.
		CO108L.2	Evaluate co-efficient of friction and centroid of irregular shaped bodies.
BTBS201	Engineering Mathematics – II	CO201.1	Evaluate mechanical advantage, Velocity ratio, efficiency and mass moment of inertia.
		CO201.2	Discuss the need and use of complex variables to find roots, to separate complex quantities and to establish relation between circular and hyperbolic functions.
		CO201.3	Solve first and higher order differential equations and apply them as a mathematical modeling in electric and mechanical systems.
		CO201.4	Determine Fourier series representation of periodic functions over different intervals.
BTBS202	Engineering Physics	CO201.4	Demonstrate the concept of vector differentiation and interpret the physical and geometrical meaning of gradient, divergence & curl in various engineering streams. Apply the principles of vector integration to transform line integral to surface integral, surface to volume integral & vice versa using Green's, Stokes and Gauss divergence theorems
		CO102.1	Apply the concept of types of oscillations in engineering.
		CO102.2	Apply the fundamentals of interference, polarization in LASER, and optical fiber in engineering.
		CO102.3	Determine the application of the trajectory of charge particles in the electromagnetic field, with basic principles of quantum physics.
BTES203	Engineering Graphics	CO102.4	Determine the different types of crystal structures using the X-ray diffraction technique, and study the fundamentals of material science and its application in Magnetic material, Superconductors, and semiconductors.
		CO103.1	Use of drawing instruments effectively for drawing and dimensioning
		CO103.2	Explain conventions and methods of engineering drawing
		CO103.3	Apply concepts of projections of points, lines, planes, solids and section of solids
BTHM204	Communication Skills	CO103.4	Construct isometric and orthographic views of given objects
		CO104.1	Apply Verbal and Non-Verbal communication in professional and social situations
		CO104.2	Apply communication skills for presentations, group discussion, interpersonal interactions, public speaking, report writing and business correspondence
BTES205	Energy and Environmental Engineering	CO104.3	Apply phonetics and grammar in communication to develop a neutral accent
		CO205.1	Identify conventional, non-conventional energy sources.
		CO205.2	Know and discuss power consuming and power developing devices for effective utilization and power consumption
		CO205.3	Identify various sources of air, water pollution and its effects.
		CO205.4	Know and discuss noise, soil, thermal pollution and Identify solid, biomedical and hazardous waste.
BTES206	Basic Civil and Mechanical Engineering	CO206.1	Identify various Civil Engineering materials and choose suitable material among various options.
		CO206.2	Apply principles of surveying to solve engineering problem.
		CO206.3	Identify various Civil Engineering structural components and select appropriate structural system among various options.
		CO206.4	Explain and define various properties of basic thermodynamics, materials and manufacturing processes.
		CO206.5	Know and discuss the working principle of various power consuming and power developing devices.
BTBS207L	Engineering Physics Lab	CO1202L.1	Determine the mechanical & electrical properties of matter.
		CO1202L.2	Determine the wavelength of He-Ne Laser and numerical aperture of optical fibre.
		CO1202L.3	Determine the various properties of semiconducting materials.
BTES208L	Engineering Graphics Lab	CO1203L.1	Use of drawing instruments effectively for drawing and dimensioning
		CO1203L.2	Implement various fundamental geometrical constructions
		CO1203L.3	Apply concepts of projections of points, lines, planes, solids and section of solids
		CO1203L.4	Construct isometric and orthographic views of given objects
BTHM209L	Communication Skills Lab	CO209L.1	To illustrate the process of introduction with RP exercising Transcription, Stress and Intonations
		CO209L.2	To apply Verbal and Non-Verbal communication through Extempore, GD, Debate, Presentation and Interviews.
BTBSC301	Engineering Mathematics-III	CO301.1	Find Laplace transform of functions using various formulas and properties. Evaluate particular types of integration.
		CO301.2	Find Inverse Laplace transform of functions using various formulas and properties. Solve linear differential/simultaneous linear differential equation using Laplace and inverse Laplace transform.
		CO301.3	Find Fourier and inverse Fourier transform, Fourier sine and inverse Fourier sine transform. Cosine transform and inverse Fourier cosine Transform of functions.
		CO301.4	Form PDE by eliminating arbitrary constant, solve PDE and use PDE to solve one and two dimensional heat flow equation.
		CO301.5	Determine Analytic functions/Bilinear transformation/ apply Cauchy's theorem/Cauchy's integral formula and Residue theorem to solve contour integration.

H.O.D. Electrical Dept.
SVKM's Institute of Technology, Dhule

BTEEC302	Network Analysis and Synthesis	CO302.1	To review basic components of electric network.
		CO302.2	To design and develop network equations and their solutions.
		CO302.3	To apply Laplace theorem for electric network analyses
		CO302.4	To analyze AC circuit.
BTEEC303	Fluid Mechanics	CO303.1	Calculate properties of fluid and hydraulic measurement.
		CO303.2	Apply fluid dynamics principal to laminar and turbulent flow and illustrate working of centrifugal pump.
		CO303.3	Plot the T-S diagram for I C Engine and explain various systems of I C Engine.
		CO303.4	Classify air compressor and performance improvement techniques for air compressor.
		CO303.5	Classify refrigeration air conditioning systems along with coefficient of performance and plot the various air conditioning processes.
BTEEC304	Measurement and Instrumentation	CO304.1	To understand philosophy of measurement.
		CO304.2	To understand different methods of analog and digital measurement.
		CO304.3	To study principle of construction and operation of different transducer and display methods.
BTEEC305A	Electrical Engineering Material	CO305.1	To study about crystal structure
		CO305.2	To understand magnetic material structure
		CO305.3	To study about conductor,superconductor & semiconducting materials
		CO305.4	To study dielectric and nano materials
BTHM3401	Basic Human Value	CO3401.1	To study concept of human values,human rights & human duties
		CO3401.2	To explain social structure and concept of Society, Religion, Culture with their Inter-Relationship
		CO3401.3	To study freedom, democracy and human Rights in Indian Constitution.
BTHM306	Engineering Economics	CO306.1	To study concept of economy and its type
		CO306.2	To study concept of time value of money
		CO306.3	To study about demand in detail
		CO306.4	To understand Meaning of Production and factors of production.
		CO306.5	To understand different Concept about market
BTEEL307	Network Analysis and Synthesis lab	CO307.1	Verifies Principles of Network
		CO307.2	Analyze Behavior of circuit response in Time & Frequency domain
		CO307.3	Understand Two Port Network & Characteristics of Filters
BTEEL308	Measurement and Instrumentation lab	CO308.1	To illustrate the working of basic measuring instruments
		CO308.2	To experiment the various methods of resistance, inductance, capacitance and power measurement
		CO308.3	To use transducers for measurement of various quantities
		CO308.4	To use Digital instruments for measurement of electrical quantities
		CO308.5	To discuss range extension methods for measuring instruments
BTEEM309	Electrical Workshop	CO309.1	To recognize the various resources and components using data sheet in Electrical Engineering
		CO309.2	To implement projects based on the circuit simulation software (Tina-TI)
		CO309.3	To desing, preparation and analysis of PCB along with report writing of project
BTEEF310	Field training	CO310.1	To demonstrate the knowledge gained during internship with the help of survey report writing and presentation
		CO310.2	To discover engineering and management principles useful at specific work environment
BTEEC401	Electrical Machines-I	CO401.1	To study diff. types, construction and operating principle of diff. types of electrical machines
		CO401.2	To illustrate the principle of energy conversion in single, mulitpe excited machines and the concept of co energy.
		CO401.3	To analyze the performance and Characteristics of electrical machines by conducting various test.
		CO402.1	To Understand basic operation of power system, power system components and their characteristics.
BTEEC402	Power System-I	CO402.2	To Analyze the Performance of Transmission Line
		CO402.3	To understand Mechanical Design of Transmission Line
		CO403.1	To prepare estimates and costing of electrical installations of power system.
BTEEC403	Electrical Installation and Estimation	CO403.2	To describe procedures of contracting and purchase.
		CO403.3	To demonstrate the different components of electrical systems, tools and wiring systems.
BTEEC404	Numerical Methods and Program	CO404.1	Apply numerical methods to obtain approximate solutions and errors in mathematical problems.
		CO404.2	Make appropriate use of MATLAB commands to implement numerical methods
		CO404.3	Derive numerical methods and solutions for linear, non-linear and differential equations.
BTID405	Product Design Engineering	CO405.1	Create simple mechanical or other designs
		CO405.2	Create design documents for knowledge sharing
		CO405.3	Manage own work to meet design requirements
		CO405.4	Work effectively with colleagues
BTEEE406B	Analog and Digital Electronics	CO406B.1	To illustrate working of transistor as an amplifier, types and characteristics of an amplifier.
		CO406B.2	To comprehend constructional details, characteristics and applications of operational amplifier.
		CO406B.3	To distinguish basic number system and fundamentals of Boolean algebra and various minimization techniques.
		CO406B.4	To comprehend types, design and characteristics of logic gates.
		CO406B.5	To implement digital systems using combinational and sequential circuits.
BTEEOE407B	Introduction to Non Conventional Energy Sources	CO407.1	To review energy scenario and different types of energy sources
		CO407.2	To understand basic concepts , construction and operational features of different non-conventional sources
BTEEL408	Electrical Machines-I lab	CO408.1	To Determine Polarity and Transformation ratio of Single phase Transformer
		CO408.2	To study diff. parts, types of connections and operations of diff. types of electrical machines
		CO408.3	To analyze the performance and draw Characteristics of electrical machines by conducting various test.
BTEEL409	Power System-I lab	CO409.2	To Understand basic operation of power Plants
		CO409.2	To discuss the major equipments used in power station.
		CO409.2	To recognize Various components of Transmission Lines
BTEEL410	Numerical Methods and Program lab	CO410.1	To Analyze the Performance of different types of transmission Lines
		CO410.1	To Understand basics Matlab programming for numerical methods
		CO410.2	To Obtain different errors using Matlab programming
BTEEL411	Analog and Digital Electronics lab	CO410.3	To obtain numerical solution of various engineering methods
		CO411.1	To comprehend constructional details, characteristics and applications of operational amplifier.
		CO411.2	To implement digital systems using combinational circuits.
BTEEC501	Electrical Machines-II	CO411.3	To implement digital systems using sequential circuits.
		CO501.1	To study different methods of speed control of AC Machine
		CO501.2	To study importance and procedure of different performance test on AC Machine
BTEEC502	Power System-II	CO501.3	Interpret the behavior of AC machines using phasors, equivalent circuits and its operating characteristics.
		CO502.1	To study different parameters of power system operation and control
		CO502.2	To study load flow and Diff. methods of reactive power control.
BTEEC503	Microprocessor and Microcontroller	CO502.3	To understand diff. methods of fault analysis and stability study
		CO503.1	To know the architecture of 8085 and 8051.
		CO503.2	To understand interfacing and interrupt features of 8085 and 8051.
		CO503.3	To develop program for basic applications.

BTHM504	Value education human rights and legislative procedure	CO504.1	To understand value of education and self-development
		CO504.2	To develop good values and character
		CO504.3	To know Human right and legislative procedure
BTEEE505C	Testing and Maintenance of Electrical equipment	CO505C.1	Test the Electrical equipment by various methods as per ISI standards
		CO505C.2	Identify, rectify and analysis of faults Power transformer and Induction motor during manufacturing and in operation relate testing equipment and fault finding
		CO505C.3	Demonstrate modern techniques for analyzing and detecting faults
BTEEOE506B	Power Plant Engineering	CO506B.1	Discuss power plant economics and interpret their performance based on load variations.
		CO506B.2	Discuss power generation using renewable and non-renewable energy resources.
		CO506B.3	Explain the issues and benefits of power plants interconnection and interface to grid.
BTEEL507	Electrical Machine-II Lab	CO507.1	To conduct test on induction machine to determine the performance characteristics
		CO507.2	To conduct test on synchronous generator (alternator) to determine the performance characteristics
		CO507.3	To conduct test on synchronous motor to draw the performance curves
BTEEL508	Power System-II Lab	CO508.1	To study Characteristics of salient pole synchronous machine
		CO508.2	To study the power limit and various compensation techniques on Transmission line model.
		CO508.3	To perform Different types of fault analysis in AC Network Analyzer.
BTEEL509	Microprocessor lab	CO509.1	To identify & formulate solutions to problems relevant to power system using software tools.
		CO509.2	To know the architecture 8085 microprocessor.
		CO509.3	To design and implement programs on 8085 microprocessor.
BTEEF510	Industrial Training	CO510.1	To demonstrate the knowledge gained during internship with the help of survey report writing and presentation
		CO510.2	To discover engineering and management principles useful at specific work environment
		CO510.3	To implement the learning acquired during internship to solve environmental, societal issues and in their future endeavours
BTEEC601	Control System	CO601.1	To know different basic concepts and components of a control system
		CO601.2	To derive transfer functions of basic control system components.
		CO601.3	To perform stability analysis using time domain and frequency domain response on a given system.
		CO601.4	To design and analyze PID controller.
		CO601.5	To understand and analyze state variable technique
BTEEC602	Principle of Electrical Machine Design	CO 602.1	To understand principles of electric machine design
		CO 602.2	To design different components of electric machine..
		CO 602.3	To design Transformer
		CO 602.4	To understand CAD and use it for transformer design
BTEEC603	Power Electronics	CO603.1	Know the characteristics of semiconductor switching devices and their driver circuits.
		CO603.2	Analyze the performance of controlled and uncontrolled converters.
		CO603.3	Analyze the performance of DC-DC and DC-AC converters.
		CO603.4	Analyze the performance of AC voltage controllers.
BTEEE604	Industrial Automation and Control	CO604.1	To understand construction and working principle of different industrial measurement system.
		CO604.2	To understand new trends in industrial process control.
		CO604.3	To discuss various control techniques used in industrial automation.
BTEEE605	Switchgear and Protection	CO605.1	To explain the principles of protective relaying
		CO605.2	To understand principle of construction, operation and selection of different type of circuit breaker used in power system.
		CO605.3	To explain different protection schemes used in power system engineering.
BTEEOE606	Project Management	CO606.1	To understand concepts of project management.
		CO606.2	To develop a project plan.
		CO606.3	To understand the project implementation strategv.
		CO606.4	To analyze post project affects.
BTEEL607	Control System Lab	CO607.1	To know basic concepts and components of control system
		CO607.2	To design and analyze Non-linear equations.
		CO607.3	Development of a program and Simulation for Control system using MATLAB
BTEEL608	Principle of Electrical Machine Design lab	CO608.1	To understand general electrical symbol
		CO608.2	To understand electrical installation layout
		CO608.3	To design different components of electric machine
		CO608.4	To design Transformer
BTEEL609	Power Electronics lab	CO 609.1	To demonstrate the characteristics of power semiconductor switches and driver circuits.
		CO 609.2	To demonstrate controlled converters circuit.
		CO 609.3	To analyze performance of DC-DC, DC- AC and AC-DC converters.
BTEEC701	Power System Operation And Control	CO701.1	Explain the fundamental concept of power system.
		CO701.2	Design the mathematical model of synchronous machine.
		CO701.3	Design the mathematical model Excitation system and speed governing system.
		CO701.4	Analyze the transient stability of power system using swing equation and equal area criteria.
		CO701.5	Analyze the economic operation of power system. .
		CO701.6	Explain the methods of Voltage control
BTEEC702	High Voltage Engineering	CO702.1	Illustrate the concept of electric field stresses, applications of insulating materials and methods for Non-destructive testing of equipment like transformers, insulators, isolators, bushings, lightning arrestors, cables, circuit breakers and surge diverters
		CO702.2	Explain the breakdown process in solid, liquid, and gaseous materials
		CO702.3	Explain the methods for generation and measurement of High Voltages and Currents (both ac and dc)
		CO702.4	Describe the phenomenon of over-voltage and choose appropriate insulation coordination levels based on IS & IEC Standards.
BTEEC703	Electrical Drives	CO703.1	Analyze the dynamics of Electrical Drives system.
		CO703.2	Use various control techniques for controlling the speed of AC and DC motors.
		CO703.3	Analyze the AC and DC drives.
		CO703.4	To Select/recommend the appropriate Drive according to the particular applications.
		CO703.5	State the recent technology of AC and DC drive
BTEEE704B	Electric Traction & Utilization	CO704.1	Identify types of Traction System.
		CO704.2	Interpret Various Power supply in Electric Traction.
		CO704.3	Analyze Various Traction Motors.
		CO704.4	Define methods of Traction motor Control.
		CO704.5	Elaborate Train movement & Breaking in Traction system.
		CO704.6	Classify the indoor and outdoor Illumination system
BTEEE705D	HVDC Transmission And FACTS	CO705.1	To understand importance, configuration and types of HVDC transmission.
		CO705.2	To analyst the operation of HVDC converter, system control and protection.
		CO705.3	To understand the concept of FACTS, their role, type and functionality.
		CO705.4	To analyze the operation of static series and shunt compensator
	Power System	CO706.1	Development of a program to analyse transient stability.

BTEEL706	Operation And Control Lab	CO706.2	Development of a program to analyse economic load dispatch and load frequency control.
		CO706.3	Development of a mathematical model of generator excitation control and AVR.
BTEEL707	High Voltage Engineering Lab	CO707.1	Demonstrate the breakdown mechanism in solid, liquid, and gaseous dielectrics.
		CO707.2	Demonstrate the performance of high-voltage generation and protection devices.
		CO707.3	Illustrate the effect of high voltage on biodiversity and protection by means of electrostatic shielding.
BTEEL708	Electrical Drives Lab	CO708.1	Efficiently use various DC drive.
		CO708.2	Efficiently use various AC drive.
		CO708.3	Simulate various drive system
BTEES709	Seminar	CO709.1	To discover recent trends in Electrical engineering
		CO709.2	To use different techniques in order to formulate seminar topic
		CO709.3	To demonstrate the knowledge gained during seminar report writing and seminar presentation
BTEEP710	PROJECT PHASE-I	CO710.1	To demonstrate the knowledge gained during project preparation with help of survey report writing and presentation
		CO710.2	To use different research techniques in order to formulate problem statements
		CO710.3	To design the relevant solution in order to address the problem statement formulated
		CO710.4	To practice core values of ethical principles, professional ethics and responsibilities
		CO710.5	To evaluate different solution based on fixed performance parameter in order to justify the applicability
BTEEF711	INTERNSHIP EVALUATION - III	CO711.1	To demonstrate the knowledge gained during internship with the help of survey report writing and presentation
		CO711.2	To discover engineering and management principles useful at specific work environment
		CO711.3	To implement the learning acquired during internship to solve environmental, societal issues and in their future endeavours
		CO711.4	To practice core values of ethical principles professional ethics and responsibilities
BTEEO801	Introduction To Industry 4.0 And Industrial Internet Of Things	CO801F.1	Know about IoT and Industry 4.0 principles and its scope.
		CO801F.2	Learn fundamentals of cyber security, Physical system and business models.
		CO801F.3	Know fundamentals of networking protocols and sensors of IIoT.
		CO801F.4	Learn IIoT Analytics, data management and advanced technologies.
		CO801F.5	Development of application based on IIoT for Industry 4.0.
BTEEO802	Joy of computing python	CO802.1	Explain Python programming fundamentals.
		CO802.2	Implement Conditional statements and Loops in Python Programs
		CO802.3	Use Python lists, tuples and dictionaries for representing compound data.
		CO802.4	Develop Python programs by defining functions and calling them.
BTEEP803	Project Phase-II	CO803.1	To demonstrate the knowledge gained during project preparation with help of survey report writing and presentation
		CO803.2	To use different research techniques in order to formulate problem statements
		CO803.3	To design the relevant solution in order to address the problem statement formulated
		CO803.4	To practice core values of ethical principles, professional ethics and responsibilities
		CO803.5	To evaluate different solution based on fixed performance parameter in order to justify the applicability

H.O.D. Electrical Dept.
SVKM's Institute of Technology, Dhule

H.O.D. Electrical Dept.
SVKM's Institute of Technology, Dhule



PROGRAMME: B.Tech. (Information Technology)

- 1) Program Outcomes, Program Specific Outcomes, and Course Outcomes of all courses offered by the department (UG) for 2019-20, 2020-21, 2021-22 and 2022-23.

1.Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

2.Problem Analysis: Identify, formulate, review research literature, and analyse complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences and engineering sciences.

3. Design/Development of Solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

4. Conduct Investigations of Complex Problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions for complex problems.

5.Modern Tool Usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modelling to complex engineering activities with an understanding of the limitations.

6.The Engineer and Society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

7.Environment and Sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

8.Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

9.Individual and Team Work: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

10.Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

H.O.D. I.T. Dept.
SVKM's Institute of Technology, Dhule

11. Project Management and Finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

12. life-long Learning: Recognize the need for, and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes (PSO):

PSO1- Software Development: To design & develop algorithms, models & processes using logical problem-solving strategies.

PSO2- Data Management: To apply the knowledge of computing and mathematics in the field of data processing.

PSO3- Data Security and Societal Aspects: To analyse & overcome computational needs of society & organizations in terms of data security, communication and ethics.

Program Outcomes (POs) as approved by All India Council of Technical Education and Dr. Babasaheb Ambedkar Technical University, motivating undergraduate engineering program students to think about what they should learn and how they should apply their knowledge in the time allotted for graduation. The POs are not specific to any single program. On the college website, total twelve POs have been prescribed. All POs are designed as per the need of modern engineering practice and requires a very good knowledge of mathematics, physics and basic engineering sciences

Program Specific Outcomes (PSOs) are program specific and written by the Head of the department in co-ordination with all the faculty members of department. It describes what graduates of a particular undergraduate engineering program should be able to do once they have completed their curriculum.

Course outcomes(CO) are statements clearly describing the meaningful, observable and measurable knowledge, skills and/or dispositions students will learn in this course. These statements clearly describing the specific type and level of new learning students will have achieved – and can reliably demonstrate – by the end of a course. It clearly identifies what (and how much or how well) the student will know and be able to do after successfully completing this course – the essential knowledge, abilities, and attitudes that constitute the basic learning needed by a graduate of this course.

All course are divided in three broad groups: Operating Environment, Network & Security, Algorithms etc. group and Multidisciplinary group. One module coordinator is appointed for each group from faculty team of same department and course coordinators are appointed for each course. Course outcomes are either predefined by the university or defined by the course coordinator and further verified by the module coordinator. It is desirable that all CO should attained their target value set by the college, all the course coordinators use various direct and indirect measures as assessment methods to check the attainment level of each CO.

H.O.D. I.T. Dept.
SVKM's Institute of Technology, Dhule

H.O.D. I.T. Dept.
SVKM's Institute of Technology, Dhule



**Shree Vile Parle Kelavani Mandal's
Institute of Technology, Dhule
Department of Information Technology
Course Outcome Statements (2022-23 Passout Batch)**

Subject Code	Subject Name	CO Number	Course outcome Statement
BTBS101	Engineering Mathematics-I	CO101.1	Apply the matrix technique (Linear algebra) to find solutions of system of linear equations arising in many engineering problem
		CO101.2	Demonstrate the concept partial derivatives and their applications to Maxima/ Minima , series expansion of multi valued functions
		CO101.3	Compute Jacobian of functions of several variables and their applications to engineering problems
		CO101.4	Identify and sketch of curves in various coordinate system
		CO101.5	Evaluate multiple integrals and their applications to area and volume
BTBS102	Engineering Chemistry	CO102.1	Develop the importance of water in industrial and domestic usage
		CO102.2	Study the knowledge of phases, components, degree of freedom and apply it in various phase diagrams
		CO102.3	Apply the knowledge of corrosion to prevent corrosion of metallic and non-metallic surfaces
		CO102.4	Examine a fuel and suggest alternative fuels
		CO102.5	Study the basic concept of electrochemistry and use their applications in the industry
BTES103	Engineering Mechanics	CO103.1	Know and apply fundamental Laws of Engineering Mechanics
		CO103.2	Know and apply conditions of static equilibrium to analyze given force system
		CO103.3	Compute Centre of gravity and Moment of Inertia of plane surfaces
		CO103.4	Compute the motion characteristics of a body /particle for a Rectilinear and Curvilinear motion
		CO103.5	Know and discuss relation between force and motion characteristics
BTES104	Computer Programming in C	CO104.1	To illustrates the use of editors and translation software
		CO104.2	To recognize syntactic structure & symbols used in C language construct
		CO104.3	To apply the use of C programming language to implement various algorithms and develops the basic concepts and terminology of programming in general
		CO104.4	To make familiar the more advanced features of the C language.
		CO104.5	To identify tasks in which the numerical techniques learned are applicable and apply them to write programs and hence use computers effectively to solve the task.
BTES105L	Workshop Practices	CO105L.1	Perform carpentry operations like planing, cutting, fitting of joints using hand and power tools
		CO105L.2	Perform fitting operations such as marking, cutting, filing, drilling and tapping using hand and power tools and also basic plumbing operations
		CO105L.3	Perform sheet metal operations such as marking, shearing , bending , punching, soldering using hand and power tools and welding operations like joint preparations, electrode selections.
		CO105L.4	Understand the simple machining skills on lathe machine operations and its use during their project work
		CO105L.1	Perform carpentry operations like planing, cutting, fitting of joints using hand and power tools
BTES106	Basic Electrical and Electronic Engineering	CO106.1	Apply basic ideas and principles of electrical engineering
		CO106.2	Identify protection equipment and energy storage devices
		CO106.3	Differentiate electrical and electronics domains and explain the operation of diodes and transistors.
		CO106.4	Acquire knowledge of digital electronics
		CO106.5	Design simple combinational and sequential logic circuits
BTBS102	Engineering Physics	CO102.1	Explain & apply the concept of types of Oscillations, Dielectric properties and Urasonics
		CO102.2	Explain and compare between interference and polarization of light, working principle of lasers and fiber optics.
		CO102.3	Interpret, apply & demonstrate principle of motion of charged particles in EE & MF, Bainbridge Mass spectrograph & G M counter
		CO102.4	Identify types of crystals & crystal planes using Miller indices, Experimental approach
		CO102.5	To describe properties of various types of materials and its applications in material science.
BTBS103	Engineering Graphics	CO103.1	Use of drawing instruments effectively for drawing and dimensioning
		CO103.2	Explain conventions and methods of engineering drawing
		CO103.3	Apply concepts of projections of points, lines, planes, solids and section of solids
		CO103.4	Construct isometric and orthographic views of given objects
		CO104.1	Apply Speaking and Writing skills in professional as well as social situations
BTHM104	Communication Skills	CO104.2	Overcome Mother Tongue Influence and demonstrate neutral accent while exercising English.
		CO104.3	Apply communication skills for Presentations, Group Discussion and interpersonal interactions.
		CO104.4	Apply grammar correctly during Speaking and Writing situations especially in context with Presentations, Public Speaking, Report writing and Business Correspondence.
BTES106	Basic Civil and Mechanical Engineering	CO106.1	Identify various Civil Engineering materials and choose suitable material among various options
		CO106.2	Apply principles of surveying to solve engineering problem
		CO106.3	Identify various Civil Engineering structural components and select appropriate structural system among various options.
		CO106.4	Explain and define various properties of basic thermodynamics, materials and manufacturing processes.
		CO106.5	Know and discuss the working principle of various power consuming and power developing devices.
BTBS107L	Engineering Physics Lab	CO107L.1	To demonstrate the working principle of ultrasonic interferometer
		CO107L.2	Study the characteristics and working principle of Laser and fiber optics
		CO107L.3	Study the trajectory of charge particle in combine effect of electric and magnetic field & principle of ionization
		CO107L.4	Study the characteristics of Magnetic & Semiconductor material
		CO107L.5	Identify the given crystal plane using the concept of miller indices
BTBS107L	Engineering Chemistry Lab	CO107L.1	Test the quality of water sample by determination of hardness, acidity, alkalinity and dissolve oxygen present in it
		CO107L.2	Examine the chemical property of an oil and quality of bleaching powder
		CO107L.3	Determine the concentration of specific ions present in the solution using titration methods
		CO107L.4	Examine the physical properties of liquid sample

**H.O.D. I.T. Dept.
SVKM's Institute of Technology, Dhule**


SVKM'S I.T. D.HULE
STUDY SUPPORTS TO STUDENTS HAVE

BTES108L	Engineering Mechanics Lab	CO108L.1	Calculate beam reaction by Parallel Force apparatus and graphics static method and forces in truss
		CO108L.2	Evaluate co-efficient of friction and centroid of irregular shaped bodies
		CO108L.3	Evaluate mechanical advantage, Velocity ratio, efficiency and mass moment of inertia
BTES108L	Engineering Graphics Lab	CO108L.1	Use of drawing instruments effectively for drawing and dimensioning
		CO108L.2	Implement various fundamental geometrical constructions
		CO108L.3	Apply concepts of projections of points, lines, planes, solids and section of solids
		CO108L.4	Construct isometric and orthographic views of given objects
BTHM109L	Communication Skills Lab	CO109L.1	To illustrate the process of Introduction
		CO109L.2	To use articulation of Phonemic sounds exercising Transcription, Stress and Intonations
		CO109L.3	To apply Verbal and Non-verbal communication through Extempore, GD, Debate, Presentation and Interviews
BTBS201	Engineering Mathematics – II	CO201.1	Discuss the need and use of complex variables to find roots, to separate complex quantities and to establish relation between circular and hyperbolic functions
		CO201.2	Solve first and higher order differential equations and apply them as a mathematical modeling in electric and mechanical systems
		CO201.3	Find Fourier series representation of periodic functions over different intervals
		CO201.4	Demonstrate the concept of vector differentiation and interpret the physical and geometrical meaning of gradient, divergence & curl in various engineering streams
		CO201.5	Apply the principles of vector integration to transform line integral to surface integral, surface to volume integral & vice versa using Green's, Stokes and Gauss divergence theorems
BTBS202	Engineering Chemistry	CO202.1	Develop the importance of water in industrial and domestic usage
		CO202.2	Study the knowledge of phases, components, degree of freedom and apply it in various phase diagrams
		CO202.3	Apply the knowledge of corrosion to prevent corrosion of metallic and non-metallic surfaces
		CO202.4	Examine a fuel and suggest alternative fuels
		CO202.5	Study the basic concept of electrochemistry and use their applications in the industry
BTES203	Engineering Mechanics	CO203.1	Know and apply fundamental Laws of Engineering Mechanics
		CO203.2	Know and apply conditions of static equilibrium to analyze given force system
		CO203.3	Compute Centre of gravity and Moment of Inertia of plane surfaces
		CO203.4	Compute the motion characteristics of a body /particle for a Rectilinear and Curvilinear motion.
BTES204	Computer Programming in C	CO204.1	Know and discuss relation between force and motion characteristics
		CO204.2	To illustrate the use of editors and translation software
		CO204.3	To recognize syntactic structure & symbols used in C language construct
		CO204.4	To apply the use of C programming language to implement various algorithms and develops the basic concepts and terminology of programming in general
		CO204.5	To make familiar the more advanced features of the C language
BTES205	Workshop Practices	CO205.1	To identify tasks in which the numerical techniques learned are applicable and apply them to write programs and hence use computers effectively to solve the task.
		CO205.2	Perform carpentry operations like planing, cutting, fitting of joints using hand and power tools
		CO205.3	Perform fitting operations such as marking, cutting, filling, drilling and tapping using hand and power tools and also basic plumbing operations
		CO205.4	Perform sheet metal operations such as marking, shearing, bending, punching, soldering using hand and power tools and welding operations like joint preparations, electrode selections.
BTES206	Basic Electrical and Electronic Engineering	CO206.1	Understand the simple machining skills on lathe machine operations and its use during their project work
		CO206.2	Apply basic ideas and principles of electrical engineering
		CO206.3	Identify protection equipment and energy storage devices
		CO206.4	Differentiate electrical and electronics domains and explain the operation of diodes and transistors.
		CO206.5	Acquire knowledge of digital electronics
BTBS202	Engineering Physics	CO204.1	Design simple combinational and sequential logic circuits
		CO204.2	Explain & apply the concept of types of Oscillations, Dielectric properties and Urasonics
		CO204.3	Explain and compare between interference and polarization of light, working principle of lasers and fiber optics.
		CO204.4	Interpret, apply & demonstrate principle of motion of charged particles in EE & MF, Bainbridge Mass spectrograph & GM counter
		CO204.5	Identify types of crystals & crystal planes using Miller indices, Experimental approach
BTBS203	Engineering Graphics	CO203.1	To describe properties of various types of materials and its applications in material science
		CO203.2	Use of drawing instruments effectively for drawing and dimensioning
		CO203.3	Explain conventions and methods of engineering drawing
		CO203.4	Apply concepts of projections of points, lines, planes, solids and section of solids
BTHM204	Communication Skills	CO204.1	Construct isometric and orthographic views of given objects
		CO204.2	Apply Speaking and Writing skills in professional as well as social situations
		CO204.3	Overcome Mother Tongue Influence and demonstrate neutral accent while exercising English
		CO204.4	Apply communication skills for Presentations, Group Discussion and interpersonal interactions
BTES205	Energy and Environmental Engineering	CO204.4	Apply grammar correctly during Speaking and Writing situations especially in context with Presentations, Public Speaking, Report writing and Business Correspondence
		CO205.1	Identify conventional, non conventional energy sources
		CO205.2	Know and discuss power consuming and power developing devices for effective utilization and power consumption
		CO205.3	Identify various sources of air, water pollution and its effects
BTES206	Basic Civil and Mechanical Engineering	CO205.4	Know and discuss noise, soil, thermal pollution and Identify solid, biomedical and hazardous waste
		CO206.1	Identify various Civil Engineering materials and choose suitable material among various options
		CO206.2	Apply principles of surveying to solve engineering problem
		CO206.3	Identify various Civil Engineering structural components and select appropriate structural system among various options
		CO206.4	Explain and define various properties of basic thermodynamics, materials and manufacturing processes
BTES207	Engineering	CO206.5	Know and discuss the working principle of various power consuming and power developing devices
		CO207L.1	Test the quality of water sample by determination of hardness, acidity, alkalinity and dissolve oxygen present in it
		CO207L.2	Examine the chemical property of an oil and quality of bleaching powder

SVKM's Institute of Technology, Dhule

H.O.D. I.T. Dept.
SVKM's Institute of Technology, Dhule

	Chemistry Lab	CO207L.3	Determine the concentration of specific ions present in the solution using titration methods
		CO207L.4	Examine the physical properties of liquid sample
BTES208L	Engineering Mechanics Lab	CO208L.1	Calculate beam reaction by Parallel Force apparatus and graphics static method and forces in truss
		CO208L.2	Evaluate co-efficient of friction and centroid of irregular shaped bodies
		CO208L.3	Evaluate mechanical advantage, Velocity ratio, efficiency and mass moment of inertia
BTBS207L	Engineering Physics Lab	CO207L.1	To demonstrate the working principle of ultrasonic interferometer
		CO207L.2	Study the characteristics and working principle of Laser and fiber optics
		CO207L.3	Study the trajectory of charge particle in combine effect of electric and magnetic field & principle of ionization.
		CO207L.4	Study the characteristics of Magnetic & Semiconductor material
		CO207L.5	Identify the given crystal plane using the concept of miller indices
BTES208L	Engineering Graphics Lab	CO208L.1	Use of drawing instruments effectively for drawing and dimensioning
		CO208L.2	Implement various fundamental geometrical constructions
		CO208L.3	Apply concepts of projections of points, lines, planes, solids and section of solids
		CO208L.4	Construct isometric and orthographic views of given objects
BTHM209L	Communication Skills Lab	CO209L.1	To illustrate the process of Introduction
		CO209L.2	To use articulation of Phonemic sounds exercising Transcription, Stress and Intonations
		CO209L.3	To apply Verbal and Non-verbal communication through Extempore, GD, Debate, Presentation and Interviews
BTES210S	Seminar	CO210S.1	Learn to differentiate information from data to present it in meaning full way.
		CO210S.2	Learn to use and cite resources
		CO210S.3	Demonstrates effective oral and verbal communication/Develop the ability of critical thinking
BTBS301	Engineering Mathematics - III	C301.1	Find Laplace transform of functions using various formulas and properties Evaluate particular types of integration
		C301.2	Find Inverse Laplace transform of functions using various formulas and properties. Solve linear differential/simultaneous linear differential equation using Laplace and inverse Laplace transform.
		C301.3	Find Fourier and inverse Fourier transform, Fourier sine and inverse Fourier sine transform. Cosine transform and inverse Fourier cosine Transform of functions.
		C301.4	Form PDE by eliminating arbitrary constant, solve PDE and use PDE to solve one and two dimensional heat flow equation
		C301.5	Determine Analytic functions//Bilinear transformation/ apply Cauchy's theorem/Cauchy's integral formula and Residue theorem to solve contour integration
BTITC302	Switching Theory and Logic Design	CO302.1	Apply classical problem solving methods to solve Binary, Octal, hexadecimal calculations and conversions along with its implementation using gates.
		CO302.2	Illustrate theory of Boolean algebra and the underlying features of various numbering systems
		CO302.3	Demonstrate the classification of logic families and the characteristics of digital ICs
		CO302.4	know the most simplified circuit using various mapping and mathematical methods
		CO302.5	Demonstrate the working of various flip-flop and their interconversion
		CO302.6	Describe various programmable logic device
BTCOC304	Computer Architecture and Organization	C304.1	To identify components of a computer system including CPU, memory and input/output units
		C304.2	To explain instruction types, its execution and interrupt mechanism, digital logic and floating-point arithmetic
		C304.3	To understand memory organization such as internal and external memory and types
		C304.4	To understand control unit operations such as hardwired and microprogrammed control units
BTITC303	Object Oriented Paradigm with C++	CO303.1	To draw the control flow of a program and understand basic of object oriented programming
		CO303.2	Demonstrate inheritance and exception handling feature in C++
		CO303.3	Demonstration of polymorphism and file handling in C++
BTHM340I	Basic Human Rights	C3401.1	Appreciate the importance of the values of human rights.
		C3401.2	Strengthen respect for human rights and fundamental freedoms and respect others caste, religion, region and culture.
		C3401.3	Know about regional, national, state, and local law that reinforces international human rights law.
BTITE305B	Programming in Java	E305B.1	Know the structure and model of the Java programming language
		E305B.2	Use the Java programming language for various programming technologies
		E305B.3	Develop software in the Java programming language (application)
BTITL307	Object - oriented Programming in C++ Lab	CO307.1	Programs to demonstrate the implementation using function and structure.
		CO307.2	Programs to demonstrate the implementation class & object and compile time polymorphism
		CO307.3	Programs to demonstrate the implementation of inheritance and file handling
BTITL306	Switching Theory and Logic Design Lab	CO306.1	Study and implement the basic and Universal gates and perform code conversions
		CO306.2	Implement of half adder, full adder, half subtractor and full subtractor.
		CO306.3	Demonstrate and Implement K-map and Quine- McClusky method
		CO306.4	Demonstrate and Implement Multiplexer and Demultiplexer with BCD
		CO306.5	Study and implement various flip-flops along with their inter conversion
		CO306.6	Study various programmable logic device
BTITL308	Programming Lab (Python)	L308.1	Student should be able to understand the basic concepts of scripting and the contributions of scripting language
		L308.2	Ability to explore python data structures like Lists, Tuples, Sets and dictionaries
		L308.3	Ability to create practical and contemporary applications using Functions, Modules and Regular Expressions.
BTITEL309 B	Programming in Java Lab	EL309B.1	Able to write programs for solving real world problems using java collection frame work
		EL309B.2	Able to write programs using abstract classes
		EL309B.3	Able to write multithreaded programs
BTITC401	Microprocessors and Microcontrollers	CO401.1	Explain about the architecture of microprocessor and microcontroller
		CO401.2	Understand the architecture, features and basic instructions of 8086
		CO401.3	Illustrate 8086 Interrupt System and its application
		CO401.4	Illustrate the design aspects of I/O and memory interfacing circuits
		CO401.5	Understand the concepts related to I/O and memory interfacing
		CO401.6	Understand the concepts related PIC 18 Microcontroller
BTITC402	Data Structures and Applications	C402.1	To write neat code by selecting appropriate data structure and demonstrate a working solution for a given problem
		C402.2	To think of all possible inputs to an application and handle all possible errors properly
		C402.3	To analyze clearly different possible solutions to a program and select the most efficient one
		C402.4	To write an application to demonstrate a good working solution



H.O.D. I.T. Dept.
SVKM's Institute of Technology, Dhule

		C402 5	To demonstrate the ability to write reusable code and abstract data types with object based approach
BTITC403	Discrete Structures and Applications	C403 1	To perform operations on various discrete structures such as sets functions, relations, and sequences
		C403 2	To solve problems using counting techniques, permutation and combination, recursion and generating functions
		C403 3	To use graphs as tools to visualize and simplify Problems
BTITC404	Internetworking Protocols	CO404 1	Understand networking models with network addressing methods
		CO404 2	Understanding packet delivery and message control mechanism
		CO404 3	Understanding of transport layer and UDP & TCP protocols
BTID405	Product Design Engineering	D405 1	Create simple mechanical or other designs
		D405 2	Create design documents for knowledge sharing
		D405 3	Manage own work to meet design requirements
		D405 4	Work effectively with colleagues
BTITE406C	Development Engineering	E406C 1	To understand the core disciplines issues in development.
		E406C 2	To understand certifications
		E406C 3	To understand the planning of developing of rural areas
BTITL407	Microprocessors and	C407 1	To program microprocessor and microcontroller for arithmetic operations.
		C407 2	To interface microprocessor and microcontroller with I/O devices
BTITL408	Data Structures and Applications Lab	L408 1	Able to write well-structured procedure-oriented programs
		L408 2	To implement the Stack ADT using both array based and linked-list based data structures
		L408 3	To implement the Queue ADT using both array based circular queue and linked-list based implementations
		L408 4	Analyze run-time execution of previous learned searching and sorting methods including binary search, selection, merge sort, heap sort and Quick sort.
BTITL409	Internetworking Protocols Lab	L409 1	Understand the practical approach to network communication protocols
		L409 2	Understand network layers, structure/format and role of each network layer.
		L409 3	Understand the various Routing Protocols/Algorithms and Internetworking
BTITC501	Database Management Systems	C501.1	Describe the fundamental elements of relational database management systems and data models.
		C501 2	Demonstrate basic concepts of the relational database design and Relational algebra.
		C501 3	Populate relational database, formulate SQL queries on database designed and calculate query cost
		C501 4	Convert the ER-model to relational tables and apply various normalization techniques
		C501 5	Explain Transaction Processing & Locking using concept of Concurrency control
BTITC502	Design and Analysis of Algorithms	C502 1	Calculate computational complexity using asymptotic notations for various algorithms
		C502 2	Apply Divide & Conquer as well as Greedy approach to design algorithms
		C502 3	Analyze optimization problems using dynamic programming.
		C502 4	Illustrate problems using backtracking and branch & bound.
		C502 5	Understand problems of graph theory
		C502 6	Compare string matching algorithms, P, NP, NP-complete, NP-Hard problems
BTITC503	Software Engineering	C503 1	Understand the software development process and models
		C503 2	Understand the requirement engineering and apply the requirement gathering process
		C503 3	Design a system, component, or process to meet desired needs within realistic constraints
		C503 4	Understand the Quality aspect in software development.
		C503 5	Understand the web engineering and project management in software development.
BTITC504	Probability and Queuing Theory	C504 1	Find probability conditional probability, expectation, variance, define pmf & pdf
		C504 2	Find probability using Binomial, Poisson, Normal, Uniform and Geometric distributions
		C504 3	Test null and alternate hypotheses for small and large samples
		C504 4	Define Stochastic processes, Markov chain, apply Chapman Kolmogorov theorem
		C504 5	Find transition probability matrix, classify states of Markov chain, define finite and infinite queuing models
BTITOE50 5A	Graph Theory	C505A 1	Able to define the basic concepts of graphs, directed graphs, and weighted graphs
		C505A 2	Is able to understand the concept of colorings and theory.
		C505A 3	Is able to understand Eulerian and Hamiltonian graphs
		C505A 4	Is able to understand the concept of plane graph and theory.
BTITPE506 E	Data Visualisation	C506E 1	Describe the seven stages of Data Visualization and its implementation using processing
		C506E 2	Illustrate theory of Time Series and visualize using the processing tool.
		C506E 3	Apply and analyze connections and correlations of data using analytical methods for real life problems.
		C506E 4	Apply Scatterplot to analyze the data using suitable example, visualize using the processing tool
		C506E 5	Demonstrate the working of trees, hierarchies, recursion, networks and graphs
		C506E 6	Describe the data acquisition, apply data preprocessing methods on open access data for visualization
BTHM501	Constitution of India	A501 1	know salient features of the Indian Constitution
		A501 2	understand directive principles of state policy, its nature and importance
		A501 3	understand structure, function and powers of Election Commission of India
		A501 4	Be aware of structure of Indian Judiciary, types of court, characteristics of Indian Judiciary.
BTITL507	Programming Lab (R Programming)	L507 1	Install and use R for simple programming tasks
		L507 2	Extend the functionality of R by using add-on packages
		L507 3	Execute program to test and demonstrate objects, classes and vector, matrix & factor
		L507 4	Use and Display various graph and charts in R
BTITL508	Database Management Systems Lab	L508 1	Execute DDL, DML, SQL queries
		L508 2	Write and Execute PL SQL programs using stored procedures, triggers and cursors
		L508 3	Write and execute SQL Join queries and functions
BTITL509	Design and Analysis of Algorithms Lab	L509 1	To implement divide and conquer, greedy algorithms concepts
		L509 2	To implement dynamic programming algorithms
		L509 3	To implement backtracking algorithms
BTITS510	Seminar	CO510 1	Identifying and define problem statement for seminar
		CO510 2	Comprehend the problem statement and present the seminar
		CO510 3	Prepare the technical report for seminar
BTITC601	Operating Systems	C601 1	To understand the objectives and functions of Operating System, types and related concepts
		C601 2	Comprehend basic concepts of Process Management and Process Synchronization
		C601 3	To understand and solve OS related memory management problems
		C601 4	To understand and solve process deadlock handling problems
		C601 5	To understand file system management and storage devices
BTITC602	Compiler	C602 1	To understand the major concept areas of language translation and compiler design
		C602 2	To Understand compiling and lexical Analysis for compiler design

H.O.D. I.T. Dept.
SVKM's Institute of Technology, Dhule

H.O.D. I.T. Dept.
SVKM's Institute of Technology, Dhule

BTITC602	Construction	C602 3	To Explain the concept of syntactical analysis for compiling process
		C602 4	To use of syntax analysis for optimized code generation
BTITC603	Object Oriented Software and Web Engineering	C603 1	Understand Object Oriented Software Development Process
		C603 2	Gain exposure to Object Oriented Methodologies & UML Diagrams
		C603 3	Apply Object Oriented Analysis Processes for projects
		C603 4	Design the system using Systematic methods & attributes
		C603 5	Model the web applications with characteristics
		C603 6	Test & Design web applications
BTITC604	Digital Image Processing	C604 1	Explain the fundamentals of digital image processing and its processing
		C604 2	Illustrate various image transforms in frequency domain
		C604 3	Perform image enhancement techniques in spatial domain
		C604 4	Apply the concept of image segmentation
		C604 5	Elucidate the mathematical modelling of image restoration and degradation
		C604 6	Demonstrate the video formation, perception and representation
BTITOE605C	Software Project Management	C605C 1	To decompose the given project in planning and various phases of a software lifecycle
		C605C 2	To know various project evaluation techniques
		C605C 3	To understand various phases of monitoring and control of the software product
		C605C 4	To apply software configuration managements and contract types
		C605C 5	To understand quality and people management along with project management tools
BTITPE606A	Software Testing	C606A 1	Understand Principles of Testing Software development life cycle model
		C606A 2	To identify various software testing problems
		C606A 3	To solve software testing problems by designing and selecting software test models, criteria, strategies and methods
		C606A 4	To apply the techniques learned to improve the quality of software development
		C606A 5	Examine real-world entities while testing Object Oriented Software
BTITL607	Operating Systems Lab	C607 1	To implement CPU Scheduling algorithms
		C607 2	To implement Bankers algorithm for deadlock avoidance and algorithm for deadlock detection
		C607 3	To implement page replacement algorithms
		C607 4	To implement file organization algorithms and semaphores
BTITL608	Digital Image Processing Lab	C608 1	To illustrate the concept of basics of Image Processing
		C608 2	To write a MATLAB program for image shrinking and zooming and Discrete Cosine Transform
		C608 3	To write a MATLAB program to perform following gray level Transformation
		C608 4	To write a MATLAB program for image enhancement and smoothing and sharpening of an image
BTITPEL609A	Software Testing Lab	C609A 1	To understand requirements and discuss test cases for the given problem
		C609A 2	To design and implement the solution for given problem in any programming language
		C609A 3	To apply the appropriate technique for the design of flow graph
BTITP610	Mini Project	C610 1	Identify, understand and define problem statement for mini project
		C610 2	Implementation of mini project
		C610 3	Documenting the development of mini project
BTITF611	Training/Internship/ Industrial Training III	C611 1	Skill development: Learning and improving skills such as writing, verbal communication, technology, teamwork, and leadership
		C611 2	To integrate or synthesize knowledge from diverse disciplines, courses and areas of interest
		C611 3	To apply knowledge and skills related to the concepts, principles, and methodologies.
BTITC701	Cloud Computing and Storage Management	C701.1	Interpret the various cloud computing models and services
		C701.2	Identify the significance of implementing virtualization techniques
		C701.3	To understand the cloud systems and build the cloud for service deployment.
		C701.4	To understand the significance of Storage virtualization and challenges.
		C701.5	To understand the features of storage availability and information recovery.
		C701.6	Understand the key terminology of storage security and management
BTCOE702	Artificial Intelligence#	C702.1	To discuss fundamental understanding of the history of artificial intelligence (AI), its foundations and understanding the design of intelligent agents
		C702.2	To use the most appropriate AI methods for problem solving
		C702.3	Apply Heuristic search strategies to develop Artificial Intelligence solution
		C702.4	To examine the knowledge of real world Knowledge representation
BTITTE703B	SOFT COMPUTING	C702.5	Apply probabilistic models to solve real-world problems and Natural Language Processing
		C703B 1	Learn about soft computing techniques and their applications.
		C703B 2	Analyze various neural network architectures
		C703B 3	To apply fuzzy logic concepts to real world applications
BTITOE704B	B) Machine Learning	C703B 4	Identify and select a suitable Soft Computing technology to solve the problem
		C704B 1	Understand and apply basic concepts of machine learning and explain relative strengths and weaknesses of different machine learning methods
		C704B 2	Illustrate the decision tree learning algorithm, hypothesis space search in decision tree, hypothesis testing and comparing learning algorithms
		C704B 3	Demonstrate Bayesian learning and Compare different types of classification models and their relevant application
		C704B 4	Illustrate the various regression techniques and Compare various kernel methods of Bayesian and Gaussian model
		C704B 5	Explain linear regression and logistic regression and compare them
BTITPE705B	B) Information Security	C704B 6	Demonstrate the reinforcement learning using various examples
		C705B 1	Explain security concepts, challenges & scope of information security
		C705B 2	Use and explain Cryptographic algorithms & tools for secure-based security of information
		C705B 3	Acquire & apply the knowledge of advanced security issues, policy standards and laws (such as ISO27001, IPR, CMM) of things After successful completion of course.
		C705B 4	describe the access control mechanism used for user authentication and authorization
		C705B 5	explain malicious software issues introduced by software-based viruses and worms
BTITPE705E	E) Data Warehousing and Data Mining	C705B 6	To describe the process of risk assessment in the context of IT security management
		C705E 1	To understand data warehouse and design model of data warehouse
		C705E 2	To apply the preprocessing steps on data
		C705E 3	To illustrate various analytical operations on data
		C705E 4	To discover patterns and knowledge from data warehouse
BTITL706	Cloud Computing and Storage	L706 1	Understand Cloud computing Architecture and Infrastructure of cloud
		L706 2	Implement the Infrastructure as Service in cloud
		L706 3	Implement the private cloud


H.O.D. I.T. Dept.
SVKM's Institute of Technology, Dhule

BTITEL707 B	B) Soft Computing Lab	LO707B 1	To Illustrate the basics of Artificial Neural Network
		LO707B 2	To Demonstrate multilayer perceptron model
		LO707B 3	To demonstrate CNN and Implement various various fuzzy membership functions
		LO707B 4	To demonstrate and Implement Fuzzification and de-fuzzification along with FIS
BTITPEL70 SB	B) Information Security Lab	LO708B 1	Implement substitution, transposition techniques and security algorithms
		LO708B 2	Implement digital signature standard
		LO708B 3	Implement network security tools such as kf sensors, Net stumbler, rootkits
BTITP709	Project Phase I*	CO709 1	Analyze the problem, formulation and solution of the selected project using various techniques and tools in Information Technology
		CO709 2	Develop solutions for contemporary real life problems using modern tools for sustainable development
		CO709 3	Create the documentation of the project development while working in a team and communicate it effectively for the benefit of the society by following the ethical and professional sustainability
		CO709 4	Analyze the IT engineering, finance and management principles for understanding the problems of various domains
BTITC801	Internet of Things#	C801 1	To interpret the vision of IoT from a global context
		C801 2	To determine the market perspective of IoT
		C801 3	To compare and contrast the use of devices, gateways and data management in IoT
		C801 4	To implement state of the art architecture in IoT
		C801 5	To illustrate the application of IoT in industrial automation and identify real world design constraints
BTITC802	Mobile Computing#	C802 1	To understand the Fundamentals of Wireless and Wireless Networks
		C802 2	To understand Mobile Communications and Mobile Computing
		C802 3	To understand GSM architectures and evolutions of networks
		C802 4	To understand DHCP and implement different routing algorithms in MANET
BTITP803	Project Phase II/ Project with Internship**	P803 1	Analyze the problem, formulation and solution of the selected project using various techniques and tools in Information Technology
		P803 2	Develop solutions for contemporary real life problems using modern tools for sustainable development.
		P803 3	Create the documentation of the project development while working in a team and communicate it effectively for the benefit of the society by following the ethical and professional sustainability
		P803 4	Analyze the IT engineering, finance and management principles for understanding the problems of various domains


H.O.D. I.T. Dept
SVKM's Institute of Technology, Unnao

H.O.D. I.T. Dept
 SVKM's Institute of Technology, Unnao

PROGRAMME: B.Tech. (Mechanical ENGINEERING)

- 1) Program Outcomes, Program Specific Outcomes, and Course Outcomes of all courses offered by the department (UG) for 2019-20, 2020-21, 2021-22 and 2022-23.
 - Website Link for Course Outcomes, Program Outcomes, and Program Specific Outcomes
 - Program Outcomes and Program Specific Outcomes (2019-20)
 1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
 2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
 3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
 4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
 5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
 6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
 7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
 8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
 9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
 10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
 11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
 12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.
 - Program Outcomes and Program Specific Outcomes (2020-21 to 2022-23)
 1. Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

AVB
8/11/23
for **H.O.D. Mechanical Dept.**
SVKM's Institute of Technology, Dhule

2. Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
3. Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.
6. Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
7. Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
8. Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes (PSO):

PSO1. Design and select Mechanical Engineering components, appropriate manufacturing processes, process automation and quality assurance systems using technical and financial analysis tools.

PSO2. To identify, formulate and solve problems related to conventional & non-conventional energy systems as well as support sustainability in the surrounding region.

PSO3. Systematically communicate the methodology and conclusion of Mechanical engineering problem solution with colleagues and superiors through effective documentation as well as oral presentation.

for ^{VAS} H.O.D. Mechanical Dept.
 SVKM's Institute of Technology, Dhule

500 words description:

Program Outcomes (POs) as approved by All India Council of Technical Education and Dr. Babasaheb Ambedkar Technical University, motivating undergraduate engineering program students to think about what they should learn and how they should apply their knowledge in the time allotted for graduation. The POs are not specific to any single program. On the college website, total twelve POs have been prescribed. All POs are designed as per the need of modern engineering practice and requires a very good knowledge of mathematics, physics and basic engineering sciences

Program Specific Outcomes (PSOs) are program specific and written by the Head of the department in co-ordination with all the faculty members of the respective department. It describes what graduates of a particular undergraduate engineering program should be able to do once they have completed their curriculum.

Course outcomes (CO) are statements clearly describing the meaningful, observable and measurable knowledge, skills and/or dispositions students will learn in this course. These statements clearly describing the specific type and level of new learning students will have achieved – and can reliably demonstrate – by the end of a course. It clearly identify what (and how much or how well) the student will know and be able to do after successfully completing this course – the essential knowledge, abilities, and attitudes that constitute the basic learning needed by a graduate of this course.

All courses are divided into few three broad groups (for eg: Design group, Thermal group and Multidisciplinary group in case of Mechanical Engineering department). One module coordinator is appointed for each group from faculty team of same department and course coordinators are appointed for each course. Course outcomes are either predefined by the university or defined by the course coordinator and further verified by the module coordinator. It is desirable that all CO should attained their target value set by the college, all the course coordinators use various direct and indirect measures as assessment methods to check the attainment level of each CO.

It is the standard practice of institute to display all POs, PSOs and COs, for all departments on its websites for teacher or student reference. It is also made mandatory for all teaching staff to refer POs, PSOs, and COs while teaching any particular course, so that, student get to know about them in a better manner. This practice also helps students to fill course exit surveys and program exit surveys which are conducted by department from time to time.

for ^{VAB} 8/11/23
H.O.D. Mechanical Dept.
SVKM's Institute of Technology, Dhule



**Shri Vile Parle Kelavani Mandal's Institute
of Technology, Dhule
Department of Mechanical Engineering
Course outcome Statements**

Subject Code	Subject Name	CO Number	Course outcome Statement
BTBS101	Engineering Mathematics – I	CO101.1	Apply the matrix technique (Linear algebra) to find solutions of system of linear equations arising in many engineering problem
		CO101.2	Demonstrate the concept of partial derivatives and their applications to Maxima/ Minima, series expansion of multi valued functions & Compute Jacobian of functions of several variables.
		CO101.3	Identify and sketch of curves in various coordinate system & Evaluate multiple integrals and their applications to area and volume
BTBS102	Engineering Chemistry	CO1202.1	Develop the importance of water in industrial and domestic usage.
		CO1202.2	Interpret the knowledge of phases, components, degree of freedom and apply it in various phase diagrams.
		CO1202.3	Describe various methods of metallurgy, types of fuels and lubricants, and also able to define various concepts of electrochemistry.
BTES103	Engineering Mechanics	CO103.1	Know and apply fundamental Laws of Engineering Mechanics
		CO103.2	Know and apply conditions of static equilibrium to analyze given force system
		CO103.3	Compute Centre of gravity and Moment of Inertia of plane surfaces
		CO103.4	Compute the motion characteristics of a body particle for a Rectilinear and Curvilinear motion.
		CO103.5	Know and discuss relation between force and motion characteristics
BTES104	Computer Programming in C	CO103.1	To illustrates the Process of programming, Fundamental Basic and various operators in c
		CO103.2	To illustrate and implement various decision statement ,loops and Function in c
		CO103.3	To Explain and implement Derived Data type -Array, String and User defined Data type –Structure
BTES105L	Workshop Practices	COWS1205.1	Perform carpentry operations like planning, cutting, fitting of joints using hand and power tools
		COWS1205.2	Perform fitting operations such as marking, cutting, filling, drilling and tapping using hand and power tools and also basic plumbing Operations.
		COWS1205.3	Perform sheet metal operations such as marking, shearing, bending, punching, and soldering using hand and power tools and Welding operations like joint preparations, electrode selections.
		COWS1205.4	Understand the simple machining skills on lathe machine operations and its use during their project work
BTES106	Basic Electrical and Electronic Engineering	CO106.1	Apply basic ideas and principles of electrical engineering
		CO106.2	Identify protection equipment and energy storage devices
		CO106.3	Differentiate electrical and electronics domains and explain the operation of diodes and transistors.
		CO106.4	Acquire knowledge of digital electronics
		CO106.5	Design simple combinational and sequential logic circuits.
BTBS108L	Engineering Chemistry Lab	CO1202L.1	Test the quality of water sample by determination of hardness, acidity, alkalinity and dissolve oxygen present in it.
		CO1202L.2	Examine chemical or physical property of given sample material.
		CO1202L.2	Determine the concentration of specific ions present in the solution using titration methods
BTES109L	Engineering Mechanics Lab	CO108L.1	Calculate beam reaction by Parallel Force apparatus and graphics static method and forces in truss.
		CO108L.2	Evaluate co-efficient of friction and centroid of irregular shaped bodies.
		CO108L.3	Evaluate mechanical advantage, Velocity ratio, efficiency and mass moment of inertia.
BTBS201	Engineering Mathematics – II	CO201.1	Discuss the need and use of complex variables to find roots, to separate complex quantities and to establish relation between circular and hyperbolic functions.
		CO201.2	Solve first and higher order differential equations and apply them as a mathematical modeling in electric and mechanical systems.
		CO201.3	Determine Fourier series representation of periodic functions over different intervals.
		CO201.4	Demonstrate the concept of vector differentiation and interpret the physical and geometrical meaning of gradient, divergence & curl in various engineering streams. Apply the principles of vector integration to transform line integral to surface integral, surface to volume integral & vice versa using Green's, Stokes and Gauss divergence theorems.
BTBS202	Engineering Physics	CO102.1	Apply the concept of types of oscillations in engineering.
		CO102.2	Apply the fundamentals of interference, polarization in LASER, and optical fiber in engineering.
		CO102.3	Determine the application of the trajectory of charge particles in the electromagnetic field, with basic principles of quantum physics.
		CO102.4	Determine the different types of crystal structures using the X-ray diffraction technique, and study the fundamentals of material science and its application in Magnetic material, Superconductors, and semiconductors.
BTES203	Engineering Graphics	CO103.1	Use of drawing instruments effectively for drawing and dimensioning
		CO103.2	Explain conventions and methods of engineering drawing
		CO103.3	Apply concepts of projections of points, lines, planes, solids and section of solids
		CO103.4	Construct isometric and orthographic views of given objects
BTHM204	Communication Skills	CO104.1	Apply Verbal and Non-Verbal communication in professional and social situations
		CO104.2	Apply communication skills for presentations, group discussion, interpersonal interactions, public speaking, report writing and business correspondence
		CO104.3	Apply phonetics and grammar in communication to develop a neutral accent
BTES205	Energy and Environmental Engineering	CO205.1	Identify conventional, non-conventional energy sources.
		CO205.2	Know and discuss power consuming and power developing devices for effective utilization and power consumption
		CO205.3	Identify various sources of air, water pollution and its effects.
		CO205.4	Know and discuss noise, soil, thermal pollution and Identify solid, biomedical and hazardous waste.
BTES206	Basic Civil and Mechanical Engineering	CO206.1	Identify various Civil Engineering materials and choose suitable material among various options.
		CO206.2	Apply principles of surveying to solve engineering problem.
		CO206.3	Identify various Civil Engineering structural components and select appropriate structural system among various options.
		CO206.4	Explain and define various properties of basic thermodynamics, materials and manufacturing processes.
		CO206.5	Know and discuss the working principle of various power consuming and power developing devices.
BTBS207L	Engineering Physics Lab	CO1202L.1	Determine the mechanical & electrical properties of matter.
		CO1202L.2	Determine the wavelength of He-Ne Laser and numerical aperture of optical fibre.
		CO1202L.3	Determine the various properties of semiconducting materials.
BTES208L	Engineering Graphics Lab	CO1203L.1	Use of drawing instruments effectively for drawing and dimensioning
		CO1203L.2	Implement various fundamental geometrical constructions
		CO1203L.3	Apply concepts of projections of points, lines, planes, solids and section of solids
		CO1203L.4	Construct isometric and orthographic views of given objects
BTHM209L	Communication Skills Lab	CO209L.1	To illustrate the process of introduction with RP exercising Transcription, Stress and Intonations
		CO209L.2	To apply Verbal and Non-Verbal communication through Extempore, GD, Debate, Presentation and Interviews.
BTBSC 301	Engineering Mathematics III	C301.1	Find Laplace transform of functions using various formulas and properties. Evaluate particular types of integration.
		C301.2	Find Inverse Laplace transform of functions using various formulas and properties. Solve linear differential/simultaneous linear differential equation using Laplace and inverse Laplace transform.
		C301.3	Find Fourier and inverse Fourier transform, Fourier sine and inverse Fourier sine transform, Cosine transform and inverse Fourier cosine Transform of functions.
		C301.4	Form PDE by eliminating arbitrary constant, solve PDE and use PDE to solve one and two dimensional heat flow equation.
		C301.5	Determine Analytic functions//Bilinear transformation: apply Cauchy's theorem Cauchy's integral formula and Residue theorem to solve contour integration.
BTMEC 302	Material Science and Metallurgy	C302.1	Explain various crystal structures of materials
		C302.2	Explain mechanical properties of materials and calculate same using appropriate equations
		C302.3	Explain phase diagrams of various engineering materials
		C302.4	Explain heat treatment process for a given application
		C302.5	Explain sample preparation of different materials for metallography
		C302.6	Explain NDT technique for a given application
BTMEC 303	Fluid Mechanics	CO303.1	Define fluid, define, and calculate various properties of fluid
		CO303.2	Calculate hydrostatic forces on the plane and curved surfaces and explain stability of floating bodies
		CO303.3	Explain various types of flow. Calculate acceleration of fluid particles
		CO303.4	Apply Bernoulli's equation and Navier-Stokes equation to simple problems in fluid mechanics
		CO303.5	Explain laminar and turbulent flows on flat plates and through pipes
		CO303.6	Explain and use dimensional analysis to simple problems in fluid mechanics
		CO303.7	Understand centrifugal pump

For **H.O.D. Mechanical Dept.**
 SVKM's Institute of Technology, Dhule
 08/11/23

BTMEC 304	Machine Drawing and CAD	C304.1	Interpret the object with the help of given sectional and orthographic views
		C304.2	I am able to Construct the curve of intersection of two solids
		C304.3	Draw machine element using keys, cotter, knuckle, bolted and welded joint
		C304.4	Assemble details of any given part, i.e., valve, pump, machine tool part etc.
		C304.5	Represent tolerances and level of surface finish on production drawings
		C304.6	Understand various creating and editing commands in Auto-CAD
BTMEC 305	Thermodynamics	C305.1	Define the terms like system, boundary, properties, equilibrium, work, heat, ideal gas, entropy etc. used in thermodynamics.
		C305.2	Study different laws of thermodynamics and apply these to simple thermal systems like balloon, piston-cylinder arrangement, compressor, pump, refrigerator, heat exchanger, etc. to study energy balance.
		C305.3	Study various types of processes like isothermal, adiabatic, etc. considering system with ideal gas and represent them on p-v and T-s planes.
		C305.4	Apply availability concept to non-flow and steady flow type systems
		C305.5	Represent phase diagram of pure substance (steam) on different thermodynamic planes like p-v, T-s, h-s, etc. Show various constant property lines on them
		C305.6	Define the concept of entropy and explain its physical interpretation with examples. Sketch entropy as an ordinate against various properties as an abscissa. Derive various equations related to entropy and explain the laws related to entropy
BTHM 3401	Basic Human Rights	CO3401.1	Understand the history of human rights
		CO3401.2	Learn to respect others caste, religion, region and culture
		CO3401.3	Be aware of their rights as Indian citizen
		CO3401.4	Understand the importance of groups and communities in the society
		CO3401.5	Realize the philosophical and cultural basis and historical perspectives of human rights
		CO3401.6	Make them aware of their responsibilities towards the nation
BTMEL 307	Material Science and Metallurgy Lab	L307.1	Select and perform appropriate hardness test and formability test for a given material
		L307.2	Select the appropriate non-destructive test and perform it
		L307.3	Plot hardenability curve of a materials hardenability using Jominy End-Quench Test
BTMEL 308	Fluid Mechanics Lab	L307.4	Explain the microstructure of various ferrous and non-ferrous materials using optical microscopy
		L308.1	Identify laminar and Turbulent flow and determine Critical Reynolds number using Reynolds Apparatus.
		L308.2	Verify Bernoulli's theorem
		L308.3	Determine pressure drop in flow through pipes and pipe fittings
		L308.4	Determine viscosity using viscometer
BTMEL 309	Machine Design and CAD Lab	L308.5	Determine metacentric height of floating body
		C309.1	I am able to Draw Conventional representation of standard machine components, welds, materials etc.
		C309.2	I am able to Draw sectional view of a given machine component
		C309.3	Develop Assemble view from details of given component i.e., valve, pump, machine tool part, etc.
		C309.4	Combine details of given machine component and draw assembled view
		C309.5	Use various Auto-CAD commands to draw orthographic projection
BTMEF 310	Internship	C309.6	Draw sectional view from pictorial view of given machine component using Auto-CAD
		C310.1	To make the students aware of industrial culture and organizational setup
BTMEC 401	Manufacturing Process I	C310.2	To create awareness about technical report writing among the student.
		CO401.1	Identify castings processes, working principles and applications and list various defects in metal casting
BTMEC 402	Theory of Machines I	CO401.2	Understand the various metal-forming processes, working principles and applications
		CO401.3	Study processes such as welding, brazing, soldering, shaping, planning, drilling, and their types and related tooling
		CO401.4	Study center lathe and milling machine with operations, which includes plain turning, taper turning, and work holding devices, cutting tools, milling cutters and indexing for gear cutting
		CO402.1	Define basic terminology of kinematics of mechanisms
		CO402.2	Classify planar mechanisms and calculate its degree of freedom
		CO402.3	Perform kinematic analysis of a given mechanism using ICR and RV methods
BTMEC 403	Strength of Materials	CO402.4	Perform kinematic analysis of a given mechanism analytically using vector or complex algebra method
		CO402.5	Perform kinematic analysis of slider crank mechanism using Klein's construction and analytical approach
		CO402.6	Understand the concepts of friction and extend the concepts to calculate braking torque and frictional torque in different types of brakes and clutches respectively.
		CO402.7	Draw different types of cams and followers and find the position and magnitude of the balancing masses required in reciprocating and rotary engines.
		CA03.1	State the basic definitions of fundamental terms such as axial load, eccentric load, stress, strain, E, μ , etc.
		CA03.2	Recognize the stress state (tension, compression, bending, shear, etc.) and calculate the value of stress developed in the component in axial/eccentric static and impact load cases
BTMEC404	Numerical Methods in Engineering	CA03.3	Distinguish between uniaxial and multiaxial stress situation and calculate principal stresses, max. Shear stress, their planes and max. normal and shear stresses on a given plane
		CA03.4	Analyze given beam for calculations of SF and BM
		CA03.5	Calculate slope and deflection at a point on cantilever / simply supported beam using double integration, Macaulay's, Area-moment and superposition methods
		CA03.6	Differentiate between beam and column and calculate critical load for a column using Euler's and Rankine's formulae
		COME404.1	Describe the concept of error
BTID405	Product Design Engineering -I	COME404.2	Illustrate the concept of various Numerical Techniques
		COME404.3	Evaluate the given Engineering problem using the suitable Numerical Technique
		COME404.4	Develop the computer programming based on the Numerical Techniques
		COBTID405.1	Create simple mechanical designs
BTHM3402	Elective II: Interpersonal Comm Skills & Self Devp for Engineers	COBTID405.2	Create design documents for knowledge sharing
		COBTID405.3	Manage own work to meet design requirements
		COBTID405.4	Work effectively with colleagues
		CO3402.1	Acquire interpersonal communication skills.
		CO3402.2	Develop the ability to work independently
		CO3402.3	Develop the qualities like self-discipline, self-criticism and self-management.
BTMEL 407	Manufacturing Process Lab I	CO3402.4	Have the qualities of time management and discipline.
		CO3402.5	Present themselves as inspiration for others.
		CO3402.6	Develop themselves as good team leaders.
		CO407.1	Perform plain turning, step turning, knurling, eccentric turning, chamfering and facing operations on lathe
		CO407.2	Prepare setup and fabricate composite job using milling, shaping and drilling machine.
		CO407.3	Making spur gears on a milling machine.
BTMEL408	Theory of Machines Lab I	CO407.4	Prepare sand casting setup using split pattern for simple component.
		CO407.5	Perform joining of two plate using TIG/MIG welding.
		CO407.6	Demonstrate cutting of a sheet metal using flame cutting
		C408.1	Perform graphically kinematic analysis of any planar mechanism using ICR and RV methods.
		C408.2	Perform graphically kinematic analysis of slider crank mechanism using Klein's construction.
		C408.3	Demonstrate use of graphical differentiation method for kinematic analysis of slider crank mechanism or any other planar mechanism with a slider.
BTMEL 409	Strength of Materials Lab	C408.4	Sketch polar diagram for a Hooke's joint.
		C408.5	Perform experimental analysis of slider crank mechanism to calculate velocity and acceleration
		C408.6	Develop a computer program for calculation of velocity and acceleration of slider crank mechanism
BTMEL 410	Numerical Methods Lab	C409.1	Analyze the stress-strain behavior of materials using different methods
		C409.2	Measure torsional strength and impact resistance of the material
		BTMEL410.1	Understand the basic concepts and applications of programming languages and selecting any one for developing the programmes to solve problems based on the numerical methods
BTMEL 410	Numerical Methods Lab	BTMEL410.2	Understand the basic working principals of the selected programming languages
		BTMEL410.3	Develop the computer programming based on the Numerical Techniques

LAB 08/11/23
 for **H.O.D. Mechanical Dept.**
 SVKM's Institute of Technology, Dhule

		BTMEL410 4	Perform the execution and debugging of computer programs
BTMEC 501	Heat Transfer	CO501.1	Explain the laws of heat transfer and deduce the general heat conduction equation and to explain it for 1-D steady state heat transfer in regular shape bodies.
		CO501.2	Describe the critical radius of insulation, overall heat transfer coefficient, thermal conductivity and lumped heat transfer.
		CO501.3	Interpret the extended surfaces
		CO501.4	Illustrate the boundary layer concept, dimensional analysis, forced and free convection under different conditions.
		CO501.5	Describe the Boiling heat transfer, mass transfer and Evaluate the heat exchanger and examine the LMTD and NTU methods applied to engineering problems
		CO501.6	Explain the thermal radiation black body, emissivity and reflectivity and evaluation of view factor and radiation shields.
BTMEC 502	Applied Thermodynamics I	C502.1	Define the terms like calorific value of fuel, stoichiometric air-fuel ratio, excess air, equivalent evaporation, boiler efficiency, etc. Calculate minimum air required for combustion of fuel.
		C502.2	Study and Analyze gas power cycles and vapour power cycles like Joule cycle and Rankine cycle and derive expressions for the performance parameters like thermal efficiency, P _m .
		C502.3	Classify various types of boiler, nozzle, steam turbine and condenser used in steam power plant.
		C502.4	Draw P-v diagram for single-stage reciprocating air compressor, with and without clearance volume, and evaluate its performance. Differentiate between reciprocating and rotary air compressors.
BTMEC 503	Machine Design I	C503.1	Formulate the problem by identifying customer need and convert into design specification
		C503.2	Understand component behavior subjected to loads and identify failure criteria
		C503.3	Analyze the stresses and strain induced in the component
		C503.4	Design of machine component using theories of failures
		C503.5	Design of component for finite life and infinite life when subjected to fluctuating load
		C503.6	Design of components like shaft, key, coupling, screw and spring
BTMEC 504	Theory of Machines II	C504.1	Explain various types of gear boxes, gear trains, belt and rope drives
		C504.2	Interpreting physical principles and phenomenon of governor, gyroscopic, flywheel
		C504.3	Measure vibration parameters in single degree of freedom systems
		C504.4	Evaluating natural frequency of 1 do
BTMEC 505	Metrology and Quality Control	C505.1	Identify techniques to minimize the errors in measurement
		C505.2	Identify methods and devices for measurement of length, angle, and gear and thread parameters, surface roughness and geometric features of parts.
		C505.3	Choose limits for plug and ring gauges
		C505.4	Explain methods of measurement in modern machineries.
		C505.5	Select quality control techniques and its applications.
		C505.6	Plot quality control charts and suggest measures to improve the quality of product and reduce cost using Statistical tools.
BTID 506	Product Design Engineering II	COBTID40 6.1	Create prototypes
		COBTID40 6.2	Test the prototypes
		COBTID40 6.3	Understand the product life cycle management
BTMEC 506	Elective II (Automobile Engg)	CO506A.1	Identify the different parts of the automobile
		CO506A.2	Explain the working of various parts like engine, transmission, clutch, brakes etc.
		CO506A.3	Demonstrate various types of drive systems.
		CO506A.4	Apply vehicle troubleshooting and maintenance procedures.
		CO506A.5	Analyze the environmental implications of automobile emissions. And suggest suitable regulatory modifications.
		CO506A.6	Evaluate future developments in the automobile technology.
BTMEL 507	Heat Transfer Lab	CO507.1	Understand the various heat transfer mode of heat transfer and its application and verify.
		CO507.2	Learn the experimental methodology
		CO507.3	Describe the concept the terms like least count, calibration of the instruments
BTMEL 508	Applied Thermodynamics Lab	CO508L.1	Conduct test on Bomb calorimeter, nozzle, steam turbine, condenser, compressor etc. to study their performance
		CO508L.2	Draw performance curves of these machines.
		CO508L.3	Analyze the results obtained from the tests.
		CO508L.4	Draw conclusions based on the results of the experiments
		CO508L.5	Based on your visit to Industry, sketch its layout and write specifications.
BTMEL 509	Machine Design Practice I	C509.1	Apply design process to an open ended problem
		C509.2	Determine suitable material and size for structural component of machine/system
		C509.3	Apply iterative technique in design including making estimate of unknown values for first computation and checking or revisiting and re-computing
		C509.4	Choose logically and defend selection of design factors
		C509.5	Design of components for given part system i.e. shaft, keys, coupling, links, screws, springs etc.
		C509.6	Work effectively as a part of design group/team
		C509.7	Have good communication skill, orally, graphically as well as in writing
BTMEL 510	Theory of Machines II Lab	L510.1	Explain various types of gear boxes, gear trains, belt and rope drives
		L510.2	Interpreting physical principles and phenomenon of governor, gyroscopic, flywheel
		L510.3	Measure vibration parameters in single degree of freedom systems
		L510.4	Evaluating natural frequency of 1 dof
BTMEF511	Internship	C511.1	To make the students aware of industrial culture and organizational setup
		C511.2	To create awareness about technical report writing among the student.
BTMEC 601	Manufacturing Processes II	C601.1	Comprehend the process of powder metallurgy and its applications.
		C601.2	Calculate the cutting forces in orthogonal and oblique cutting
		C601.3	Evaluate the machinability of materials
		C601.4	Comprehend the abrasive processes.
		C601.7	Understand the manufacturing process of Ceramics, Glasses and their design considerations
		C601.8	Explain different molding techniques for processing of plastics
BTMEC 602	Machine Design II	C602.1	Define function of bearing and classify bearings.
		C602.2	Understanding failure of bearing and their influence on its selection.
		C602.3	Classify the friction clutches and brakes and decide the torque capacity and friction disk parameter.
		C602.4	Select materials and configuration for machine element like gears, belts and chain
		C602.5	Design of elements like gears, belts and chain for given power rating
		C602.6	Design thickness of pressure vessel using thick and thin criteria
BTMEC 603	Applied Thermodynamics II	C603.1	Explain the working of I.C. engine with basic components and Apply principles of thermodynamics for analysis of Air Standard Cycles.
		C603.2	Explain the various engine systems, emissions of I.C. engine, alternative fuels and analyze the engine performance considering various parameters.
		C603.3	Explain fundamentals of various refrigeration systems and analyze refrigeration systems performance with different parameters
		C603.4	Explain different parameters of air conditioning processes.
		C603.5	Analyze the performance of various power cycles for different configurations.
		C603.6	Compare the different types of power plants.
BTMEC 604	Elective (IC Engine)	C604B.1	Understand the engine fundamentals and various engine components.
		C604B.2	Explain stages of combustion in SI and CI engines and factors affecting it.
		C604B.3	Understand the engine supporting systems.
		C604B.4	Evaluate Performance parameters of SI and CI engines during testing. Understand the concept of fuel cell technology and electric vehicle
		C604B.5	Describe fuel cell technology and its types.
		C604B.6	Explain the concept of Electric Vehicle and Hybrid Vehicle
BTMEC 605C	Elective (RES)	C605C.1	Explain the difference between renewable and non-renewable energy.
		C605C.2	Describe working of solar collectors.
		C605C.3	Explain various applications of solar energy.
		C605C.4	Describe working of other renewable energies such as wind, biomass
BTMEC 606B	OEC4/Solar Energy (Audit)	C606.1	Calculate direct, diffuse and global solar radiations falling on horizontal and inclined surfaces
		C606.2	Analyze the performance of flat plate collector, air heater and concentrating type collector.
		C606.3	Understand test procedures and apply these while testing different types of collectors.
		C606.4	Evaluate performance and compare various types of thermal energy storage systems.

AB 08/11/23

for **H.O.D. Mechanical Dept.**
SVKM's Institute of Technology, Dhule

		C606.5	Calculate payback period and annual solar savings due to replacement of conventional systems.
		C606.6	Analyze solar water heating system for a few domestic and commercial applications.
BTMEL 607	Metrology and Quality Control Lab	C607.1	Measure linear, angular circular features, dimensional and geometric features
		C607.2	Measure surface roughness of components.
		C607.3	Calibrate metrological equipment
		C607.4	Determine the process capability
		C607.5	Select quality control tools in total quality management.
BTMEL 608	Machine Design Practice II	C608.2	Determine suitable material and size for structural component of machine system.
		C608.3	Apply iterative technique in design including making estimate of unknown values for first computation and checking or revisiting and re-computing.
		C608.4	Choose logically and defend selection of design factors.
		C608.5	Design of components for given part system i.e. shaft, keys, coupling, links, screws, springs etc.
		C608.6	Work effectively as a part of design group/team.
		C608.7	Have good communication skill, orally, graphically as well as in writing.
BTMEL 609	I C Engine Lab	CO609.1	Conduct test on IC Engines to study their performance
		CO609.2	Draw performance curves of these machines systems
		CO609.3	Analyze the results obtained from the tests.
		CO609.4	Draw conclusions based on the results of the experiments
		CO609.5	Describe the working of carburetor and fuel injector
		CO609.6	Describe the working of ignition system.
BTMEL 610	Refrigeration and Air Conditioning Lab	L610.1	Conduct test on Refrigeration and air conditioning test units to study their performance.
		L610.2	Draw performance curves of these machines systems.
		L610.3	Analyse the results obtained from the tests.
		L610.4	Draw conclusions based on the results of the experiments.
BTMEM 611	TPCS	C611.1	Visit nearby places to understand the problems of the community
		C611.2	Select one of the problems for the study, state the exact title of the project and define scope of the problem
		C611.3	Explain the motivation, objectives and scope of the project.
		C611.4	Evaluate possible solutions of the problem
		C611.5	Design, produce, test and analyze the performance of product/system/process.
		C611.6	Modify, improve the product system process.
BTMEC 701	Mechatronics	C701.1:	Define sensor, transducer and understand the applications of different sensors and transducers.
		C701.2:	Explain the signal conditioning and data representation techniques.
		C701.3:	Design pneumatic and hydraulic circuits for a given application.
		C701.4:	Write a PLC program using Ladder logic for a given application.
		C701.5:	Understand applications of microprocessor and micro controller.
		C701.6:	Analyse PI, PD and PID controllers for a given application.
BTMEC 702	CAD/CAM	C702.1	List and describe the various input and output devices for a CAD work station
		C702.2	Carry out/calculate the 2-D and 3-D transformation positions (Solve problems on 2-D and 3-D transformations)
		C702.3	Describe various CAD modeling techniques with their relative advantages and limitations
		C702.4	Develop NC part program for the given component, and robotic tasks
		C702.5	Describe the basic Finite Element procedure
		C702.6	Explain various components of a typical FMS system, Robotics, and CIM
		C702.7	Classify parts in part families for GT
		C702.8	Describe and differentiate the CAPP systems
BTMEC 703	Manufacturing Processes III	C703.1	Differentiate clearly between NC and CNC machines and Explain the working of CNC components
		C703.2	Prepare and execute a part program for producing a given product.
		C703.3	Explain appropriate non-traditional machining processes
		C703.4	Explain different surface coating techniques.
		C703.5	Explain different rapid prototyping techniques.
		C703.6	Explain the working principle of various micro-manufacturing processes.
BTMEC 704B	Industrial Engineering and Management	CO704B.1	Understand and apply the planning and organizing function of management in an organization
		CO704B.2	Understand and apply the staffing, leading and controlling function of management in an organization.
		CO704B.3	Understand the types of manufacturing, service systems and apply the concepts of forecasting, material requirement planning and operations scheduling in production/operations management.
		CO704B.4	Apply concepts of product design, capacity planning, plant location, plant layout and assembly line balancing in the design of operational systems for enhancing productivity in an organization
		CO704B.5	Understand and analyze different concepts of industrial engineering like work study, method study and work measurement.
		CO704B.6	Apply basic principles of ergonomics, concurrent engineering and TQM in the design of work system.
BTMEC 705A	Engineering Economics	C705.1	Apply the appropriate engineering economics analysis method(s) for problem solving: present worth, annual cost, rate-of-return, payback, break-even, Benefit-cost ratio.
		C705.2	Evaluate the cost effectiveness of individual engineering projects using the methods learned and draw inferences for the investment decisions.
		C705.3	Compare the life cycle cost of multiple projects using the methods learned, and make a quantitative decision between alternate facilities and/or systems.
		C705.4	Compute the depreciation of an asset using standard Depreciation techniques to assess its impact on present or future value.
		C705.5	Apply all mathematical approach models covered in solving engineering economics problems: mathematical formulas, interest factors from tables, Excel functions and graphs. Estimate reasonableness of the results.
		C705.6	Examine and evaluate probabilistic risk assessment methods
		C705.7	Compare the differences in economic analysis between the private and public sectors. Recognize the limits of mathematical models for factors hard to quantify.
		C705.8	Develop and demonstrate teamwork, project management, and professional communications skills
BTMEL 706	Manufacturing Processes Lab III	C703.1	Analyze the types of chips generated during various machining processes.
		C703.2	Explain the effect of process parameter during turning process.
		C703.3	Develop manual part program for performing various CNC operations
		C703.4	Describe the concept of wire EDM technology and its applications.
BTMEL 707	Mechatronics Lab	C707.1	Understand the various types of sensors and their applications.
		C707.2	Design a pneumatic circuit for a given application
		C707.3	Design a hydraulic circuit for a given application
		C707.4	Write a PLC program using Ladder logic
		C707.5	Experiment PID controller for controlling temperature
		C707.6	Demonstrate the capacitance sensor for measuring level
BTMEL 708	CAD/CAM Lab	C708.1	Construct CAD part models, assembly model and drafting of machine elements using CAD software
		C708.2	Evaluate stresses in components subjected to simple structural loading using FE software
		C708.3	Write NC programs for turning and milling
		C708.4	Describe case study of industrial robots
BTMFS 709	Seminar	C709.1	State the exact title of the seminar
		C709.2	Explain the motivation for selecting the seminar topic and its scope
		C709.3	Search pertinent literature and information on the topic
		C709.4	Critically review the literature and information collected
		C709.5	Demonstrate effective written and verbal communication
BTMEF 710	Internship	C710.1	To make the students aware of industrial culture and organizational setup
		C710.2	To create awareness about technical report writing among the student.
BTMEP 711	Project Stage I	C711.1	State the exact title of the project and problem definition
		C711.2	Explain the motivation, objectives and scope of the project
		C711.3	Review the literature related to the selected topic of the project
		C711.4	Design the mechanism, components of the system and prepare detailed drawings
BTMEC 801A	Fundamentals of Automotive	C811.5	Evaluate the cost considering different materials/manufacturing processes
		C801A.1	Explain various types of I.C. Engines and Cycles of operation
		C801A.2	Recognize normal and abnormal combustion in SI and CI engines, also examine engine performance

08/11/23
 for H.O.D. Mechanical Dept.
 SVKM's Institute of Technology, Dhule

	Systems	C801A.3	Explain the effects of emission formation of IC engines, its effects and the legislation standards.
		C801A.4	Explain the working of various parts like clutch, transmission, powertrain etc.
		C801A.5	Classify and explain brakes and steering systems.
		C801A.6	Explain Suspension system, wheel alignment and Tyres.
		CO801F.1	Understand the renewable, non-renewable energy sources, impact of current energy usage and sector wise consumption.
		CO801F.2	Explain the concept of solar energy budget, solar spectrum and types of solar collectors.
BTMEC 801F	Non-Conventional Energy Sources	CO801F.3	Explain the characteristics, functioning of p-n Junction, manufacturing of p-n junction, interaction of p-n junction with radiation, functioning of p-n junction solar cell and determination of operational characteristics of p-n junction based solar cell and its construction.
		CO801F.4	Explain the principle of photo catalysis, OTEC, geothermal energy, biomass, overview of wind mill, types of wind mill, design of wind turbine and examine the performance characteristics and performance limits of wind mill.
		CO801F.5	Describe the various parts of battery with function, battery technology, battery test process, significance of C-Rate and its effect on charge discharge curve, different battery structures and their types.
		CO801F.6	Explain the types of fuel cells, issues associated with fuel processing, electrochemical devices, super capacitor, Flywheels and magneto hydrodynamic power generation.
		C803.1	State the aim and objectives for this stage of the project.
		C803.2	Construct and conduct the tests on the system/product.
BTMEP 803	Project Stage II	C803.3	Analyze the results of the tests.
		C803.4	Discuss the findings, draw conclusions, and modify the system product, if necessary.

SAJB 08/11/23
 For **H.O.D. Mechanical Dept.**
SVKM's Institute of Technology, Dhule