COURSE OUTCOMES: First Year Engineering Science

UNDERGRADUATE COURSES [UG]

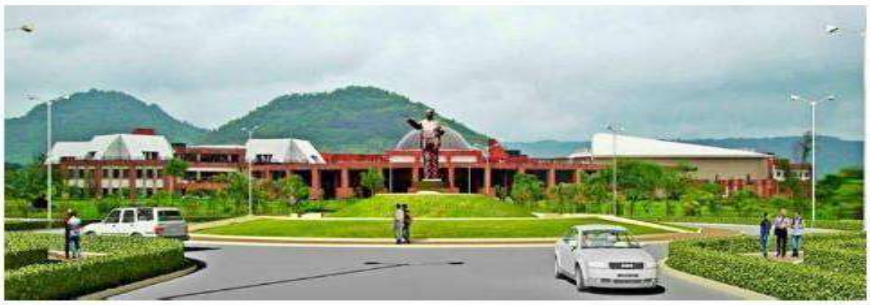
COMMON TO ALL BRANCHES

Dr. Babasaheb Ambedkar Technological University, Lonere

Dr. Babasaheb Ambedkar Technological University
(Established as a University of Technology in the State of Maharashtra)
(under Maharashtra Act No. XXIX of 2014)
P.O. Lonere, Dist. Raigad, Pin 402 103, Maharashtra
Telephone and Fax. 02140 - 275142
www.dbatu.ac.in

PROPOSED CURRICULUM
UNDER GRADUATE PROGRAMME
B.Tech
FIRST YEAR ENGINEERING

WITH EFFECT FROM THE ACADEMIC YEAR 2020-2021.



GROUP A

Dr. Babasaheb Ambedkar Technological University, Lonere

Teaching and Evaluation Scheme for First Year B. Tech. (All Branches)

Group A

Semester I									
Course Code	**Course Title**	**Teaching Scheme**			**Evaluation Scheme**				
		L	T	P	CA	MSE	ESE	Total	Credit
Mandatory	**Induction Program**	**3-weeks duration in the beginning of semester.**							
BTBS101	Engineering Mathematics- I	3	1	-	20	20	60	100	4
BTBS102	Engineering Physics	3	1	-	20	20	60	100	4
BTES103	Engineering Graphics	2	-	-	20	20	60	100	2
BTHM104	Communication Skills	2	-	-	20	20	60	100	2
BTES105	Energy and Environment Engineering	2	-	-	20	20	60	100	2
BTES106	Basic Civil and Mechanical Engineering	2	-	-	50	-	-	50	Audit
BTBS107L	Engineering Physics Lab	-	-	2	60	-	40	100	1
BTES108L	Engineering Graphics Lab	-	-	4	60	-	40	100	2
BTHM109L	Communication Skills Lab.	-	-	2	60	-	40	100	1
		14	**2**	8	330	100	420	850	18
Semester II									
BTBS201	Engineering Mathematics-II	3	1	-	20	20	60	100	4
BTBS202	Engineering Chemistry	3	1	-	20	20	60	100	4
BTES203	Engineering Mechanics	2	1	-	20	20	60	100	3
BTES204	Computer Programming in C	3	-	-	20	20	60	100	3
BTES205	Workshop Practices	-	-	4	60	-	40	100	2
BTES206	Basic Electrical and Electronics Engineering	2	-	-	50	-	-	50	Audit
BTBS207L	Engineering Chemistry Lab	-	-	2	60	-	40	100	1
BTES208L	Engineering Mechanics Lab	-	-	2	60	-	40	100	1
BTES210S	Seminar	-	-	2	60	-	40	100	1
BTES211P	Field Training / Internship/Industrial Training (minimum of 4 weeks which can be completed partially in first semester and second Semester or in at one time).	-	-	-	-	-	-	-	Credits To be evaluated in III Sem.
		13	**3**	**10**	**430**	**80**	**440**	**950**	**19**
		27							

FIRST YEAR FIRST SEMESTER

Course Code	BTBS101
Type of Course	
Course Title	Engineering Mathematics- I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1:Apply the matrix technique (Linear algebra) to find solutions ofsystem of linear equations arising in many engineering problem CO2:Demonstrate the concept partial derivatives and their applications to Maxima/ Minima, series expansion of multi-valued functions CO3:Compute Jacobian of functions of several variables and theirapplications to engineering problems CO4:Identify and sketch of curves in various coordinate system CO5: Evaluate multiple integrals and their applications to area and volume

Course Code	BTBS102 / 202
Type of Course	
Course Title	Engineering Physics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Explain & apply the concept of types of Oscillation, Dielectric properties & ultrsonics CO2: Explain & compare between Interference & Polarisation of light ,working Principle of Lasers &Fiber optics CO3: Interprete, apply &demonstrate principle of motion of charged particles in EF&MF, BAinbridge Mass spectrograph &G M counter CO4: Identify Types of crystals & crystal planes using Miller indices,Experimental approach

Course Code	BTES103 / 203
Type of Course	
Course Title	Engineering Graphics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: Use of drawing instruments effectively for drawing and dimensioning. CO2: Explain conventions and methods of engineering drawing. CO3: Apply concept of projections of points, lines, planes, solids and section of solids CO4: Construct isometric and orthographic views of given objects

Course Code	BTHM104 / 204
Type of Course	
Course Title	Communication Skills
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: Apply speaking and writing skills in professional as well as social situations CO2: Overcome Mother Tongue Influence and demonstrate neutralaccent while exercising English CO3: Apply communication skills for Presentations, Group Discussion and interpersonal interactions CO4: Apply grammar correctly during Speaking and Writing situations especially in context with Presentations, Public Speaking, Report writing and Business Correspondence

Course Code	BTES105 / 205
Type of Course	
Course Title	Energy and Environment Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: Identify conventional,non-conventional energy sources. CO2:Knowand discuss power consuming and power developing devices for effective utilization and power consumption CO3:Identify various sources of air, water pollution and its effects CO4:Know and discuss noise,soil, thermal pollution and Identify solid, biomedical and hazardous waste

Course Code	BTES106 / 206
Type of Course	
Course Title	Basic Civil and Mechanical Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	Audit
Course Outcomes	CO1:Identify various Civil Engineering materials and choose suitable material among various options CO2:Apply principles of surveying to solve engineering problem CO3:Identify various Civil Engineering structural components and select appropriate structural system among various options CO4:Explain and define various properties of basic thermodynamics,materials and manufacturing processes CO5: Know and discuss the working principle of various power consuming and power developing devices

Course Code	BTBS107L / BTBS207L
Type of Course	
Course Title	Engineering Physics Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Student will be able to define basic of Electron optics & X-Rays. CO2:. Student will have the concept & fundamental principles of Interference, Diffraction & Polarization. CO3: Student will be able to explain the concept Superconductivity & Nuclear Physics. CO4: Student will be able to use modern techniques in Semiconductor, Modern physics & Atomic structure.

Course Code	BTES108L / BTES208L
Type of Course	
Course Title	Engineering Graphics Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-4
Credits	2
Course Outcomes	C01: Know and understand the conventions and the methods of engineering drawing. CO-2 Construct basic and intermediate geometry and comprehend the theory of projection. CO-3 Improve their visualization skills so that they can apply these skills in developing a new products. CO-4 Improve their technical communication skill in the form of communicative drawings.

Course Code	BTHM109L / BTHM209L
Type of Course	
Course Title	Communication Skills Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	C01: Students will be able to listen, read, write and speak (LRWS model) effectively and efficiency. CO2. Students will be able to speak grammatically correct English. CO3. Students will be able to write an application & resume, make presentation and shall be able to appear for an interview successfully. CO4. Students will be able to write formal and informal language.

FIRST YEAR SECOND SEMESTER

Course Code	BTBS201
Type of Course	
Course Title	Engineering Mathematics-II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Discuss the need and use of complex variables to find roots ,to separate complex quantities and to establish relation between circular and hyperbolic functions CO2: Solve first and higher order differential equations and apply them as a mathematical modelling in electric and mechanical systems CO3: Determine Fourier series representation of periodic functions over different intervals CO4: Demonstrate the concept of vector differentiation and interpret the physical and geometrical meaning of gradient, divergence &curl in various engineering streams CO5: Apply the principles of vector integration to transform line integral to surface integral ,surface to volume integral &vice versa using Green's , Stoke's and Gauss divergence theorems

Course Code	BTBS202 / BTBS102
Type of Course	
Course Title	Engineering Chemistry
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Demonstrate knowledge of chemistry in technical fields CO2: Bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer CO3: Develop the importance of water in industrial and domestic usage CO4: Identify the concepts of Chemistry to lay the ground work for subsequent studies in various engineering fields CO5: Examine a fuel and suggest alternative fuels

Course Code	BTES203 / BTES103
Type of Course	
Course Title	Engineering Mechanics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Apply fundamental Laws of Engineering Mechanics CO2: Apply Conditions of static equilibrium to analyze given force system CO3: Compute Centre of gravity and Moment of Inertia of planesurfaces CO4: Compute the motion characteristics of a body/particle for a Rectilinear and Curvilinear Motion CO5: Know and discuss relation between force and motion characteristics

Course Code	BTES204 / BTES104
Type of Course	
Course Title	Computer Programming in C
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1:Gain a broad perspective about the uses of computers in engineering industry and C Programming CO2:Develop the basic concept of algorithm, algorithmic thinking and flowchart CO3:Apply the use of C programming language to implement various algorithms and develops the basic concepts and terminology of programming in general CO4:Use the more advanced features of the C language CO5: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

Course Code	BTES205 / BTES105L
Type of Course	
Course Title	Workshop Practices
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-4
Credits	2
Course Outcomes	CO1: Basic knowledge of various hand tools, power tools, machinetools, and their use in different sections of manufacturing. CO2.The workshop practices would help to build the understanding of the complexity of the industrial job. CO3. Workshop curriculum builds the hands on experiences which would help to learn manufacturing process and production

Course Code	BTES206 / BTES106
Type of Course	
Course Title	Basic Electrical and Electronics Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	Audit
Course Outcomes	CO1:Apply basic ideas and principles of electrical engineering CO2: Identify protection equipment and energy storage devices CO3: Differentiate electrical and electronics domains and explain the operation of diodes and transistors CO4: Acquire knowledge of digital electronics CO5: Design simple combinational and sequential logic circuits

Course Code	BTBS207L / BTBS107L
Type of Course	
Course Title	Engineering Chemistry Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Develop innovative methods to produce soft water for industrialuse and potable water at cheaper cost. CO2. Substitute metals with conducting polymers and also produce cheaper biodegradable polymers to reduce environmental pollution. CO3. Design economically and new methods of synthesis nano materials. CO4. Apply their knowledge for protection of different metals from corrosion.

Course Code	BTES208L / BTES108L
Type of Course	
Course Title	Engineering Mechanics Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1 Verify law of Force Polygon and law of Moments using Force Polygon and bell crank lever apparatus and also study Parallel Force apparatus. (Simply supported type). CO2 Determine mechanical advantage, Velocity ratio and efficiency of a screw jack. CO3 Detailed analysis is to be performed to determine the bending moments, shear force, axial forces etc at the required section

Course Code	BTES210S
Type of Course	
Course Title	Seminar
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	C01Students will be able to practice acquired knowledge within the chosen area of technology for project development. CO2. Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach. CO3. Reproduce, improve and refine technical aspects for engineering projects. CO4. Work as an individual or in a team in development of technical projects.

Course Code	BTES211P
Type of Course	
Course Title	Field Training / Internship / Industrial Training
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-0
Credits	
Course Outcomes	C01: To get acquainted with the components and equipments. CO2:To apply theoretical knowledge into practical applications. CO3:To develop interest in their respective branch and to know the avenues for their branch. CO4: To provide platform for technical presentation

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

COURSE OUTCOMES: CIVIL ENGINEERING

UNDERGRADUATE COURSES [UG]

SECOND YEAR THIRD SEMESTER

Course Structure
for Degree Programme
B. Tech. in Civil Engineering

with effect from AY 2018-19

Dr. Babasaheb Ambedkar Technological University
Lonere 402 103, Dist- Raigad, Maharashtra, INDIA

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

Course Structure

Evaluation Scheme

Sr. No	Particulars of Evaluation	MSE	CA		ESE		Total
			CA_1	CA_2	Internal	External	
01	Theory courses	20	10	10	---	60	100
02	Audit courses	---	50	50	---	---	100
03	Studio Courses (Product Design Engg)	---	30	30	40	---	100
03	Laboratory (Practical) courses	---	15	15	10	10	50
04	Seminar / Min Project/ Project Stage 1	---	30		20	---	50
05	Field Training	---	---	---	50	---	50
06	Project Stage II	---	---	---	50	50	100

Semester- III

Sr. No.	Subject Code	Subject	Contact Hours			Credit
			L	T	P	
		Theory				
01	BTBSC301	Mathematics – III	3	1	-	4
02	BTCVC302	Mechanics of Solids	3	1	✓	4
03	BTCVC303	Hydraulics I	2	1	✓	3
04	BTCVC304	Surveying I	2	1	✓	3
05	BTCVC305	Building Construction	2	-	✓	2
06	BTCVC306	Engineering Geology	2	-	✓	2
07	BTHM303	Soft Skills Development	2	-	-	AU
		Practical / Drawing and/or Design				
08	BTCVL307	Hydraulics Laboratory I	-	-	2	1
09	BTCVL308	Surveying Laboratory I	-	-	2	1
10	BTCVL309	Building Construction - Drawings Laboratory	-	-	2	1
11	BTCVL310	Engineering Geology Lab	-	-	2	1
12	BTCVS311	Seminar on Topic of Field Visit to Foundation Work	-	-	1	AU
13	BTCVF312	Field Training / Internship/Industrial Training Evaluation (from semester II)	-	-	-	1
		Sub-Total	16	4	09	
		Total	29			23

Course Code	BTBSC301
Type of Course	
Course Title	Mathematics – III
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: On completion of the course, student will be able to formulate and solve mathematical model of civil engineering phenomena in field of structures, survey, fluid mechanics and soil mechanics. CO2: Student will demonstrate basic knowledge of L.D.E., Vector, P.D.E.,F.T.& Probability CO3: Student will show the understanding of impact of EngineeringMathematics in Civil. CO4: using the internal connections between geometry, algebra, and numerical computation CO5: distinguishing between a formal proof and a less formal arguments and understanding the different roles these play in mathematics.

Course Code	BTCVC302
Type of Course	
Course Title	Mechanics of Solids
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Perform the stress-strain analysis. CO2: Draw force distribution diagrams for members and determinate beams. CO3: Find deflections in determinant beams. CO4: Visualize force deformation behavior of bodies.

Course Code	BTCVC303
Type of Course	
Course Title	Hydraulics I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Calibrate the various flow measuring devices CO2: Determine the properties of fluid and pressure and their measurement CO3: Understand fundamentals of pipe flow, losses in pipe and analysis of pipe network CO4: Visualize fluid flow phenomena observed in Civil Engineering systems

Course Code	BTCVC3O4
Type of Course	
Course Title	Surveying I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Perform measurements in linear/angular methods CO2: Perform plane table surveying in general terrain CO3: Know the basics of levelling and theodolite survey in elevation and angular measurements

Course Code	BTCVC305
Type of Course	
Course Title	Building Construction
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: Understand types of masonry structures CO2: Understand composition of concrete and effect of various parameters affecting strength CO3: Comprehend components of building and there purposes CO4: Comprehend the precast and pre-engineered building construction techniques

Course Code	BTCVC306
Type of Course	
Course Title	Engineering Geology
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: Recognize the different land forms which are formed by variousgeological agents CO2: Identify the origin, texture and structure of various rocks andphysical properties of mineral CO3: Emphasize distinct geological structures which have influenceon the civil engineering structure CO4: Understand how the various geological conditions affect the design parameters of structures

Course Code	BTHM303
Type of Course	
Course Title	Soft Skills Development
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	Audit
Course Outcomes	CO1: Learners will acquire interpersonal communication skills. CO2: Learners will develop the ability to work independently. CO3: Learners will develop the qualities like self-discipline, self-criticism and self-management. CO4: Learners will have the qualities of time management and discipline. CO5: Learners would be able to present themselves as an inspiration for others.

Course Code	BTCVL307
Type of Course	
Course Title	Hydraulics Laboratory I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: To provide practical knowledge in verification of principles of fluid flow. CO2: To understand Major and Minor Losses. CO3: To impart knowledge in measuring pressure, discharge and velocity of fluid flow. CO4: To gain knowledge in performance testing of Hydraulic Turbines and Hydraulic Pumps at constant speed and Head. CO5: To provide the students with a solid foundation in fluid flow principles. CO6: Given the required flow rate and pressure rise, select the properpump to optimize the pumping efficiency. CO7: Analyze a variety of practical fluid-flow devices and utilize fluid mechanics principles in design. CO8: Students can able to understand to analyze practical problems in all power plants and chemical industries.

Course Code	BTCVL308
Type of Course	
Course Title	Surveying Laboratory I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Use the theodolite along with chain/tape, compass on the field CO2: Apply geometric and trigonometric principles of basic surveying calculations CO3: Plan a survey, taking accurate measurements, field booking, andadjustment of errors CO4: Apply field procedures in basic types of surveys, as part of asurveying team CO5: Employ drawing techniques in the development of a topographic map

Course Code	BTCVL309
Type of Course	
Course Title	Building Construction - Drawings Laboratory
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Draw plan, elevation and section of various structures CO2: Apply the principles of planning and by laws used for building planning CO3: Prepare detailed working drawing for doors and windows

Course Code	BTCVL310
Type of Course	
Course Title	Engineering Geology Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Calculate the linear measurement on surface CO2: Find out engineering properties of various geological materials CO3: Draw subsurface lithologs CO4: Identify minerals and rocks by studying physical properties

Course Code	BTCVS311
Type of Course	
Course Title	Seminar on Topic of Field Visit to Foundation Work
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-1
Credits	Audit
Course Outcomes	CO1: Field trip provides real-world experience, increases the quality of education, and improves the social relations, outside of the four walls of a classroom.

Course Code	BTCVF312
Type of Course	
Course Title	Field Training / Internship / Industrial Training
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-0
Credits	1
Course Outcomes	CO1: Demonstrates professional responsibility based on real life experience and exposure CO2: Demonstrates discipline outcomes in the work setting CO3: Demonstrate effective listening, oral and written presentation skills

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

SECOND YEAR FOURTH SEMESTER

Semester- IV

Sr. No.	Subject Code	Subject	Contact Hours L	T	P	Credit
		Theory				
01	BTCVC401	Hydraulics II	2	1	✓	3
02	BTCVC402	Surveying – II	2	1	✓	3
03	BTCVC403	Structural Mechanics-I	3	1	-	4
04	BTID405	Product Design Engineering	1	2	-	3
05	CV E1	**Elective I**	3	-	-	3
06	BTCVC406	Engineering Management	1	-	-	AU
07	BTHM3401	Basic Human Rights	2	-	-	AU
		Practical / Drawing and/or Design				
08	BTCVL407	Hydraulics Laboratory II	-	-	2	1
09	BTCVL408	Surveying Laboratory II	-	-	4	2
10	BTCVL409	Mechanics of Solids Laboratory	-	-	2	1
11	BTCVM410	Mini Project	-	-	2	1
12	BTCVF411	Seminar on Topic of Field Visit to works involving Superstructure Construction	-	-	1	1
		Sub-Total	14	5	11	
		Total	31			22
		Elective I				
	BTCVE404A BTCVE404B BTCVE404C	Numerical Methods in Engineering Planning for Sustainable Development Instrumentation & Sensor Technologies for Civil Engineering Applications	3	-	-	3

Course Code	BTCVC401
Type of Course	
Course Title	Hydraulics II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Design open channel sections in a most economical way CO2: Know about the non-uniform flows in open channel and the characteristics of hydraulic jump CO3: Understand application of momentum principle of impact of jets on plane

Course Code	BTCVC402
Type of Course	
Course Title	Surveying – II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand basics different types of curves on roads and their preliminary survey CO2: Perform setting of curves, buildings, culverts and tunnels CO3: Comprehend different geodetic methods of survey such as triangulation, trigonometric levelling CO4: Comprehend modern advanced surveying techniques

Course Code	BTCVC403
Type of Course	
Course Title	Structural Mechanics-I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Describe the concept of structural analysis, degree of indeterminacy CO2: Calculate slopes and deflection at various locations for different types of beams CO3: Identify determinate and indeterminate trusses and calculate forces in the members of trusses Perform the distribution of the moments the in continuous beam and frame

Course Code	BTID405
Type of Course	
Course Title	Product Design Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:1-2-0
Credits	3
Course Outcomes	CO1: Create simple design of components or a system as whole CO2: Create design documents for knowledge sharing CO3: Manage own work to meet design requirements CO4: work effectively in a team

Course Code	BTCVE404B
Type of Course	CV E1
Course Title	Planning for Sustainable Development
Nature of Course	Elective I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: a main role has been attributed to education and educational practices, which are the most relevant means for enhancing specific learning outcomes for sustainable development: knowledge, self-regulation skills, critical thinking skills, social responsibility, social

Course Code	BTCVE404C
Type of Course	CV E1
Course Title	Instrumentation & Sensor Technologies for Civil Engineering Applications
Nature of Course	Elective I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the properties civil engineering materials CO2: Understand the components and functions of buildings made up of masonry and concrete CO3: Understand the types of doors, windows and staircases made up of various materials CO4: Understand the prefabrication and precast techniques in construction CO5: Understand the test procedures for material testing and analyse the properties of materials using standard methods and evaluation procedures

Course Code	BTCVC406
Type of Course	
Course Title	Engineering Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:1-0-0
Credits	Audit
Course Outcomes	C01: Demonstrate the nuances of management functions C02: Analyze the framework of a business organization C03: Adopt an empirical approach toward business situations. C04: Apply various Management techniques.

Course Code	BTHM3401
Type of Course	
Course Title	Basic Human Rights
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	Audit
Course Outcomes	CO1 Demonstrate a good understanding of the provisions under the Constitution of India dealing with human rights. CO2: Display a good understanding of the nature and scope of speciallegislations dealing with protection of human rights of marginalized and vulnerable sections. CO3: Demonstrate a good understanding of the practical application of human rights law to specific human rights problems in India. CO4: Analyze complex human rights problems and apply relevant provisions of human rights law in India to a hypothetical situation/case study and a theoretical knowledge of the underpinnings of the human rights framework in India, its operation and issues associated with its implementation.

Course Code	BTCVL407
Type of Course	
Course Title	Hydraulics Laboratory II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Understand various properties of fluids and measurement techniques CO2: Carry out calibrations of various flow measuring devices CO3: Understand mechanism of hydraulic jump, various jets and pumps

Course Code	BTCVL408
Type of Course	
Course Title	Surveying Laboratory II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-4
Credits	2
Course Outcomes	CO1: Determine contour level of field CO2: Determine the tachometric constants and grade of a line CO3: Use sub tense bar for distance measurement

Course Code	BTCVL409
Type of Course	
Course Title	Mechanics of Solids Laboratory
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Evaluate Young Modulus, torsional strength, hardness and tensile strength of given specimens CO2: Determine the strength of coarse aggregates CO3: Find the compressive strength of concrete cubes and bricks CO4: Determine physical properties of given coarse aggregates, fine aggregates and cement samples

Course Code	BTCVM410
Type of Course	
Course Title	Mini Project
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Students will be able to practice acquired knowledge within the chosen area of technology for project development CO2: Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach. CO3: Students will be able to practice acquired knowledge within the chosen area of technology for project development. CO4: Identify, discuss and justify the technical aspects of the chosen project with a comprehensive and systematic approach. CO5: Reproduce, improve and refine technical aspects for engineering projects CO6: Work as an individual or in a team in development of technicalprojects. CO7: Communicate and report effectively project related activities and findings.

Course Code	BTCVF411
Type of Course	
Course Title	Seminar on Topic of Field Visit to works involving Superstructure Construction
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-1
Credits	1
Course Outcomes	CO1: students understood Elements of superstructure. CO2: Material used to construct superstructure. CO3: Instruments required to constructing Superstructure.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

THIRD YEAR FIFTH SEMESTER

Semester- V

Sr. No	Subject Code	Subject	Contact Hours			Credit
			L	T	P	
		Theory				
01	BTCVC 501	Design of Steel Structures	2	2	-	4
02	BTCVC 502	Structural Mechanics-II	2	1	-	3
03	BTCVC 503	Soil Mechanics	3	1	✓	4
04	BTCVC 504	Environmental Engineering	2	-	✓	2
05	BTCVC 505	Transportation Engineering	2	-	✓	2
06	CV E2	**Elective II**	3	-	-	3
07	BTHM507	Essence of Indian Traditional Knowledge	1	-	-	AU
		Practical / Drawing and/or Design				
08	BTCVL508	Soil Mechanics Laboratory	-	-	2	1
09	BTCVL509	Environmental Engineering Laboratory	-	-	2	1
10	BTCVL510	Transportation Engineering Laboratory	-	-	2	1
11	BTCVS511	Seminar on Topic of Field Visit to works related to Building Services	-	-	1	AU
		Sub-Total	15	4	7	
		Total	26			21
		Elective II				
	BTCVE506A	Materials, Testing & Evaluation				
	BTCVE506B	Computer Aided Drawing	3	-		3
	BTCVE506C	Development Engineering				
	BTCVE506D	Business Communication & Presentation Skills				

Course Code	BTCVC 501
Type of Course	
Course Title	Design of Steel Structures
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-2-0
Credits	4
Course Outcomes	CO1: Identify and compute the design loads and the stressesdeveloped in the steel member. CO2: Analyze and design the various connections and identify the potential failure modes. CO3: Analyze and design various tension, compression and flexural members. CO4: Understand provisions in relevant BIS Codes.

Course Code	BTCVC 502
Type of Course	
Course Title	Structural Mechanics-II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Have a basic understanding of matrix method of analysis andwill be able to analyze the determinant structure. CO2: Have a basic understanding of the principles and concepts related to finite difference and finite element methods CO3: Have a basic understanding of concept of influence line

Course Code	BTCVC 503
Type of Course	
Course Title	Soil Mechanics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Understand different soil properties and behavior CO2: Understand stresses in soil and permeability and seepage aspects. CO3: Develop ability to take up soil design of various foundations.

Course Code	BTCVC 504
Type of Course	
Course Title	Environmental Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: Apply the water treatment concept and methods. CO2: Prepare basic process designs of water and wastewater treatment plants. CO3: Apply the wastewater treatment concept and methods. CO4: Apply the solid waste management concepts.

Course Code	BTCVC 505
Type of Course	
Course Title	Transportation Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: Comprehend various types of transportation systems and their history of the development CO2: Comprehend to various types of pavements CO3: Design the pavements by considering various aspects associated with traffic safety measures.

Course Code	BTCVE506A
Type of Course	CV E2
Course Title	Materials, Testing & Evaluation
Nature of Course	Elective II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	2
Course Outcomes	CO1: To develop skill among students to construct strong and durablestructures by applying knowledge of material science. CO2: To make the students aware of quality assurance and control in their real life as a professional.

Course Code	BTCVE506B
Type of Course	CV E2
Course Title	Computer Aided Drawing
Nature of Course	Elective II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	2
Course Outcomes	CO1: Understand conventions of formal engineering drawings andinterpret the drawings CO2: Draw working drawings of masonry and RCC Wall footing, panelled doors, windows and RCC staircase CO3: Communicate a design idea/concept graphically/ visually for a residential Building. CO4: Draw water supply, sanitary and electrical layout in a line diagram CO5: Understand concepts of Building Information Modeling using Revit Architecture.

Course Code	BTCVE506C
Type of Course	CV E2
Course Title	Development Engineering
Nature of Course	Elective II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	2
Course Outcomes	CO1: To develop multi scaled perspective about decisions in the builtenvironment, CO2: To expose the students to the analysis and evaluation of real world problems aiming to bring desired change in the society.

Course Code	BTCVE506D
Type of Course	CV E2
Course Title	Business Communication & Presentation Skills
Nature of Course	Elective II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	2
Course Outcomes	CO1: effective interpersonal communications CO2: effective business writing CO3: skills that maximize team effectiveness CO4: good time management CO5: effective problem solving

Course Code	BTCVL508
Type of Course	
Course Title	Soil Mechanics Laboratory
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Determine different engineering properties of soil. CO2: Identify and classify soils based on standard geotechnical engineering practices. CO3: Perform Laboratory oratory compaction and in-place density tests. CO4: Perform and interpret direct shear tests and estimate shear strength parameters.

Course Code	BTCVL509
Type of Course	
Course Title	Environmental Engineering Laboratory
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Perform common environmental experiments relating to water and wastewater quality, and know which tests are appropriate for given environmental problems. CO2: Statistically analyze and interpret laboratorial results. CO3: Apply the laboratorial results to problem identification, quantification, and basic environmental design and technical solutions. CO4: Understand and use the water and wastewater sampling procedures and sample preservations. CO5: Obtain the necessary background for subsequent courses in environmental engineering. CO6: Demonstrate the ability to write clear technical laboratorial reports. CO7: Understand and apply ethical issues associated with decision making and professional conduct in the laboratorial and field environment CO8: Understand the impact of water and wastewater treatment on people and the environment. CO9: Quantify the pollutant concentration in water, wastewater and ambient air.

Course Code	BTCVL510
Type of Course	
Course Title	Transportation Engineering Laboratory
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Perform tests on various road construction materials. CO2: Perform CBR tests on local soils to determine subgrade properties needed for roadways.

Course Code	BTCVS511
Type of Course	
Course Title	Seminar on Topic of Field Visit to works related to Building Services
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-1
Credits	Audit
Course Outcomes	CO1: Provide further knowledge of building services engineering systems and an understanding of the importance of quality of installation and proper co-ordination on the overall performance and maintainability of building. CO2: Synchronize the construction activities with installation of building services. CO3: Select the suitable electrical as well mechanical services for particular requirements of buildings. CO4: Ensure green building applications to the new constructions.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

THIRD YEAR SIXTH SEMESTER

Semester- VI

$:Students should register for the CVF 705 in Semester VI to undergo training during vacation after semester VI and appear at examination in Semester VII. Result shall appear in Grade-sheet of Semester VII

Sr. No.	Subject Code	Subject Title	Contact hours			Credit
			L	T	P	
01	BTCVC601	Design of Concrete Structures I	3	1	-	3
02	BTCVC602	Foundation Engineering	2	1	-	3
03	BTCVC603	Concrete Technology	2	-	✓	2
04	BTCVC604	Project Management	2	1	-	2
05	CVE3	**Elective III**	3	-	-	3
06	BTCVC606	Building Planning and Design	2	-	✓	2
		Practical / Drawing and/or Design				
07	BTCVL607	Concrete Technology Laboratory	-	-	2	1
08	BTCVL608	Building Planning, Design and Drawing Laboratory	-	-	4	2
09	BTCVM609	Community Project (Mini Project)	-	-	2	1
10	BTCVS610	Seminar on Topic of Field Visit Road Construction	-	-	1	AU
11	BTCVF611	Industrial Training$	-	-	2	--
		Sub-Total	14	3	11	
		Total		28		19
		Elective III				
	BTCVE605A	Waste Water Treatment				
	BTCVE605B	Operations Research				
	BTCVE605C	Geographic Data Analysis and Applications				
	BTCVE605D	Advanced Engineering Geology				
	BTCVE605E	Advanced Soil Mechanics				
	BTCVE605F	Design of Masonry and Timber Structures				

Course Code	BTCVC601
Type of Course	
Course Title	Design of Concrete Structures I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	3
Course Outcomes	CO1: Comprehend to the various design philosophies used for designof reinforced concrete. CO2: Analyze and design the reinforced concrete slab using limit state and working state method. CO3: Analyze and design the reinforced concrete beam using limit state and working state method. CO4: Analyze and design the reinforced concrete column using limit state and working state method.

Course Code	BTCVC602
Type of Course	
Course Title	Foundation Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: To predict soil behavior under the application of loads and come up with appropriate solutions to foundation design queries. CO2: Analyze the stability of slope by theoretical and graphical methods. CO3: Analyze the results of in-situ tests and transform measurements and associated uncertainties into relevant design parameters. CO4: Synthesize the concepts of allowable stress design, appropriate factors of safety, margin of safety, and reliability.

Course Code	BTCVC603
Type of Course	
Course Title	Concrete Technology
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: Understand the various types and properties of ingredients ofconcrete. CO2: Understand effect of admixtures on the behavior of the freshand hardened concrete. CO3: Formulate concrete design mix for various grades of concrete.

Course Code	BTCVC604
Type of Course	
Course Title	Project Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	2
Course Outcomes	CO1: Understand various steps in project Management, different types of charts. CO2: Construct network by using CPM and PERT method. CO3: Determine the optimum duration of project with the help of various time estimates. CO4: Know the concept of engineering economics, economic comparisons, and linear break even analysis problems. CO5: Understand the concept of total quality Management including Juran and Deming's philosophy.

Course Code	BTCVE605A
Type of Course	CVE3
Course Title	Waste Water Treatment
Nature of Course	Elective III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Determine the sewage characteristics and design various sewagetreatment plants CO2: Understand municipal water and wastewater treatment systemdesign and operation. CO3: Apply environmental treatment technologies and design processes for treatment of industrial waste water. CO4: Understand the rural sanitation schemes.

Course Code	BTCVE605B
Type of Course	CVE3
Course Title	Operations Research
Nature of Course	Elective III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1 : Analyse any real life system with limited constraints and depict it in a model form. CO2 : Convert the problem into a mathematical model. CO3 : Solve the mathematical model manually as well as using soft resources/software such as solver, TORA etc. CO4 : Understand variety of problems such as assignment, transportation, travelling salesman etc. CO5 : Solve the problems mentioned in point 4 using linear programming approach using software. CO6 : Understanding different queing situations and find the optimal solutions using models of different situations.

Course Code	BTCVE605C
Type of Course	CVE3
Course Title	Geographic Data Analysis and Applications
Nature of Course	Elective III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Comprehend fundamental concepts and practices of Geographic Information Systems (GIS) and advances in Geospatial Information Science and Technology (GIS&T). CO2: Apply basic graphic and data visualization concepts such as color theory, symbolization, and use of white space. CO3: Demonstrate organizational skills in file and database management. CO4: Give examples of interdisciplinary applications of Geospatial Information Science and Technology.

Course Code	BTCVE605D
Type of Course	CVE3
Course Title	Advanced Engineering Geology
Nature of Course	Elective III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Explain the distribution, Geological characters and Civil Engineering significance of major rock formations of India. CO2: Investigate subsurface geology to know geological set up, depthof foundation and treatment to weak zone. CO3: Explain Geo-hydrological Characters, morphometric analysis of river basin and Geological aspects of water conservation. CO4: Determine physical and mechanical properties of rocks and Rock Quality Designation. CO5: Identify favorable and unfavorable field characters of rocksfor tunneling and bridge CO6: Apply geological knowledge in Civil Engineering planning, development and use of suitable construction material.

Course Code	BTCVE605E
Type of Course	CVE3
Course Title	Advanced Soil Mechanics
Nature of Course	Elective III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: calculate and analyze the stresses on soil and be able to draw the stress paths CO2: analyze the effect of flow of fluids through soils CO3: evaluate the compressibility of soils CO4: obtain and analyze the shear strength of soils

Course Code	BTCVE605F
Type of Course	CVE3
Course Title	Design of Masonry and Timber Structures
Nature of Course	Elective III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand classification and properties of masonry and timber units CO2: Investigate and Analyse load characteristics on structures and carry out computations CO3: Understand basic principles and concepts of designing the structural units CO4: Propose suitable type of adjoining structural components andtheir application area.

Course Code	BTCVC606
Type of Course	
Course Title	Building Planning and Design
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: To plan buildings considering various principles of planning and bye laws of governing body. CO2: Comprehend various utility requirements in buildings CO3: Understand various techniques for good acoustics.

Course Code	BTCVL607
Type of Course	
Course Title	Concrete Technology Laboratory
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Determine the consistency and fineness of cement. CO2: Determine the setting times of cement CO3: Determine the specific gravity and soundness of cement. CO4: Determine the compressive strength of cement CO5: Determine the specific gravity of coarse aggregate and fine aggregate by Sieve analysis. CO6: Determine the flakiness and elongation index of aggregates.

Course Code	BTCVL608
Type of Course	
Course Title	Building Planning, Design and Drawing Laboratory
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-4
Credits	2
Course Outcomes	CO1: Draw plan, elevation and section of load bearing and framed structures. CO2: Draw plan, elevation and section of public structures.

Course Code	BTCVM609
Type of Course	
Course Title	Community Project (Mini Project)
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Experience the industrial environment, recognize the requirement of the industry and cope up with the industrial circumstances. CO2: Recognize career paths taking into account their individual abilities and prepare a report about the work experience in the industry. CO3: Communicate effectively about the training through technical presentation. CO4: Develop their employability and start-up skills and to enhance the ability to engage in, life-long learning. CO5: Develop individual confidence to handle various engineering assignments and ability to think strategically, and to lead, motivate and work with teams.

Course Code	BTCVS610
Type of Course	
Course Title	Seminar on Topic of Field Visit Road Construction
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-1
Credits	Audit
Course Outcomes	CO1Outline broad features of road construction planning and management. CO2: material used for road construction. CO3: Testing of material used for Road construction. CO4: Evaluate the resources required for road construction. CO5: Propose the planning and management for road construction CO6: Choose appropriate resources for road construction.

Course Code	BTCVF611
Type of Course	
Course Title	Industrial Trainings
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	
Course Outcomes	CO1: Identify the industry and their locations, products/expertise/domain, and interact with the authorities there at. CO2: Communicate effectively through technical presentation, report and interactions, and identify career goals and paths based on individual attributes such as affinity, aptitude, strengths and challenges, and inputs from the in-plant training. CO3: Acquaint various structural partitions such as labs, workshops, assembly units, stores, and administrative unit and machinery units; understand their functions, applications and maintenance; understand the business model of the industry; and understand the innovations/achievements of the industry. CO4: Enhance communication skills and life-long learning, and acquire technical skills, employability skills, start-up skills, and risks in industry, management skills and such other skills which are conducive to professional engagement.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

FOURTH YEAR SEVENTH SEMESTER

Dr. Babasaheb Ambedkar Technological University

(Established as a University of Technology in the State of Maharashtra)

(under Maharashtra Act No. XXIX of 2014)

P.O. Lonere, Dist. Raigad
Pin 402 103, Maharashtra
Telephone and Fax: 02140 - 275142
www.dbatu.ac.in

Proposed Course Contents for

B. Tech. in Civil Engineering

w.e.f. June 2020

7th Semester - 8th Semester

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

B. Tech. Civil Engineering

Course Structure for Semester VII (Fourth Year) w.e.f. 2020-2021

Course Code	Type of Course	Course Title	Weekly Teaching Scheme			Evaluation Scheme				Credits
			L	T	P	CA	MSE	ESE	Total	
BTCVC701	Core	Design of Concrete Structures - II	2	1	--	20	20	60	100	3
BTCVC702	Core	Infrastructure Engineering	3	--	--	20	20	60	100	3
BTCVC703	Core	Water Resources Engineering	3	1	--	20	20	60	100	4
BTCVC704	Core	Professional Practices	2	1	--	20	20	60	100	3
BTCVE705A	Elective IV	Construction Techniques	3	--	--	20	20	60	100	3
BTCVE705B		Engineering Economics								
BTCVE705C		Finite Element Method								
BTCVE705D		Limit State Design of Steel Structures								
BTCVE705E		Plastic Analysis and Design								
BTCVE705F		Water Power Engineering								
BTCVOE706A	Open Elective V	Advanced Structural Mechanics	3	--	--	--	--	--	--	Audit (AU/ NP)
BTCVOE706B		Air Pollution Control								
BTCVOE706C		Bridge Engineering								
BTCVOE706D		Introduction to Earthquake Engineering								
BTCVOE706E		Town and Urban Planning								
BTCVOE706F		Tunneling and Underground Excavations								
BTCVL707	Laboratory	Design & Drawing of RC & Steel Structures	--	--	2	30	--	20	50	1
BTCVL708	Laboratory	Professional Practices	--	--	2	30	--	20	50	1
BTCVT709	Training	Field Training /Internship/Industrial	--	--	--	--	--	50	50	1
BTCVS710	BTS	Seminar	--	--	2	--	--	50	50	1
BTCVP711	BTP	Project Stage-I**	--	--	6	--	50	50	100	3
		Total	**16**	**3**	**12**	**160**	**150**	**490**	**800**	**23**

***In case of students opting for Internship and Industry Project in the eighth semester, the Project must be industry-based.*

ABBREVIATIONS

PEO: Program Educational Objectives

PO: Program Outcomes

CO: Course Outcomes

L: No. of Lecture hours (per week)

T: No. of Tutorial hours (per week)

P: No. of Practical hours (per week)

C: Total number of credits

BSH: Basic Science and Humanity

BSC: Basic Sciences Course

PCC: Professional Core Course

OEC: Open Elective Course

PEC: Professional Elective Course

BHC: Basic Humanity Course

ESC: Engineering Science Course

HSMC: Humanity Science and Management Course

NCC: National Cadet Corps

NSS: National Service Scheme

CA: Continuous Assessment

MSE: Mid Semester Exam

ESE: End Semester Exam

SS: Self Study Course

Course Code	BTCVC701
Type of Course	Core
Course Title	Design of Concrete Structures - II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Able to identify the behavior, analyze and design of the beam sections subjected to torsion CO2: Able to analyze and design of axially and eccentrically loaded column and construct the interaction diagram for them CO3: Understand various concepts, systems and losses in pre-stressing CO4: Able to analyze and design the rectangular and symmetrical I-section pre-stressed beam/girders

Course Code	BTCVC702
Type of Course	Core
Course Title	Infrastructure Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Know about the basics and design of various components of railway engineering CO2: Understand the types and functions of tracks, junctions and railway stations CO3: Know about the aircraft characteristics, planning and components of airport CO4: Understand the types and components of docks and harbours

Course Code	BTCVC703
Type of Course	Core
Course Title	Water Resources Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Understand need of Irrigation in India and water requirement asper farming practice in India CO2: Understand various irrigation structures and schemes CO3: Develop basis for design of irrigation schemes.

Course Code	BTCVC704
Type of Course	Core
Course Title	Professional Practices
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand the importance of preparing the types of estimates under different conditions for various structures CO2: Know about the rate analysis and bill preparations and to study about the specification writing CO3: Know the various types of contract, accounts in PWD, methods for initiating the works in PWD and tendering CO4: Understand the valuation of land and buildings, various methods and factors affecting valuation.

Course Code	BTCVE705A
Type of Course	Elective
Course Title	Construction Techniques
Nature of Course	Elective IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the planning of new project with site accessibility and services required CO2: Comprehend the various civil construction equipment's CO3: Familiar with layout of RMC plant, production, capacity and operation process CO4: Recognize various aspect of road construction, construction of diaphragm walls, railway track construction etc.

Course Code	BTCVE705B
Type of Course	Elective
Course Title	Engineering Economics
Nature of Course	Elective IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Adopt as per principles of economics and financing CO2: Analyze available alternatives and propose best suitable among them CO3: Apply various models of financial management and accounting

Course Code	BTCVE705C
Type of Course	Elective
Course Title	Finite Element Method
Nature of Course	Elective IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the different energy methods in structural analysisand basic concepts of finite element method CO2: Analyze 1-D problems related to structural analysis like Bars, Trusses, Beams and Frames using finite element approach CO3: Find solution to problems using direct approach methods like Rayleigh – Ritz or Galerkin's Method CO4: Solve 2-D problems using knowledge of theory of elasticity CO5: Students will be able to implement the knowledge of numerical methods in FEM to find the solution to the various problems in statics and dynamics CO6: Analyze 1D, 2D, and 3D structures using different software packages based on FEM

Course Code	BTCVE705D
Type of Course	Elective
Course Title	Limit State Design of Steel Structures
Nature of Course	Elective IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Identify and compute the design loads and the stresses developed in the steel member CO2: Analyze and design the various connections and identify the potential failure modes CO3: Analyze and design various tension, compression and flexural members CO4: Understand provisions in relevant BIS Codes

Course Code	BTCVE705E
Type of Course	Elective
Course Title	Plastic Analysis and Design
Nature of Course	Elective IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand modes of structural collapse CO2: Perform the plastic analysis and design of various determinant and in-determinant structures CO3: Adapt plastic theory of design for various structures

Course Code	BTCVE705F
Type of Course	Elective
Course Title	Water Power Engineering
Nature of Course	Elective IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Identify potential energy sources and adapt as per the requirement CO2: inculcate basics of electricity generation and power plants CO3: propose suitable energy source for running a project optimistically

Course Code	BTCVOE706A
Type of Course	Elective
Course Title	Advanced Structural Mechanics
Nature of Course	Open Elective V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	Audit (AU/NP)
Course Outcomes	CO1: Understand the concepts of three-dimensional stress and strain at a point as well as the stress-strain relationships CO2: Calculate the stresses and strains in axially loaded members, torsion of noncircular cross section members, and members subject to nonsymmetrical flexural loading CO3: Calculate the stresses and strains associated with thick-wall cylindrical pressure vessels and rotating disks CO4: Determine the stresses resulting from bending of curved beams and flat plates CO5: Apply the theories of strength and fracture CO6: Apply energy methods for the determination of the deflections and rotations CO7: Design of beams, cylinders and shafts for allowable stresses and loads

Course Code	BTCVOE706B
Type of Course	Elective
Course Title	Air Pollution Control
Nature of Course	Open Elective V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	Audit (AU/NP)
Course Outcomes	CO1: Identify the sources of air pollutants and their effect on human, plants and materials CO2: Apply knowledge of meteorology for controlling air pollution CO3: Design air pollution controlling equipment CO4: Apply knowledge of legislation for prevention and control of air pollution

Course Code	BTCVOE706C
Type of Course	Elective
Course Title	Bridge Engineering
Nature of Course	Open Elective V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	Audit (AU/NP)
Course Outcomes	CO1: Understand components of bridges and its various types CO2: Understand site selection criteria and comprehend various forces acting on bridges CO3: Analyze bridge structures using different analysis techniques CO4: Understand the importance of different types of bridge bearings

Course Code	BTCVOE706D
Type of Course	Elective
Course Title	Introduction to Earthquake Engineering
Nature of Course	Open Elective V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	Audit (AU/NP)
Course Outcomes	CO1: Capture complexities in earthquake resistant design of structures CO2: Grasp Nature of earthquake vibration and associated forces on structures CO3: Understand importance of designing the building to targeted seismic performance

Course Code	BTCVOE706E
Type of Course	Elective
Course Title	Town and Urban Planning
Nature of Course	Open Elective V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	Audit (AU/NP)
Course Outcomes	CO1: Understand town and Urban planning and their essentialattributes CO2: Identify elements of planning and regulations of the same CO3: Implement guidelines provided by standard authorities

Course Code	BTCVOE706F
Type of Course	Elective
Course Title	Tunneling and Underground Excavations
Nature of Course	Open Elective V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	Audit (AU/NP)
Course Outcomes	CO1: Understand types of tunnels and tunneling methods conformingto site conditions CO2: Investigate various tunneling operations and relevant machinery required CO3: Understand methods and operations of excavating large anddeep tunnels CO4: Propose suitable tunneling and excavations methods to optimize the same

Course Code	BTCVL707
Type of Course	Laboratory
Course Title	Design & Drawing of RC & Steel Structures
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: student will be able to simulate a practical design requirement in to a theoretical statement to solve mathematically to arrive at a safe economical and realistic feasible solution that can be executed

Course Code	BTCVL708
Type of Course	Laboratory
Course Title	Professional Practices
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: To discuss introduce methods of quantity surveying, costing,and valuation CO2: To facilitate students with concepts of costing involved in infrastructures CO3: To make students familiar with process involved duringtendering & contracting

Course Code	BTCVL709
Type of Course	Training
Course Title	Field Training / Internship / Industrial
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-0
Credits	1
Course Outcomes	CO1: To enable students to implement Project Planning in their Industrial In-plant Training Project work. CO2: To study the concept of Facility, Location & Layout & implement in their Industrial In-plant training Project work CO3: To be capable of self-education and clearly understand the valueof achieving Perfection in the respective Project work CO4: To enable students to learn the basic concepts of Project &Production Management CO5: An understanding of the impact of engineering solutions and industrial safety in a global and social context

Course Code	BTCVL710
Type of Course	BTS
Course Title	Seminar
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: In terms of content, students will be able to show competence in identifying relevant information, defining and explaining topics under discussion. They will demonstrate depth of understanding, use primary and secondary sources; they will demonstrate complexity, insight, cogency, independent thought, relevance, and persuasiveness. CO2: Students will demonstrate that they have paid close attention to what others say and can respond constructively. Through listening attentively, they will be able to build on discussion fruitfully, supporting and connecting with other discussants. CO3: Students will be able to judge when to speak and how much to say, speak clearly and audibly in a manner appropriate to the subject, ask appropriate questions, use evidence to support claims, respond to a range of questions, take part in meaningful discussion to reach a shared understanding, speak with or without notes, show depth of understanding, demonstrate breadth of reading, use primary and secondary sources, show independence and flexibility of thought, help discussions to move forward, show intellectual leadership and effective time management. CO4: students will develop persuasive speech, present information ina compelling, well-structured, and logical sequence, respond respectfully to opposing ideas, show depth of knowledge of complex subjects, and develop their ability to synthesize, evaluate and reflect on information. CO5: Through asking appropriate questions, students will demonstrate their understanding of discussions and spark further discussion. CO6: Students will be able to reach across diverse disciplines to applytheories, methods and knowledge bases from multiple fields to a single question or problem. CO7: Students will engage with works that are widely held to be significant in the field of study, while recognizing cultural diversity and the ever-changing nature of what is regarded as important.

Course Code	BTCVL711
Type of Course	BTP
Course Title	Project Stage-I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-6
Credits	3
Course Outcomes	CO1: develop plans with relevant people to achieve the project'sgoals CO2: break work down into tasks and determine handover procedures CO3: estimate and cost the human and physical resources required, and make plans to obtain the necessary resources

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

FOURTH YEAR EIGHT SEMESTER

B. Tech. Civil Engineering

Course Structure for Semester VIII [Fourth Year] w.e.f. 2020-2021

Course Code	Type of Course	Course Title	Weekly Teaching Scheme			Evaluation Scheme$				Credits
			L	T	P	CA	MSE	ESE	Total	
BTCVSS801A	(Self-Study Course)#	Characterization of Construction Materials	03**	--	--	20	20	60	100	3
BTCVSS801B		Geosynthetics and Reinforced Soil Structures								
BTCVSS801C		Higher Surveying								
BTCVSS801D		Maintenance and Repair of Concrete Structures								
BTCESS801E		Structural Dynamics								
BTCESS802A	(Self-Study Course)#	Energy Efficiency Acoustics and Daylighting in Building	03**	--	--	20	20	60	100	3
BTCESS802B		Environmental Remediation of Contaminated Sites								
BTCESS802C		Remote Sensing Essentials								
BTCESS802D		Mechanical Characterization of Bituminous Materials								
BTCESS802E		Soil Structure Interaction								
BTCEP803	Project Stage-II	In-house Project or Internship and Project in Industry*	--	--	30	50	--	100	150	15
		Total	04	--	30	90	40	220	350	21

 # The subjects are to be studied on self-study mode using SWAYAM/NPTEL/any other online source approved by the University.

*** If required Coordinator may be appointed for each Self study course and an administrative load of 03 hours per week may be considered for monitoring and assisting the students, and to conduct examination (if required), evaluation and preparation of result.*

$ If the examination schedule for the online Self study course chosen by student do not match with the University's Academic Schedule, the University/Institute have to conduct exam for such courses.

** Six months of Internship and Project in the Industry. One Faculty guide from the Institute and one Mentor from the Industry should be identified to monitor the progress of work. During the Project/Internship period of work, a review of work should be taken twice followed by a final presentation at the end of Project period.*

Course Code	BTCVSS801A
Type of Course	Self-Study Course
Course Title	Characterization of Construction Materials
Nature of Course	Self-Study Course
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Able to compare the properties of most common and advanced building materials CO2: Able to understand the typical and potential applications of these materials CO3: Able to understand the relationship between material properties and structural form CO4: Able to understand the importance of experimental verification of material properties CO5: Able to Gain knowledge in modern materials to be used

Course Code	BTCVSS801B
Type of Course	Self-Study Course
Course Title	Geosynthetics and Reinforced Soil Structures
Nature of Course	Self-Study Course
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Able to apply the appropriate geosynthetic material for improving ground for various Civil Engineering projects, and design of various reinforced soil structures.

Course Code	BTCVSS801C
Type of Course	Self-Study Course
Course Title	Higher Surveying
Nature of Course	Self-Study Course
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To provide knowledge of Total Station & advanced surveying instruments. CO2: Develop skills in using Total Station & advanced surveying instruments and analyse data. CO3: Summarize the basic principles of GPS and GIS in civil engineering. CO4: Manage the suggested or identified constructional problems, solve in teams, in order to improve future problem solving ability and able to present it. CO5: Use total station in the field of civil engineering land survey.

Course Code	BTCVSS801D
Type of Course	Self-Study Course
Course Title	Maintenance and Repair of Concrete Structures
Nature of Course	Self-Study Course
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Select the relevant method of maintaining different building structures. CO2: Test the structures to predict its stability CO3: Select the relevant materials for repair of structures. CO4: Apply the relevant methods of repair for the masonry structures. CO5: Restore the damages of building structural elementsusing suitable method of repair. CO6: Prepare the structural audit and budget for the maintenance of structures.

Course Code	BTCVSS801E
Type of Course	Self-Study Course
Course Title	Structural Dynamics
Nature of Course	Self-Study Course
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: fundamental theory of dynamic equation of motion CO2: apply knowledge of mathematics, science, and engineering by developing the equations of motion for vibratory systems and solving for the free and forced response. CO3: apply structural dynamics theory to earthquake analysis, response, and design of structures CO4: interpret dynamic analysis results for design, analysis and research purposes CO5: create simple computer models for engineering structures using knowledge of structural dynamics CO6: modeling approach of dynamic response in civil engineering applications CO7: dynamic properties and behavior of civil structures

Course Code	BTCESS802A
Type of Course	Self-Study Course
Course Title	Energy Efficiency Acoustics and Daylighting in Building
Nature of Course	Self-Study Course
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To the concepts functional design of building for thermal aspects and energy efficiency; especially in tropical climates i.e. in Indian context CO2: To appreciate the significance and benefits of energy efficiency in buildings. CO3: To have a general understanding of the methodology used to determine the energy efficiency of buildings, the different opportunities for improving the energy efficiency of buildings and the potential savings. CO4: To have an overview of the different mechanisms for financing energy efficiency measures. CO5: To have conceptualized an approach to setting out and implementing policies to facilitate energy efficiency in buildings in their country.

Course Code	BTCESS802B
Type of Course	Self-Study Course
Course Title	Environmental Remediation of Contaminated Sites
Nature of Course	Self-Study Course
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Demonstrate mass balance and pollution calculations; CO2: Demonstrate the basic concepts of pollution, the effects of environmental contamination and the various remediation technologies which may be employed CO3: Categorise and differentiate between contamination and degradation caused by various types of urban, industrial and agricultural development CO4: Assess, distinguish and critique the scientific and engineering approaches to landscape degradation and rehabilitation and demonstrate knowledge of various remediation technologies.

Course Code	BTCESS802C
Type of Course	Self-Study Course
Course Title	Remote Sensing Essentials
Nature of Course	Self-Study Course
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the concepts of Photogrametry and compute the heights of objects CO2: Understand the principles of aerial and satellite remote sensing, Able to comprehend the energy interactions with earth surface features, spectral properties of water bodies . CO3: Understand the basic concept of GIS and its applications, know different types of data representation in GIS CO4: Understand and Develop models for GIS spatial Analysis and will be able to know what the questions that GIS can answer are CO5: Apply knowledge of GIS software and able to work with GIS software in various application fields CO6: Illustrate spatial and non spatial data features in GIS and understand the map projections and coordinates systems CO7: Apply knowledge of GIS and understand the integration of Remote Sensing and GIS

Course Code	BTCESS802D
Type of Course	Self-Study Course
Course Title	Mechanical Characterization of Bituminous Materials
Nature of Course	Self-Study Course
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: The influence of the temperature on any linear viscoelastic material will be discussed. CO2: The ways of scaling with respect to linearity of response will also be elaborated in the course. CO3: The characterization of laboratory design with respect to rock design will be covered as well. CO4: Students will be learning about the stimulation process of fatigue damage of bituminous mixtures. CO5: Candidates will be introduced to the MSCR testing methods inthe Mechanical Characterization of Bituminous Materials training. CO6: They will be taught the features of modified bituminous rock mixtures and their uses. CO7: Applicants will be dealing with the chemical composition of the bituminous rock type. CO8: In the Mechanical Characterization of Bituminous Materials certification syllabus the students will be covering the topic of "dynamic shear

Course Code	BTCESS802E
Type of Course	Self-Study Course
Course Title	Soil Structure Interaction
Nature of Course	Self-Study Course
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Evaluate the soil stiffness and damping ratio CO2: Analyze the cases when to consider or neglect the soil-structureinteraction effects CO3: Analyze the structure with soil-structure interaction effects bylumped mass model

Course Code	BTCEP803
Type of Course	Project Stage-II
Course Title	In-house Project or Internship and Project in Industry
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-30
Credits	15
Course Outcomes	CO1: Analyze photographs, drawings and maps to inform the direction of projects as well as the overall budget constraints. CO2: Ensure project feasibility through continual evaluation of structural integrity and design practicality. CO3: Create designs that utilise a variety of materials CO4: perform and adjust quantity calculations for practical and budgetary purposes CO5: Communicate with team members as well as customers and vendors to ensure maximum cohesion and fluidity on projects CO6: Inspect project sites to ensure they meet relevant codes and are progressing properly. CO7: Imbibe the practice of professional ethics and need for lifelong learning. CO8: Communicate effectively and work in teams

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

COURSE OUTCOMES: Computer Science and Engineering

UNDERGRADUATE COURSES [UG]

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Dr. Babasaheb Ambedkar Technological University
(Established as a University of Technology in the State of Maharashtra)
(under Maharashtra Act No. XXIX of 2014)
P.O. Lonere, Dist. Raigad, Pin 402 103, Maharashtra
Telephone and Fax. 02140 - 275142
www.dbatu.ac.in

PROPOSED CURRICULUM

UNDER GRADUATE PROGRAMME

B.TECH

COMPUTER ENGINEERING

WITH EFFECT FROM THE ACADEMIC YEAR 2020-2021

SECOND YEAR THIRD SEMESTER

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Semester –III (Second Year)

Proposed Scheme w.e.f. July – 2021

Course Category	Course Code	Course Title	Weakly Teaching Hrs			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
	BTBS301	Engineering Mathematics – III	3	1	-	20	20	60	100	4
	BTCOC302	Discrete Mathematics	3	1	-	20	20	60	100	4
	BTCOC303	Data Structures	3	1	-	20	20	60	100	4
	BTCOC304	Computer Architecture & Organization	3	1	-	20	20	60	100	4
	BTCOC305	Elective –I (a) Object - oriented Programming in C++ (b) Object Oriented Programming in Java	3	1	-	20	20	60	100	4
	BTCOL306	Data Structures Lab & Object Oriented Programming Lab	-	-	4	60	-	40	100	2
	BTCOS307	Seminar – I	-		4	60	-	40	100	2
	BTES211P	Field Training / Internship / Industrial Training Evaluation	-	-	-	-	-	-	-	Audit
		TOTAL	15	5	8	220	100	380	700	24

Course Code	BTBS301
Type of Course	
Course Title	Engineering Mathematics-III
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Analyze expansion of Fourier series using Euler formula CO2: Apply to transform form one to another domain by Fourier integrals CO3: Apply to transform one domain to another domain by z-transforms CO4: Apply to construct numerical data and solving by least square method CO5: Apply to solve transcendental equations by appropriate numerical method CO6: Apply to construct the relevant table which are present in the formula by using appropriate method CO7: Apply to evaluate definite integral from a set of table values by Simpson's &Weddell's rule CO8: Analyze the evaluation of double, triple and vector product by green's, stokes gauss divergence theorem

Course Code	BTCOC302
Type of Course	
Course Title	Discrete Mathematics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Understand sets, relations, functions and discrete structures. Apply Propositional logic and First order logic to solve problems. CO2: Express and solve number theoretic problems using algebraicproperties of groups, rings and fields. CO3: To design and develop real time application using graph theory CO4: Students would be able to model and analyze computational processes using analytic and combinatorial methods. CO5: Students will be able to use the methods learnt as part of this subject in subsequent courses in the design and analysis of algorithms, theory of computation, and compilers. CO6: Develop a discrete model for a given computational problem and solve.

Course Code	BTCOC303
Type of Course	
Course Title	Data Structures
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Student should able to know fundamentals of data structures like array, list, linked list, stack, queue, tree, graph, hashing. CO2: Student should able to identify suitable data structure for application. CO3: Student should able to use data structure to solve problems. CO4: Student should able to implement various data structures andalgorithm essential for implementing computer based solutions.

Course Code	BTCOC304
Type of Course	
Course Title	Computer Architecture & Organization
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: To understand the basic hardware and software issues of computer organization CO2: Identify functional units, bus structure and addressing modes. CO3:Students will be able to identify where, when and how enhancements of computer performance can be accomplished CO4: Students will also be introduced to more recent applications of computer organization in advanced digital systems CO5: Identify memory hierarchy and performance

Course Code	BTCOC305
Type of Course	Elective –I
Course Title	Object - oriented Programming in C++
Nature of Course	Elective –I
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Develop a working understanding of formal Object-Oriented Analysis and Design processes. CO2: Analyze real problems/requirements and design systems by developing specifications and abstractions to make development of complex systems easy CO3: Develop the skills to determine which processes and OOAD techniques should be applied to a given project. CO4: Develop an understanding of the application of OOAD practicesfrom a software project management perspective

Course Code	BTCOC305
Type of Course	Elective –I
Course Title	Object Oriented Programming in Java
Nature of Course	Elective –I
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Appreciation and understanding of object oriented concepts and their utility. CO2 :Apply Object oriented approach to design software CO3 Ability to formulate the problem, come up with object oriented design. CO4: Practicing use of different features of Object Oriented Methodology like templates, exception handling, reflection etc. • CO5: Study different systems and apply different design methodologies based on the problem specification and objectives.

Course Code	BTCOL306
Type of Course	
Course Title	Data Structures Lab & Object Oriented Programming Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-4
Credits	2
Course Outcomes	CO1: Student should able to know fundamentals of data structures like array, list, linked list, stack, queue, tree, graph, hashing CO2: Student should able to identify suitable data structure for application. CO3: Student should able to use data structure to solve problems CO4: Student should able to implement various data structures and algorithm essential for implementing computer based solutions

SECOND YEAR FOURTH SEMESTER

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Semester –IV (Second Year)

Proposed Scheme w.e.f. January – 2022

Course Category	Course Code	Course Title	Weakly Teaching Hrs			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
	BTCOC401	Design & Analysis of Algorithms	3	1	-	20	20	60	100	4
	BTCOC402	Operating Systems	3	1	-	20	20	60	100	4
	BTHM403	Basic Human Rights	3	-	-	20	20	60	100	3
	BTBS404	Probability Theory and Random Processes	3	-	-	20	20	60	100	3
	BTES405	Digital Logic Design & Microprocessors	3	1	-	20	20	60	100	4
	BTCOL406	Operating Systems & Python Programming Lab	1*	-	4	60	-	40	100	3
	BTCOS407	Seminar – II			4	60	-	40	100	2
	BTCOF408	Field Training / Internship / Industrial Training Evaluation						-	-	Audit to be evaluated in V Sem.
TOTAL			**16**	**3**	**8**	**220**	**100**	**380**	**700**	**23**

*Note: Lecture should be conducted only for Python Programming

Course Code	BTCOC401
Type of Course	
Course Title	Design & Analysis of Algorithms
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Analyzing the amortized time complexity of a given algorithmand data structure operations. CO2: Decide the appropriate design methodology for a given problem from among the paradigms of Divide and Conquer, Dynamic Programming, Greedy, Branch and Bound. CO3: Design algorithms for network flows. CO4: Distinguish between P and NP classes of problems.

Course Code	BTCOC402
Type of Course	
Course Title	Operating Systems
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Understand functional architecture of an operating system. CO2: To provide a detailed discussion of the various memory management techniques. CO3: Learn about and understand theoretical concepts and programming constructs used for the operation of modern operating systems. CO4: Gain practical experience with software tools available in modern operating systems such as semaphores, system calls, sockets and threads.

Course Code	BTHM403
Type of Course	
Course Title	Basic Human Rights
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Be familiar with the major universal and regional systems of human rights law, their relationships to each other, and the legal value and authority of declarations, decisions, judgments and other materials generated by them. CO2: Develop an awareness of the primary areas of concern within the field of human rights law and other relevant branches of law, and the ways in which human rights are promoted and protected

Course Code	BTBS404
Type of Course	
Course Title	Probability Theory and Random Processes
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Develop appropriate probabilistic model for a given problem ofalgorithmic nature and computation of its statistical parameters CO2:Learning of different methods of statistics for data analysis CO3: Modelling of various real life problems of operation research. CO4: .Determine service time and waiting time in a queue. CO5: To understand elementary queuing concepts and apply elsewhere in computer science.

Course Code	BTES405
Type of Course	
Course Title	Digital Logic Design & Microprocessors
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Use the basic logic gates and various reduction techniques of digital logic circuit in. CO2: Design combinational and sequential circuits. CO3: Design and implement hardware circuit to test performance and application CO4: Understand the architecture and use of microcontrollers for the basic operations and simulate using simulation software.

Course Code	BTCOL406
Type of Course	
Course Title	Operating Systems & Python Programming Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:1-0-4
Credits	3
Course Outcomes	CO1: Develop a basic understanding of the Python programming language CO2: To learn how to design and program Python applications. CO3: Demonstrate significant experience with Python program development environment CO4: Solve problems requiring the writing of well-documented programs in the Python language, including use of the logical constructs of that language.

THIRD YEAR FIFTH SEMESTER

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Semester –V (Third Year)

Proposed Scheme w.e.f. July – 2022

Course Category	Course Code	Course Title	Weakly Teaching Hrs			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
	BTCOC501	Database Systems	3	1	-	20	20	20	100	4
	BTCOC502	Theory of Computation	3	1	-	20	20	20	100	4
	BTCOC503	Software Engineering	3	1	-	20	20	20	100	4
	BTCOE504	Elective – II (A) Human computer Interaction (B) Numerical Methods	3	-	-	20	20	20	100	3
	BTHM505	Elective – III (A) Economics and Management (B) Business Communication	3	-	-	20	20	20	100	3
	BTCOL506	Database Systems & Software Engineering Lab	-	-	4	60	-	40	100	2
	BTCOM507	Mini-project – I	-	-	4	60	-	40	100	2
	BTCOF408	Field Training / Internship / Industrial Training Evaluation	-	-	-	-	-	-	-	Audit
		TOTAL	**15**	**3**	**8**	**220**	**100**	**380**	**700**	**22**

Course Code	BTCOC501
Type of Course	
Course Title	Database Systems
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Model, design and normalize databases for real life applications. CO2: To learn data models, conceptualize and depict a database system using ER diagram. CO3: Query Database applications using Query Languages like SQL. CO4: Understand validation framework like integrity constraints, triggers and assertions. CO5: Understand various storage structures and query optimization.

Course Code	BTCOC502
Type of Course	
Course Title	Theory of Computation
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Design finite state machines, regular expressions and grammarsfor given languages. CO2: Understand formal machines, languages and computations CO3: Develop analytical thinking and intuition for problem solving situations in related areas of theory of computation. CO4: Develop analytical thinking and intuition for problem solving situations in related areas of theory of computation. CO5: To know the limitations of computation, i.e. the un solvability of problems

Course Code	BTCOC503
Type of Course	
Course Title	Software Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: [SECO1] To understand the Software Engineering Practice &Process Models CO2: To understand Design Engineering, Web applications, and Software Project Management CO3: An understanding of some ethical and professional issues thatare important for software engineers CO4: To develop an ability to look at the Computer Science discipline from Software Engineering Systems perspective.

Course Code	BTCOE504
Type of Course	Elective – II
Course Title	Human computer Interaction
Nature of Course	Elective – II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Demonstrate an understanding of guidelines, principles, and theories influencing human computer interaction.. CO2: Describe the key design principles for user interfaces CO3: Carry out the steps of experimental design, usability and experimental testing, and evaluation of human computer interaction systems CO4: Develop and implement a process to gather requirements for, engage in iterative design of, and evaluate the usability of a user interface

Course Code	BTCOE504
Type of Course	Elective – II
Course Title	Numerical Methods
Nature of Course	Elective – II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Determine an interpolating function for data. CO2: solve initial value problems. CO3: aware of the use of numerical methods in modern scientific computing CO4: Students would be able to assess the approximation techniques to formulate and apply appropriate strategy to solve real world problems.

Course Code	BTCOL506
Type of Course	
Course Title	Database Systems & Software Engineering Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-4
Credits	2
Course Outcomes	CO1: Give detailed Problem CO2: Perform Software scoping activity CO3: Estimate required Resources CO4: Perform Software Estimation CO5: Perform Risk Analysis and Management CO6: Carry out Project Scheduling and Tracking CO7: Prepare Project Plan CO8: Prepare Software Quality Assurance Plan (SQAplan) CO9: Carry out Requirement Analysis Modelling CO10: Carry out Design CO11: Perform Software Testing

THIRD YEAR SIXTH SEMESTER

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Semester –VI (Third Year)

Proposed Scheme w.e.f. January – 2023

Course Category	Course Code	Course Title	Weakly Teaching Hrs			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
	BTCOC601	Compiler Design	3	1	-	20	20	60	100	4
	BTCOC602	Computer Networks	3	1	-	20	20	60	100	4
	BTCOC603	Machine Learning	3	1	-	20	20	60	100	4
	BTCOE604	Elective – IV (A) Geographic Information System (B) Internet of Things (C) Embedded Systems	3	-	-	20	20	60	100	3
	BTHM605	Elective – V (A) Development Engineering (B) Employability and Skill Development (C) Consumer Behaviour	3	-	-	20	20	60	100	3
	BTCOL606	Competitive Programming & Machine Learning Lab	1*	-	4	60	-	40	100	3
	BTCOM607	Mini-project – II	-	-	4	60	-	40	100	2
	BTCOF608	Field Training / Internship / Industrial Training	-	-	-	-	-	-	-	Audit to be Evaluated in VII Sem.
		TOTAL	**16**	**3**	**8**	**220**	**100**	**380**	**700**	**23**

*Note: Lecture should be conducted only for Competitive Programming

Course Code	BTCOC601
Type of Course	
Course Title	Compiler Design
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: To inform students about different parsing techniques, techniques to generate intermediate code and different optimization techniques... CO2: .to enrich the knowledge in various phases of compiler and its use CO3:To introduce the concepts underlying the design and implementation of language processors CO4: To provide practical programming skills necessary for constructing a compiler

Course Code	BTCOC602
Type of Course	
Course Title	Computer Networks
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: To develop an understanding of modern network architectures from a design and performance perspective CO2: Analyze the requirements for a given organizational structure and select the most appropriate networking architecture and technologies CO3: To study protocols, network standards, the OSI model, IP addressing, cabling, networking components, and basic LAN design CO4: Ability to write program using socket programming

Course Code	BTCOC603
Type of Course	
Course Title	Machine Learning
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: The aim of the course is to introduce principles of machine learning methods in general, to give an understanding of basic mechanisms underlying various specific methods. In case-based reasoning the integration of learning and problem solving is focused.

Course Code	BTCOE604
Type of Course	Elective – IV
Course Title	Internet of Things
Nature of Course	Elective – IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To learn the basic issues, policy and challenges in the Internet of Things CO2: To get an idea of some of the application areas where Internet of Things can be applied. CO3: Internet To understand the cloud and Internet environment. CO4: To understand the various modes of communications with Internet.

FOURTH YEAR SEVENTH SEMESTER

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Semester –VII (Final Year)

Proposed Scheme w.e.f. July – 2023

Course Category	Course Code	Course Title	Weakly Teaching Hrs			Evaluation Scheme				Credit
			L	T	P	CA	MSE	ESE	Total	
	BTCOC701	Artificial Intelligence	3	-	-	20	20	60	100	3
	BTCOC702	Cloud Computing	3	-	-	20	20	60	100	3
	BTCOE703	Elective – VI (A) Bioinformatics (B) Distributed System (C) Big Data Analytics	3	-	-	20	20	60	100	3
	BTCOE704	Open Elective – VII (A) Cryptography and Network Security (B) Business Intelligence (C) Block chain Technology	3	-	-	20	20	60	100	3
	BTCOE705	Open Elective – VIII (A) Virtual Reality (B) Deep Learning (C) Design Thinking	3	-	-	20	20	60	100	3
	BTHM706	Foreign Language Studies	-	-	4	-	-	-	-	Audit
	BTCOL707	Artificial Intelligence & Cloud Computing Lab	-	-	4	60	-	40	100	2
	BTCOS708	Project Phase – I	-	-	-	60	-	40	100	2
	BTCOF608	Field Training / Internship / Industrial Training	-	-	-	-	-	-	-	Audit
		TOTAL	**15**	**-**	**8**	**220**	**100**	**380**	**700**	**19**

Course Code	BTCOC701
Type of Course	
Course Title	Artificial Intelligence
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To understand the notions of rational behavior and intelligent agents CO2: To develop a general appreciation of the goals, subareas, achievements and difficulties of AI. • CO3 To provide the knowledge of methods of blind as well as informed search and ability to practically apply the corresponding techniques. CO4: To develop general understanding of major concepts and approaches in knowledge representation, planning, learning, robotics and other AI areas. CO5: To developing programming skills for AI applications & exposure to logic programming with Prolog.

Course Code	BTCOC702
Type of Course	
Course Title	Cloud Computing
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand various basic concepts related to cloud computingtechnologies.. CO2: To demonstrate an understanding of Service models, deployment models, Virtualization CO3: Understand different cloud programming platforms and tools CO4: Create application by utilizing cloud platforms such as Google app Engine and Amazon Web Services (AWS)

Course Code	BTCOE703
Type of Course	Elective – VI
Course Title	Bioinformatics
Nature of Course	Elective – VI
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To Understand the theoretical basis behind bioinformatics CO2: To know algorithms and programming techniques like dynamicprogramming, hashing, and suffix trees CO3: To help in developing multidisciplinary approach to the systematic analysis and modelling of complex biological phenomena. CO4: Serving as an introduction to computational and systems biology, this course emphasizes the fundamentals of nucleic acid and protein sequence analysis, structural analysis, and the analysis of complex biological systems

Course Code	BTCOE703
Type of Course	Elective – VI
Course Title	Distributed System
Nature of Course	Elective – VI
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To learn the principles, architectures, algorithms and programming models used in distributed systems. CO2: Ability to write distributed programs using sockets, RPC/RMI, etc CO3: Appreciation of the differences in the handling of issues like mutual exclusion, deadlock detection, fault handling, etc. in a centralized system and a distributed system. CO4: To gain experience in the application of fundamental Computer Science methods and algorithms in the development of distributed systems and distributed systems applications

Course Code	BTCOE703
Type of Course	Elective – VI
Course Title	Big Data Analytics
Nature of Course	Elective – VI
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To design and develop Hadoop and Map Reduce Framework.. CO2:The basics of Analytics – Concepts, Data preparation – merging, managing missing numbers sampling, Data visualization, Basic statistics. CO3: To Developed the skills necessary for utilizing tools (including deploying them on Hadoop/MapReduce) to handle a variety of big data analytics, and to be able to apply the analytics techniques on a variety of applications

Course Code	BTCOE704
Type of Course	Open Elective – VII
Course Title	Cryptography and Network Security
Nature of Course	Open Elective – VII
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To understand the network security, services, attacks, mechanisms, types of attacks... CO2: To understand cryptographic techniques for encryption, hashing, signature CO3: Develop an understanding of security policies (authentication, integrity and confidentiality), as well as protocols to implement such policies in the form of message exchanges. CO4: Deploy the cryptographic techniques to detect and prevent basicsecurity threats

Course Code	BTCOL707
Type of Course	
Course Title	Artificial Intelligence & Cloud Computing Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-4
Credits	2
Course Outcomes	CO1: State Space Search – Water Jug Problem, Missionaries and cannibals, Tower of HANOI, Eight puzzle, Implementation of these problems using both uninformed and informed search. – BFS, DFS, Best First Search, A*. CO2: Two-agent Games – Tic-Tac-Toe using Min-Max search and Alpha-Beta pruning, Constraint Satisfaction Problems – N-Queens using Heuristic repair and constraint propagation. CO3: Logic-Unification, Resolution, Answer Extraction Using Resolution. Machine Learning – Decision Tree, Candidate Elimination, Clustering (K-means), Neural net learning (Perception), Genetic algorithms (2SAT), Expert Systems, Natural Language Processing

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road, Aurangabad - 431010 (M.S.)
NAAC Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

COURSE OUTCOMES: Electrical Engineering

UNDERGRADUATE COURSES [UG]

SECOND YEAR THIRD SEMESTER

ELECTRICAL ENGINEERING DEPARTMENT

Structure and syllabus

Of

Second Year B. Tech. (Electrical Engineering)

With effect from August 2016

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road, Aurangabad - 431010 (M.S.)
NAAC Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

TEACHING & EVALUATION SCHEME ELECTRICAL ENGINEERING

III SEMESTER.

Course Code	Course Name	Teaching Scheme			Evaluation Scheme					Credits
		L	P	T	Int	MSE	ESE	TW	Pr/OR	
MAL301	Engineering Mathematics-III	3	0	1	20	20	60	-	-	4
EEL302	Network Analysis and Synthesis	3	0	1	20	20	60	-	-	4
MEL303	Fluid Mechanics and Thermal Engineering	3	0	0	20	20	60	-	-	3
EEL304	Measurement and Instrumentation	3	0	1	20	20	60	-	-	4
EEL305	Engineering Economics	2	0	0	20	20	60	-	-	2
EEL306	Elective –I	4	0	0	20	20	60	-	-	4
EEP307	Network Analysis and Synthesis Lab	0	2	0	-	-	-	25	25	1
EEP308	Measurement and Instrumentation Lab	0	2	0	-	-	-	25	25	1
EET309	Industrial Training	-	-	-	-	-	-	25	25	1
EEE310	NSS/NCC/Sports/ Arts	-	-	-	-	-	-	-	-	-
	TOTAL	18	04	03	120	120	360	75	75	24

Elective-I 1. Electrical Engineering Materials, 2. Human Values and engg. Ethics, 3. Signals and Systems

Course Code	MAL301
Type of Course	
Course Title	Engineering Mathematics-III
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: To know how root finding techniques can be used to solve practical engineering problems. CO2: Student can solve problems of linear differential equation. CO3: Students can apply Laplace transform to solve problems of electrical fields CO4: Student can apply Z transform under different conditions and can derive equation from them. CO5: to apply the analytical technique to express periodic function as a Fourier sine and cosine series. CO6: Student can analyze the functions of complex variable.

Course Code	EEL302
Type of Course	
Course Title	Network Analysis and Synthesis
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: To review basic components of electric network CO2: To design and develop network equations and their solutions CO3: To apply Laplace theorem for electric network analyses CO4: To analyze AC circuit CO5: Apply knowledge of Network theory for analysis of 2-port networks CO6: Obtain transfer functions of circuits and analysis of stability using poles of the transfer function

Course Code	MEL303
Type of Course	
Course Title	Fluid Mechanics and Thermal Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To apply the knowledge of mathematics, science and engineering fundamentals to model the energy conversion phenomenon CO2: To identify and formulate power production based on the fundamentals laws of thermal engineering. AND understand dynamics of fluid flow CO3: To instil upon to envisage appropriate experiments related to heat engines. AND understand concept of refrigeration and air conditioning CO4: To investigate the effectiveness of energy conversion process inmechanical power generation for the benefit of mankind CO5: To appreciate concepts learnt in fundamentals laws of thermodynamics from which learning ideas how to sustain in energy crisis and think beyond curriculum in the field of alternative and renewable sources of energy. CO6: To communicate effectively the concepts of internal combustion engines and try to think beyond curriculum in alternative sources of energy.

Course Code	EEL304
Type of Course	
Course Title	Measurement and Instrumentation
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: To understand philosophy of measurement CO2:To understand different methods analog and digital measurement CO3: To study principle of construction and operation of different transducer and dismay methods CO4: The students will be able to find the applications of instrument transformer and data acquisition system for sensing & control of electrical quantities CO5: The students will be able to use digital instruments for various measurements. CO6: Choose the suitable method for measurement of active, reactive powers and energy.

Course Code	EEL305
Type of Course	
Course Title	Engineering Economics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: To study concept of time value of money CO2: To study about demand in detail CO3: To understand Meaning of Production and factors of production CO4: To understand dif. Concept about market CO5: Explain the importance of finance functions, financial ratios and solve related problems CO6: Explain the elements of budgeting and bench marking

Course Code	EEL306
Type of Course	Elective –I
Course Title	Electrical Engineering Materials
Nature of Course	Elective –I
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	CO1: Evaluate insulating, conducting and magnetic materials used in electrical machines CO2: Understand the properties of liquid, gaseous and solid insulatingmaterials. CO3: Evaluate transformer oil by testing CO4: To study about crystal structure CO5: To study about conducting and superconducting materials CO6: To study dielectric and nano material

Course Code	EEL306
Type of Course	Elective –I
Course Title	Human Values and Engg. Ethics
Nature of Course	Elective –I
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	CO1: To familiarize the prospective engineers with elements of human values and engineering profession ethics CO2: human rights as a branch of public international law, and relevant juridical mechanisms at global as well as regional levels CO3: to study human rights in Indian Constitution and law CO4: To study scholarly values such as transparency, impartiality, clarity, reliance and the importance of sound reasoning and empirical inference CO5: different forms of promoting and implementing human rights, domestically as well as on the international level CO6: the role of human rights in contemporary issues relating to terrorism, religion, ethnicity, gender and development

Course Code	EEL306
Type of Course	Elective –I
Course Title	Signals and Systems
Nature of Course	Elective –I
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	CO1: To study classification of signals and system CO2: To analyze diff. types of time signal

Course Code	EEP307
Type of Course	
Course Title	Network Analysis and Synthesis Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Practical implications of the fundamentals of Ohm's law, Kirchhoff's current and voltage laws CO2: Accurate measurement of voltage, current, power and impedance of any circuit CO3: DC analysis, Transient analysis and Frequency analysis of a given circuit depending on types of elements CO4: Using DSO to measure the frequency, and amplitude of any signal CO5: Practical implementation of the fundamental electrical theoremsand modelling of simple electrical systems CO6: Teamwork skills for working effectively in groups and develop analytical skills to compare experimental results with theoretical concepts

Course Code	EEP308
Type of Course	
Course Title	Measurement and Instrumentation Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Understand the concepts of measurement, error and uncertainty. CO2: Understand the static and dynamic characteristics of measuring instruments CO3: Gain knowledge about the principle of operation and characteristics of different types of resistance, capacitance and inductance transducers CO4: Acquire knowledge of analyzing different stages of signal conditioning units CO5: Ability to interpret the results and draw meaningful conclusions CO6: Ability to work as a member of a team while carrying out experiments

Course Code	EET309
Type of Course	
Course Title	Industrial Training
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-0
Credits	1
Course Outcomes	CO1:to get oriented with industrial culture CO2:to study and understand the vision and mission of the industries CO3: to know the process and methodologies of production CO4: to understand the strategies of marketing and HR CO5:to know the HR policies and selection of candidates CO6:to work with industrial staff at administrative commercial and economic forms

Course Code	EEE310
Type of Course	
Course Title	NSS/NCC/Sports/ Arts
Nature of Course	
Weekly Teaching Hours	L-T-P:0-0-0
Credits	1
Course Outcomes	C01: Create awareness in social issues and Participate in mass education program. C02: to inoculate the team work and leadership C03: to build the qualities for nationality and good citizens C04:to aware the students about different social activities C05: to learn and practice the NCC and values and ethics CO4 Create environmental awareness. CO5 Participate in relief and rehabilitation work during natural calamities.

SECOND YEAR FOURTH SEMESTER

IV SEMESTER.

Course Code	Course Name	Teaching Scheme			Evaluation Scheme					Credits
		L	P	T	Int	MSE	ESE	TW	Pr/OR	
EEL401	Electrical Machine-I	3	0	1	20	20	60	-	-	4
EEL402	Power System-I	3	0	1	20	20	60	-	-	4
EEL403	Electrical Installation and Estimation	3	0	0	20	20	60	-	-	3
EEL404	Numerical Methods and Programming	3	0	0	20	20	60	-	-	3
EEL405	Elective –II	4	0	0	20	20	60	-	-	4
EEL406	Elective –III	3	0	0	20	20	60	-	-	3
EEP408	Electrical Machine-I Lab	0	2	0	-	-	-	25	25	1
EEP409	Numerical Methods and Programming Lab	0	2	0	-	-	-	25	25	1
EEE410	NSS/NCC/Sports/ Arts	-	-	-	-	-	-	-	-	-
	TOTAL	19	04	02	120	120	360	50	50	23

Elective-II Solid State Devices, 2. Analog and Digital electronics, 3. Electromagnetic Theory

Elective –III Industrial safety, 2. Introduction to Non-Conventional energy sources, 3. Software Techniques.

Course Code	EEL401
Type of Course	
Course Title	Electrical Machine-I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: To study diff. types, construction and operating principle of diff. types of electrical machines CO2: To study diff. types, construction and operating principle of diff. types of electrical machines CO3: To test the transformer and calculate its efficiency and performance in distribution system. CO4: To scrutinize three-phase transformer connections and use special purpose transformer for measurement and protection CO5: to select appropriate DC motor for specific purpose and compute their steady performance CO6: To compute the performance with DC generators and supply increasing load with parallel operation and to select the speed control and starting method of DC motor CO7: Students will be able to identify applications of DC machines &transformer in power sector

Course Code	EEL402
Type of Course	
Course Title	Power System-I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: To Understand basic operation of power system, power system components and their characteristics CO2: Students will be able to understand overall structure of power system CO3: To make students capable of analysis of mechanical and electrical design aspects of transmission system CO4: Students will be able to implement the knowledge to design underground power distribution system CO5: Students will be able to understand mechanical design of transmission lines CO6: Students will be able to analyse various performance parametersof transmission lines CO7: Enable the students to do analysis of different types of distribution systems and its design

Course Code	EEL403
Type of Course	
Course Title	Electrical Installation and Estimation
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To prepare estimates and costing of electrical installations of power system, To understand procedures of contracting and purchase. CO2: To understand the basic concepts, design and estimation of distribution systems, substation. CO3: To enable candidate to design earthing system for residential and commercial. CO4: To know different systems of earthing and estimation of industrial installations CO5: To understand various types of materials required for wiring. CO6: To prepare estimates and costing of electrical installations ofpower system CO7: To understand procedures of contracting and purchase

Course Code	EEL404
Type of Course	
Course Title	Numerical Methods and Programming
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To study and understand MATLAB programming CO2: To review mathematical concepts CO3:To develop computer program for linear and nonlinear equations CO4: to study Trapezoidal & Simpson's 1/3rd Rules. CO5: Iterative and Matrix-Factorization methods for system of linear equations. CO6: Finding root by Regula Falsi and Newton-Raphson methods. CO7:Euler, RK4, Predictor-Corrector for 1st order ODE and Finite Difference methods for simple ODE's.

Course Code	EEL405
Type of Course	Elective –II
Course Title	Solid State Devices
Nature of Course	Elective –II
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	CO1: To study construction and characteristics of solid state devices CO2: To apply operational amplifier models in circuits employing negative feedback CO3: To design electronics circuit using Timer IC and voltage regulators CO4: To perform analysis of amplifiers using small signal models forthe circuit elements CO5: To calculate the frequency response of circuits containing BJT,Op-Amp etc.

Course Code	EEL405
Type of Course	Elective –II
Course Title	Analog and Digital electronics
Nature of Course	Elective –II
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	CO1: To review basic number system CO2: To understand deign and characteristics of digital logic gates CO3: To study different techniques in use of digital circuits CO4: To design digital systems

Course Code	EEL405
Type of Course	Elective –II
Course Title	Electromagnetic Theory
Nature of Course	Elective –II
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	CO1: Should be able to specify the "constitutive relationships" for fields and understand why they are required. CO2: Have an ability to determine and describe static and dynamic electric and magnetic fields for technologically important structures: the coil, charge distributions, the dipole, the coaxial cable, dielectric and conducting spheres immersed in electric fields. CO3: Knowledge of, physical interpretation, and ability to apply Maxwell's equations to determine field waves, potential waves, energy and charge conservation conditions CO4: Experimental measurement of voltages induced by time varyingmagnetic flux. Flux determination CO5: A knowledge of and experimental measurement of the influence of boundaries on waves. Thus, knowledge of and the application of boundary conditions for fields, Brewster's angle to eliminate reflections and polarize radiation, total reflection from a boundary, evanescent fields, and some knowledge of their application to modernoptic

Course Code	EEL406
Type of Course	Elective –III
Course Title	Industrial safety
Nature of Course	Elective –III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To understand importance of safety in industrial environment CO2: To understand different safety procedures in an industrial environment

Course Code	EEL406
Type of Course	Elective –III
Course Title	Introduction to Non-Conventional energy sources
Nature of Course	Elective –III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Know the need of renewable energy resources and Describe the environmental aspects of non-conventional energy resources. In Comparison with various conventional energy systems, their prospects and limitations. CO2: Describe the use of solar energy and the various components used in the energy production with respect to applications like - heating, cooling, desalination, power generation, drying, cooking etc. CO3: Appreciate the need of Wind Energy and the various components used in energy generation and know the classifications CO4: Understand the concept of Biomass energy resources and their classification, types of biogas Plants- applications CO5: Compare Solar, Wind and bio energy systems, their prospects, Advantages and limitations. CO6: Acquire the knowledge of fuel cells, wave power, tidal power and geothermal principles and applications.

Course Code	EEL406
Type of Course	Elective –III
Course Title	Software Techniques
Nature of Course	Elective –III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To understand different techniques of software models CO2: To understand verification and validation of software CO3: To analyze software project management

Course Code	EEP408
Type of Course	
Course Title	Electrical Machine-I Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Apply and Deduce the principles of Electrical Machines through laboratory experimental work CO2: Acquire hands on experience of conducting various tests on dc machines and obtaining their performance indices using standard analytical as well as graphical methods. CO3: Acquire hands on experience of conducting various tests on transformers and obtaining their performance indices using standard analytical as well as graphical methods. CO4: Demonstrate the starting & speed control of various AC & DC motors

Course Code	EEP409
Type of Course	
Course Title	Numerical Methods and Programming Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Obtain numerical solution of various engineering methods CO2: Apply Numerical analysis which has enormous application in the field of Science and some fields of Engineering. CO3: Apply numerical integration and differentiation, numerical solution of ordinary differential equations. CO4: Familiar with calculate and interpret errors in numerical method. CO5: Familiar with programming with numerical packages like MATLAB

Course Code	EEE410
Type of Course	
Course Title	NSS/NCC/Sports/ Arts
Nature of Course	
Weekly Teaching Hours	L-T-P:0-0-0
Credits	
Course Outcomes	CO1: Create awareness in social issues and Participate in mass education program. CO2: To inoculate the team work and leadership CO3: To build the qualities for nationality and good citizens CO4: To aware the students about different social activities CO5: To learn and practice the NCC and values and ethics CO6: Create environmental awareness. CO7: Participate in relief and rehabilitation work during natural calamities.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road, Aurangabad - 431010 (M.S.)
NAAC Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

THIRD YEAR FIFTH SEMESTER

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY LONERE.

ELECTRICAL ENGINEERING DEPARTMENT

Structure and syllabus

Of

Third year B. Tech. Electrical Engineering / Electrical Engineering (Electronics and Power)/ Electrical & Electronics Engg / Electrical & Power Engineering

With effect from January 2019

Teaching & Evaluation scheme of Third year B. Tech. Electrical Engineering / Electrical Engineering (Electronics and Power)/ Electrical & Electronics Engg / Electrical & Power Engg .

V Semester

Course Code	Course Name	Teaching Scheme			Evaluation Scheme				
		L	P	T	Int	MSE	ESE	Total	Credits
BTEEC501	Electrical Machine-II	3	0	1	20	20	60	100	4
BTEEC502	Power System-II	3	0	1	20	20	60	100	4
BTEEL503	Microprocessor and micro Controller	3	0	0	20	20	60	100	3
BTHM504	Value Education, Human Rights and Legislative Procedures [MOOC/Swayam/NPTEL]	2	0	0	-	-	-	Audit course	0
BTEEE505	Elective-IV	3	0	0	20	20	60	100	3
BTEEOE506	Elective-V	3	0	0	20	20	60	100	3
BTEEL507	Electrical Machine-II Lab	0	4	0	60	-	40	100	2
BTEEL508	Power System-II Lab	0	2	0	30	-	20	50	1
BTEEL509	Microprocessor and micro Controller Lab	0	2	0	30	-	20	50	1
BTEEF510	Industrial Training	-	-	-	50	-	-	50	1
	Total	17	08	02	270	100	380	750	22

Elective- IV: 1.Illumination engineering 2. Advances in Renewable Energy Sources. 3. Testing and Maintenance of Electrical equipment.
Elective-V: 1.Electrical Mobility. 2 Power Plant Engineering. 3. Design and Analysis of Algorithms

Course Code	BTEEC501
Type of Course	
Course Title	Electrical Machine-II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Acquire knowledge about the constructional details and principle of operation of alternators and induction motors CO2: Understand the types of winding, generation of EMF of synchronous machine and different types of harmonics produced and its mitigation. CO3: Analysis of the steady state operation of 3-ph synchronous machines using different voltage Regulation methods & slip test, Understand and analyze parallel operation of synchronous machine and to Examine the Synchronous machine on infinite bus, synchronous motor operation with variable excitation & load. CO4: Acquire knowledge about the constructional details and principle of operation of three phase induction motor, to have knowledge about the starting and speed control of induction motors and to know about testing and applications of induction motors. CO5: understand the fractional kilowatt motors and the double field revolving theory CO6: Understand special motors like Repulsion, Hysteresis, Reluctance, Universal and BLDC motors

Course Code	BTEEC502
Type of Course	
Course Title	Power System-II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Apply the concept of per unit system and symmetrical components to analysis of different kinds of faults in interconnected power systems. CO2: Understand methods available for analysis of load flow problem and develop software for solution of the same. CO3: To study the dynamics of power system, i.e. steady state dynamics and transient state dynamics. CO4: To provide knowledge of load density calculation in an area and forecasting of load in advance using different methods CO5: to study different methods of reactive power control and its application in power system

Course Code	BTEEL503
Type of Course	
Course Title	Microprocessor and micro Controller
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1:To introduce students with the architecture and operation of typical microprocessors and microcontrollers. CO2:Work with standard microprocessor real time interfaces including GPIO, serial ports, digital-to-analog converters and analog-to-digital converters CO3: To familiarize the students with the programming and interfacing of microprocessors and microcontrollers. CO4: To write assembly language program in microcontroller 8051 for various applications. CO5: distinguish and analyze the properties of Microprocessors & Microcontrollers. analyze the data transfer information through serial & parallel ports. CO6: illustrate how the different peripherals (8255, 8253 etc.) are interfaced withMicroprocessor.

Course Code	BTHM504
Type of Course	
Course Title	Value Education, Human Rights and Legislative Procedures
	[MOOC/Swayam/NPTEL]
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	Audit
Course Outcomes	CO1: To acquaint students with the core competencies related with values, knowledge of Human rights and Law in general. CO2: The curriculum intends to familiarize student's personality development and the prosodic features like human rights and legislation CO3: to acquaint the students in order to make them civilize and act accordingly in the professional work environment CO4: Understand the ideas of values, ethics, patriotism and morality in a multicultural context CO5: Understand how universal values can be uncovered by different means, including scientific investigation, historical research, or public debate and deliberation CO6: To familiarize the students with the legislative procedures

Course Code	BTEEE505
Type of Course	Elective-IV
Course Title	Advances in Renewable Energy Sources
Nature of Course	Elective-IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Students would be able to Describe the various renewable energy sources and the possible conversion paths to a useful form of energy CO2: Students would be able describe how biomass is currently used as a source of energy, its future potential both in providing energy and in producing alternative fuels. CO3: Students would be able to Explain the physical principles of wave energy, the generation of tides and how to harness their power; describe the physics of geothermal resources, the thermal gradient and heat flow in sedimentary basins. CO4: Students would be able to understand the ecosystem, biodiversity and the food chains, also the impact of the pollution on it. The need to conserve it CO5: Learn about the energy and environment, air pollution climate changes and its impacts on sustainable development CO6: Will have a good understanding of national and international regulations and framework conditions for renewable energy systems. This also includes different price models and actions.

Course Code	BTEEOE506
Type of Course	Elective-V
Course Title	Power Plant Engineering
Nature of Course	Elective-V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: the students would be able to Describe and analyze different types of sources and mathematical expressions related to thermodynamics and various terms and factors involved with power plant operation. CO2: the students would be able to Analyze the working and layout of steam power plants and the Nuclear Power plants and learn the different systems comprising the plant and discuss about its economic and safety impacts CO3: the students would be able to Discuss the working principle and basic components of the hydro electric plants and the economic principles and safety precautions involved with it CO4: Combine concepts of previously learnt courses to define the working principle of diesel power plant, its layout, safety principles and compare it with plants of other types. CO5: the students would be able to understand the concept of integrated generation that is combined working of power plants and also the economics of the combined generation CO6: the students would be able to understand the interconnected generation and their interfacing with the grid. Concepts of parallel operation and load sharing

Course Code	BTEEL507
Type of Course	
Course Title	Electrical Machine-II Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-4
Credits	2
Course Outcomes	CO1: Identify relevant information to supplement to the Electric Machine II CO2.Set up testing strategies and select proper instruments to evaluate performance characteristics of electrical machines . Develop testing and experiment al procedures on different types of electrical machines and Analyze their operation under different loading conditions. CO3. Estimate constraints, uncertainties and risks of the system (social, environmental, business, safety issues etc.). Combine an understanding of the established principles, theories, concepts and terminology relevant to electrical machines with practical laboratory experimentation; CO4. Prepare professional quality textual and graphical presentations of laboratory data and, incorporating accepted data analysis .

Course Code	BTEEL508
Type of Course	
Course Title	Power System-II Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Identify different types of over current (directional/non-directional) relays and their characteristics. CO2: Explain the working of percentage differential relay used for protection of various power apparatus. CO3: Describe constructional features and working principle of voltage relays. CO4: Implement the AC load flow analysis to different power systems for their state estimation. CO5: Use the DC load flow analysis for approximate state estimation of different power systems. CO6: Schedule the economic load dispatch method to power plant fortotal cost optimization through optimum use of plant capacity.

Course Code	BTEEL509
Type of Course	
Course Title	Microprocessor and micro Controller Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: At the end of the course, a student will be able to Identify relevant information to supplement to the Microprocessor and Microcontroller course.. CO2: Set up programming strategies and select proper mnemonics and run their program on the training boards CO3: Practice different types of programming keeping in mind technical issues and evaluate possible causes of discrepancy in practical experimental observations in comparison CO4:Develop testing and experimental procedures on Microprocessorand Microcontroller analyze their operation under different cases CO5: Prepare professional quality textual and computational results, incorporating accepted data analysis and synthesis methods, simulation software, and word processing tools. CO6: Primarily via team based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.

Course Code	BTEEF510
Type of Course	
Course Title	Industrial Training
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-0
Credits	1
Course Outcomes	CO1: To get oriented with industrial culture CO2: to study and understand the vision and mission of industry CO3: To know the process and methodologies of production. CO4: to study the strategies for marketing and HR CO5: to understand the HR policies and selection of candidates CO6: To work with industrial staff at administrative commercial andeconomic forums.

THIRD YEAR SIXTH SEMESTER

VI semester

Course Code	Course Name	Teaching Scheme			Evaluation Scheme				
		L	P	T	Int	MSE	ESE	Total	Credits
BTEEC601	Control System	3	0	1	20	20	60	100	4
BTEEC602	Principles of Electrical Machine Design	3	0	0	20	20	60	100	3
BTEEC603	Power Electronics	3	0	1	20	20	60	100	4
BTEEE604	Elective-VI	3	0	0	20	20	60	100	3
BTEEC605	Elective-VII	3	0	0	20	20	60	100	3
BTEEOE606	Elective-VIII [MOOC/Swayam/NPTEL]	3	0	0	20	20	60	100	3
BTEEL607	Control System- Lab	0	2	0	30	-	20	50	1
BTEEL608	Principles of Electrical Machine Design Lab	0	2	0	30	-	20	50	1
BTEEL609	Power Electronics Lab	0	4	0	60	-	40	100	2
	Total	18	08	02	240	120	440	800	24

Elective-VI Industrial automation and Control 2. Design of Experiments 3. Artificial neural network.
Elective-VII 1. Switch Gear and Protection 2. Computer aided analysis and design 3. Mechatronics
Elective- VIII. 1. Rural Technology and Community Development. 2. Project Management 3. Knowledge Management

Course Code	BTEEC601
Type of Course	
Course Title	Control System
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Code	BTEEC602
Type of Course	
Course Title	Principles of Electrical Machine Design
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understanding of the design of electrical machines with particular reference to magnetic, electric, mechanical and thermal design. CO2: Understanding the designer qualities, factors of design, limitations. CO3: An iterative design process resulting in a machine capable of meeting a desired performance point. CO4: Ability to understand, analyze and synthesize electrical machine to meet a given specification. CO5: Problem solving, computer literacy, report writing of a givenspecific electrical machine. CO6: Convert the generic design procedures into computer aided methodologies

Course Code	BTEEC603
Type of Course	
Course Title	Power Electronics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Relate basic semiconductor physics to properties of power devices, and combine circuit mathematics and characteristics of linear and non-linear device CO2: Ability to analyze various single phase and three phase power converter circuits and understand their applications. CO3: Foster ability to identify basic requirements for power electronics based design application. CO4: To develop skills to build, and troubleshoot power electronics circuits. CO5: Foster ability to understand the use of power converters in commercial and industrial applications. CO6: Identify the critical areas in application levels and derive typical alternative solutions, select suitable power converters to control Electrical Motors and other industry grade apparatus

Course Code	BTEEE604
Type of Course	Elective-VI
Course Title	Industrial automation and Control
Nature of Course	Elective-VI
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: The student will be equipped with basic skills useful in identifying the concepts of automated machines and equipment and describe the terms and phrases associated with industrial automation CO2: The student will able to measure different physical quantitiesand identify different errors in measuring instruments and do itscalibration. CO3: Explain the basic principles & importance of process control in industrial process plants. CO4: Specify the required instrumentation and final elements to ensure that well-tuned control is achieved; tuning of PID controller CO5: Explain the importance and application of good instrumentationfor the efficient design of process control loops for processengineering plants. CO6: Student will able to design a suitable scheme of speed control for the traction systems.

Course Code	BTEEC605
Type of Course	Elective-VII
Course Title	Switch Gear and Protection
Nature of Course	Elective-VII
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Acquire the knowledge of various abnormal conditions that could occur in power CO2: To understand different protection schemes used in power system operation CO3: to understand digital and numerical protection, its construction and working and different methods of digital protection CO4: Knowledge of various conventional relays, their design and latest developments. CO5: Knowledge of various types of existing circuit breakers, theirdesign and constructional details. CO6: Elucidate various protection schemes of various power system components like alternators, transformers and bus-bars.

Course Code	BTEEOE606
Type of Course	Elective-VIII [MOOC/Swayam/NPTEL]
Course Title	Project Management
Nature of Course	Elective-VIII [MOOC/Swayam/NPTEL]
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To understand concepts of project management. CO2: To develop a project plan. CO3: To understand the project implementation strategy. CO4: To analyze post project affects.

Course Code	BTEEL607
Type of Course	
Course Title	Control System- Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: At the end of the course, a student will be able to: Discuss the need of software tools (MATLAB, PSPICE) to illustrate modeling and simulation of any system. CO2: Classify and evaluate the performance parameters of a system and then with simulation prepare an advance tool to modify the values of the parameter of the system in order to meet the desired need. CO3: Prepare professionals in laboratory to compute or to predict the characteristics of a system by visualizing experimental data and its graphical representation CO4: Evaluate possible causes of discrepancy in practical experimental observations in comparison to theory by introducing the concepts of different stability theorems. CO5: Primarily via team based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will develop the ability to divide up and share task responsibilities to complete assignments CO6:Develop professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software, and word processing tools.

Course Code	BTEEL608
Type of Course	
Course Title	Principles of Electrical Machine Design Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: To be aware of the symbols that are used in Electrical machines CO2: Calculate main dimensions and Design parameters of single phase and three phase transformer with visualization of the transformer in AutoCAD CO3: Determine the parameters of transformer along with the understanding of computer aided machine design CO4: Calculate main dimensions and winding design parameter of three phase Induction motor along with development of the winding diagram in AutoCAD CO5: to calculate and design Lap and wave winding

Course Code	BTEEL609
Type of Course	
Course Title	Power Electronics Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-4
Credits	2
Course Outcomes	At the end of the course, a student will be able to: CO1: Identify relevant information to supplement to the Power Electronics (EE603) course. CO2: Set up testing strategies and select proper instruments to evaluate performance characteristics of Power devices and power electronics circuits and analyze their operation under different loading conditions. CO3: Practice different types of wiring and devices connections keeping in mind technical, economical, safety issues. CO4: Realize the limitations of computer simulations for verification of circuit behavior, apply these techniques to different power electronic circuits and evaluate possible causes of discrepancy in practical experimental observations in comparison to theory. CO5: Prepare professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software, and word processing tools. CO6: Primarily via team-based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road, Aurangabad - 431010 (M.S.)
NAAC Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

FOURTH YEAR SEVENTH SEMESTER

Dr. Babasaheb Ambedkar Technological University, Lonere.

Dr. Babasaheb Ambedkar Technological University
(Established as a University of Technology in the State of Maharashtra)
(under Maharashtra Act No. XXIX of 2014)
P.O. Lonere, Dist. Raigad, Pin 402 103, Maharashtra
Telephone and Fax. : 02140 -275142
www.dbatu.ac.in

COURSE STRUCTURE AND SYLLABUS

For

Final Year B. Tech. Electrical Engineering / Electrical Engineering (Electronics and Power)/ Electrical & Electronics Engg / Electrical & Power Engineering

With effect from the Academic Year 2020-2021(Final Year)

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road, Aurangabad - 431010 (M.S.)
NAAC Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

Dr. Babasaheb Ambedkar Technological University, Lonere.

B.Tech (Electrical Engineering / Electrical Engineering (Electronics and Power)/ Electrical & Electronics Engg / Electrical & Power Engineering)

Curriculum for Semester VII [Final Year]

Sr. No.	Course Code	Type of Course	Course Title	Hours per week			Evaluation Scheme			Total Marks	Credits
				L	T	P	MSE	CA	ESE		
1	BTEEC701	PCC1	Power System Operation & Control	3	0	0	20	20	60	100	3
2	BTEEC702	PCC2	High Voltage Engineering	3	0	0	20	20	60	100	3
3	BTEEC703	PCC3	Electrical Drives	3	0	0	20	20	60	100	3
4	BTEEE704	PEC1	Elective-IX	3	0	0	20	20	60	100	3
5	BTEEE705	PEC2	Elective-X	3	0	0	20	20	60	100	3
6	BTEEL706	Lab	Power System Operation & Control Lab	0	0	2	--	30	20	50	1
7	BTEEL707	Lab	High Voltage Engineering Lab	0	0	2	--	30	20	50	1
8	BTEEL708	Lab	Electrical Drives Lab	0	0	2	--	30	20	50	1
9	BTEES709	Seminar	Seminar	0	0	2	--	30	20	50	1
10	BTEEP710	Project	Project Part-I	0	0	6	--	30	20	50	3
11	BTEEF711	--	Field Training /Internship/Industrial Training III	--	--	--	--	--	50	50	1
			Total	15	0	14	100	250	450	800	23

Elective-IX	Elective-X
A) Special Purpose Electrical Machines	A) Digital Signal Processing
B) Electrical Traction and Utilization	B) Energy Audit and Conservation
C) Engineering System Design and Optimization	C) Electrical Power Quality
D) Financial Management	D) HVDC Transmission and FACTS

Course Code	BTEEC701
Type of Course	PCC1
Course Title	Power System Operation & Control
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Explain the fundamental concept of power system CO2: Design the mathematical model of synchronous machine CO3: Design the mathematical model Excitation system and speed governing system CO4: Analyze the transient stability of power system using swingequation and equal area criteria CO5: Analyze the economic operation of power system CO6: Explain the methods of Voltage control

Course Code	BTEEC702
Type of Course	PCC2
Course Title	High Voltage Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: 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 CO2: Explain the breakdown process in solid, liquid, and gaseous materials CO3: Analyze methods for generation and measurement of High Voltages and Currents (both ac and dc) CO4: Describe the phenomenon of over-voltage and choose appropriate insulation coordination levels based on IS & IEC Standards

Course Code	BTEEC703
Type of Course	PCC3
Course Title	Electrical Drives
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Analyze the dynamics of Electrical Drives system. CO2: Use various control techniques for controlling the speed of ACand DC motors CO3: Analyze the AC and DC drives CO4: To Select/recommend the appropriate Drive according to the particular applications CO5: State the recent technology of AC and DC drive

Course Code	BTEEC704
Type of Course	PEC1
Course Title	Special Purpose Electrical Machines
Nature of Course	Elective-IX
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Demonstrate construction, working principle, and applicationof various types of special purpose electrical machines CO2: Select a special Machine for a particular application CO3: Demonstrate behaviour of induction generator and inductionmachine:

Course Code	BTEEC704
Type of Course	PEC1
Course Title	Electrical Traction and Utilization
Nature of Course	Elective-IX
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	At the end of the course, a student will be able to CO1: 1. Illustrate working principle electric power utilization and their application in real life. CO2: Identify types of Traction System. Choose proper traction systems depending upon application considering economic and technology up-gradation. CO3:Employ mathematical and graphical analysis considering different practical issues to design of traction system; analyze the performance parameter of the traction system CO4: Interpret Various Power supply in Electric Traction and Analyze Various Traction Motors Define methods of Traction motor Control CO5: Elobrate Train movement & Breaking in Traction system CO6: Classify the indoor and outdoor Illumination system

Course Code	BTEEC704
Type of Course	PEC1
Course Title	Engineering System Design and Optimization
Nature of Course	Elective-IX
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To understand different level optimization problem formulation CO2: To study novel methods in optimization CO3: To understand and develop genetic algorithm for engineering problems

Course Code	BTEEC704
Type of Course	PEC1
Course Title	Financial Management
Nature of Course	Elective-IX
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: The students would be able to understand and define basic terminology used in finance and accounts CO2: The students would be able to prepare& appraise Financial Statements and evaluate a company in the light of different measurement systems CO3: The students would be able to analyze the risk and return of alternative sources of financing CO4: Estimate cash flows from a project, including operating, net working capital, and capital spending CO5: To estimate the required return on projects of differing risk ,to estimate the cash flows from an investment project, calculate the appropriate discount rate, determine the value added from the project, and make a recommendation to accept or reject the project CO6: To describe and illustrate the important elements in project finance Using financial calculator and Excel in a variety of problems

Course Code	BTEEC705
Type of Course	PEC2
Course Title	Digital Signal Processing
Nature of Course	Elective-X
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Represent signals, systems and digital processing of analog signals CO2: Represent discrete time signals, systems and analysis of Discrete-Time Linear Time- Invariant Systems CO3: Apply digital signal processing techniques to analyze discrete time signals in time domain CO4: Apply digital signal processing techniques to analyze discrete time signals in frequency domain CO5: Design different filter structure CO6: Validate system functionality and evaluate results

Course Code	BTEEC705
Type of Course	PEC2
Course Title	Energy Audit and Conservation
Nature of Course	Elective-X
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To recognize Global Environmental Issues and Role of Renewable & non-conventional energy sources CO2: To estimate Energy efficiency opportunities in Thermal-Mechanical Systems and Electrical System CO3: To analyze Energy Conservation Proposals economically and prepare audit reports

Course Code	BTEEC705
Type of Course	PEC2
Course Title	Electrical Power Quality
Nature of Course	Elective-X
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Student will be able to get the in-depth understanding of power quality issues & standards CO2: Students will be able to understand working of power quality improving Equipment's

Course Code	BTEEC705
Type of Course	PEC2
Course Title	HVDC Transmission and FACTS
Nature of Course	Elective-X
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To understand importance, configuration and types of HVDCtransmission CO2: To analyst the operation of HVDC converter, system controland protection CO3: To understand the concept of FACTS, their role, type and functionality CO4: To analyze the operation of static series and shunt compensator

COURSE OUTCOMES: Electronics & Telecommunication Engineering COURSES [UG]

Dr. Babasaheb Ambedkar Technological University, Lonere.

Dr. Babasaheb Ambedkar Technological University
(Established as a University of Technology in the State of Maharashtra)
(under Maharashtra Act No. XXIX of 2014)
P.O. Lonere, Dist. Raigad, Pin 402 103, Maharashtra
Telephone and Fax. : 02140 - 275142
www.dbatu.ac.in

COURSE STRUCTURE AND SYLLABUS

For

B. Tech. Electronics and Telecommunication Engineering Programme

With effect from the Academic Year

2017-2018 (First Year), 2018-2019 (Second Year),
2019-2020 (Third Year), 2020-2021 (Final Year).

SECOND YEAR THIRD SEMESTER

Course Code	BTBSC301
Type of Course	
Course Title	Engineering Mathematics-III
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Solve higher order linear differential equation using appropriate techniques for modeling and analyzing electrical circuits. CO2: Solve problems related to Fourier transform, Laplace transform and applications to Communication systems and Signal processing. CO3: Obtain Interpolating polynomials, numerically differentiate and integrate functions, numerical solutions of differential equations using single stepand multi-step iterative methods used in modern scientific computing. CO4: Perform vector differentiation and integration, analyze thevector fields and apply to Electromagnetic fields. CO5: Analyze conformal mappings, transformations and perform contour integration of complex functions in the study of electrostatics and signal processing.

Course Code	BTEXC302
Type of Course	
Course Title	Analog Circuits
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand the characteristics of IC and Op-Amp andidentify the internal structure. CO2: Understand and identify various manufacturing techniques. CO3: Derive and determine various performances based parameters and their significance for Op-Amp. CO4: Comply and verify parameters after exciting IC by anystated method. CO5: Analyze and identify the closed loop stability considerations and I/O limitations. CO6: Analyze and identify linear and nonlinear applications ofOp-Amp. CO7: Understand and verify results (levels of V & I) withhardware implementation. CO8: Implement hardwired circuit to test performance and application for what it is being designed.

Course Code	BTEXC303
Type of Course	
Course Title	Electronic Devices & Circuits
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Comply and verify parameters after exciting devices byany stated method. CO2: Implement circuit and test the performance. CO3: Analyze small signal model of FET and MOSFET. CO4: Explain behavior of FET at low frequency. CO5: Design an adjustable voltage regulator circuits.

Course Code	BTEXC304
Type of Course	
Course Title	Network Analysis
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Apply knowledge of mathematics to solve numerical based on network simplification and it will be used to analyzethe same. CO2: Design passive filters and attenuators theoretically and practically. To apply knowledge for design of active filters aswell as digital filters and even extend this to advance adaptivefilters. CO3: Identify issues related to transmission of signals, analyze different RLC networks. CO4: Find technology recognition for the benefit of the society.

Course Code	BTEXC305
Type of Course	
Course Title	Digital Logic Design
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Use the basic logic gates and various reduction techniquesof digital logic circuit in detail. CO2: Design combinational and sequential circuits. CO3: Design and implement hardware circuit to test performance and application. CO4: Understand the architecture and use of VHDL for basic operations and Simulate using simulation software.

Course Code	BTHM3401
Type of Course	
Course Title	Basic Human Rights
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	Audit
Course Outcomes	CO1: Simply put, human rights education is all learning that develops the knowledge, skills, and values of human rights. CO2: Strengthen the respect for human rights and fundamental freedoms. CO3: Enable all persons to participate effectively in a freesociety. CO4: Learn about human rights principles, such as the universality, indivisibility, and interdependence of human rights. CO5: Learn about regional, national, state, and local law that reinforces international human rights law. CO6: Learn and know about and being able to use global, regional, national, and local human rights instruments and mechanisms for the protection of human rights.

SECOND YEAR FOURTH SEMESTER

Course Code	BTEXC401
Type of Course	
Course Title	Electrical Machines and Instruments
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: The ability to formulate and then analyze the working of any electrical machine using mathematical model under loadedand unloaded conditions. CO2: The skill to analyze the response of any electrical machine. CO3: The ability to troubleshoot the operation of an electrical machine. CO4: The ability to select a suitable measuring instrument for agiven application. CO5: The ability to estimate and correct deviations in measurements due to the influence of the instrument and due to the accuracy of the instrument.

Course Code	BTEXC402
Type of Course	
Course Title	Analog Communication Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand and identify the fundamental concepts and various components of analog communication systems. CO2: Understand the concepts of modulation and demodulation techniques. CO3: Design circuits to generate modulated and demodulated wave. CO4: Equip students with various issues related to analog communication such as modulation, demodulation, transmittersand receivers and noise performance. CO5: Understand the concepts of modulation and demodulation techniques of angle modulation (frequency and phase). CO6: Explain signal to noise ratio, noise figure and noise temperature for single and cascaded stages in a communication system. CO7: Develop the ability to compare and contrast the strengthsand weaknesses of various communication systems.

Course Code	BTEXC403
Type of Course	
Course Title	Microprocessor
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Learner gains ability to apply knowledge of engineering in designing different case studies. CO2: Students get ability to conduct experiments based on interfacing of devices to or interfacing to real world applications. CO3: Students get ability to interface mechanical system to function in multidisciplinary system like in robotics, Automobiles. CO4: Students can identify and formulate control and monitoring systems using microprocessors. CO5: Students will design cost effective real time system to serve engineering solution for Global, social and economic context. CO6: This course understanding will enforce students to acquire knowledge of recent trends like superscalar and pipelining and thus finds recognition of continuous updation. CO7: Learn use of hardware and software tools. CO8: Develop interfacing to real world devices.

Course Code	BTEXC404
Type of Course	
Course Title	Signals and Systems
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand mathematical description and representation of continuous and discrete time signals and systems. CO2: Develop input output relationship for linear shift invariant system and understand the convolution operator for continuous and discrete time system. CO3: Understand and resolve the signals in frequency domainusing Fourier series and Fourier transforms. CO4: Understand the limitations of Fourier transform and needfor Laplace transform and develop the ability to analyze the system in s- domain. CO5: Understand the basic concept of probability, random variables & random signals and develop the ability to findcorrelation, CDF, PDF and probability of a given event.

Course Code	BTID405
Type of Course	
Course Title	Product Design Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:1-0-2
Credits	2
Course Outcomes	CO1: Create simple mechanical or other designs CO2: Create design documents for knowledge sharing CO3: Manage own work to meet design requirements CO4: Work effectively with colleagues.

Course Code	BTBSC406
Type of Course	
Course Title	Numerical Methods and Computer Programming
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Able to solve algebraic and transcendental equations by using numerical techniques and will be able to compare different numerical techniques used for this purpose and alsowill be able to choose a proper one as per the requirement ofthe problem. CO2: Able to solve a system of linear equations with any number of variables using different direct and iterative numerical techniques. CO3: Understand the concept of interpolation, finite difference operators and their relations, and can apply different interpolation techniques on equi-spaced or non equi-spaced data values. CO4: Prepare them to write computer programs for the numerical computational techniques. CO5: Understand application of the NMCP course in many engineering core subjects like signal processing, digital communication, numerical techniques in electromagneticsetc. CO6: Understand procedure-oriented and object oriented programming concepts. CO7: Capable of writing C and C++ programs efficiently.

THIRD YEAR FIFTH SEMESTER

Course Code	BTEXC501
Type of Course	Professional Core Course 1
Course Title	Electromagnetic Field Theory
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand characteristics and wave propagation on high frequency transmission lines CO2: Carryout impedance transformation on TL CO3: Use sections of transmission line sections for realizingcircuit elements CO4: Characterize uniform plane wave CO5: Calculate reflection and transmission of waves at mediainterface CO6: Analyze wave propagation on metallic waveguides inmodal form CO7: Understand principle of radiation and radiation characteristics of an antenna

Course Code	BTEXC502
Type of Course	Professional Core Course 2
Course Title	Control System Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the modeling of linear-time-invariant systems using transfer function and state-space representations. CO2: Understand the concept of stability and its assessment for linear-time invariant systems. CO3: Design simple feedback controllers.

Course Code	BTETC503
Type of Course	Professional Core Course 3
Course Title	Computer Architecture
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: learn how computers work CO2: know basic principles of computers working CO3: analyze the performance of computers CO4: know how computers are designed and built CO5: Understand issues affecting modern processors (caches, pipelines etc.).

Course Code	BTEXC504
Type of Course	Professional Core Course 4
Course Title	Digital Signal Processing
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand use of different transforms and analyze the discrete time signals and systems. CO2: Realize the use of LTI filters for filtering different realworld signals. CO3: Capable of calibrating and resolving different frequencies existing in any signal. CO4: Design and implement multistage sampling rate converter. CO5: Design of different types of digital filters for various applications.

Course Code	BTEXC505
Type of Course	BTEXC505 Professional Core Course 5
Course Title	Microcontroller and its Applications
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner gains ability to apply knowledge of engineering in designing different case studies. CO2: Students get ability to conduct experiments based on interfacing of devices to or interfacing to real world applications. CO3: Graduates will be able to design real time controllers using microcontroller based system. CO4: Students get ability to interface mechanical system to function in multidisciplinary system like in robotics, Automobiles. CO5: Students can identify and formulate control and monitoring systems using microcontrollers. CO6: Students will design cost effective real time system to serve engineering solution for Global, social and economic context. CO7: Learners get acquainted with modern tools like Programmers, Debuggers, cross compilers and current IDE i.e.integrated development environment tools. CO8: Learn importance of microcontroller in designing embedded application. CO9: Learn use of hardware and software tools. CO10: Develop interfacing to real world devices.

Course Code	BTEXPE506A
Type of Course	Program Elective Course 1
Course Title	Probability Theory and Random Processes
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand representation of random signals CO2: Investigate characteristics of random processes CO3: Make use of theorems related to random signals CO4: To understand propagation of random signals in LTIsystems.

Course Code	BTEXPE506C
Type of Course	Program Elective Course 1
Course Title	Data Structure & Algorithms Using Java Programming
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To impart the basic concepts of data structures andalgorithms. CO2: To understand concepts about searching and sorting techniques CO3: Describe how arrays, records, linked structures are represented in memory and use them in algorithms. CO4: To understand basic concepts about stacks, queues, liststrees and graphs. CO5: To enable them to write algorithms for solving problemswith the help of fundamental data structures.

Course Code	BTEXPE506D
Type of Course	Program Elective Course 1
Course Title	Introduction to MEMS
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Appreciate the underlying working principles of MEMSand NEMS devices. CO2: Design and model MEM devices.

THIRD YEAR SIXTH SEMESTER

Course Code	BTETC601
Type of Course	Professional Core Course 1
Course Title	Antennas and Wave Propagation
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Formulate the wave equation and solve it for uniformplane wave. CO2: Analyze the given wire antenna and its radiationcharacteristics. CO3: Identify the suitable antenna for a given communicationsystem.

Course Code	BTETC602
Type of Course	Professional Core Course 2
Course Title	Computer Network & Cloud Computing
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To master the terminology and concepts of the OSI reference model and the TCP-IP reference model. CO2: To master the concepts of protocols, network interfaces, and design/performance issues in local area networks and widearea networks. CO3: To be familiar with wireless networking concepts. CO4: To be familiar with contemporary issues in networking technologies. CO5: To be familiar with network tools and network programming. CO6: For a given requirement (small scale) of wide-area networks (WANs), local area networks (LANs) and WirelessLANs (WLANs) design it based on the market available component. CO7: For a given problem related TCP/IP protocol developedthe network programming. CO8: Configure DNS DDNS, TELNET, EMAIL, File Transfer Protocol (FTP), WWW, HTTP, SNMP, Bluetooth, Firewalls using open source available software and tools.

Course Code	BTETC603
Type of Course	Professional Core
	Course 3
Course Title	Digital Image Processing
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Review the fundamental concepts of digital imageprocessing system. CO2: Analyze images in the frequency domain using various transforms. CO3: Categories various compression techniques. CO4: Interpret image segmentation and representation techniques.

Course Code	BTETPE604A
Type of Course	Program Elective Course 2
Course Title	CMOS Design
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Design different CMOS circuits using various logicfamilies along with their circuit layout. CO2: Use tools for VLSI IC design.

Course Code	BTETPE604B
Type of Course	Program Elective Course 2
Course Title	Information Theory and Coding
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the concept of information and entropy CO2: Understand Shannon's theorem for coding CO3: Calculation of channel capacity CO4: Apply coding techniques

Course Code	BTETPE604C
Type of Course	Program Elective Course 2
Course Title	Power Electronics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Build and test circuits using power devices such as SCR CO2: Analyze and design controlled rectifier, DC to DCconverters, DC to AC inverters, CO3: Learn how to analyze these inverters and some basic applications. CO4: Design SMPS.

Course Code	BTETPE604D
Type of Course	Program Elective Course 2
Course Title	Nano Electronics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand various aspects of nano-technology and the processes involved in making nano components and material.CO2: Leverage advantages of the nano-materials and appropriate use in solving practical problems. CO3: Understand various aspects of nano-technology and the processes involved in making nano components and material.CO4: Leverage advantages of the nano-materials and appropriate use in solving practical problems.

Course Code	BTETPE604D
Type of Course	Program Elective Course 2
Course Title	Nano Electronics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand various aspects of nano-technology and the processes involved in making nano components and material.CO2: Leverage advantages of the nano-materials and appropriate use in solving practical problems. CO3: Understand various aspects of nano-technology and the processes involved in making nano components and material. CO4: Leverage advantages of the nano-materials and appropriate use in solving practical problems

Course Code	BTETPE604F
Type of Course	Program Elective Course 2
Course Title	Android Programming
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: At the end of the course, students will demonstrate the ability to write simple GUI applications, use built-in widgetsand components, work with the database to store data locally, and much more.

Course Code	BTETOE605A
Type of Course	Open Elective Course 1
Course Title	Digital System Design
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Design and analyze combinational logic circuits CO2: Design & analyze modular combinational circuits with MUX/DEMUX, Decoder, Encoder CO3: Design & analyze synchronous sequential logic circuits CO4: Use HDL & appropriate EDA tools for digital logic designand simulation.

Course Code	BTETOE605B
Type of Course	Open Elective Course 1
Course Title	Optimization Techniques
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: After completion of this course students will be able to cast engineering minima/maxima problems into optimization framework CO2: Learn efficient computational procedures to solve optimization problems

Course Code	BTETOE605C
Type of Course	Open Elective Course 1
Course Title	Project Management and Operation Research
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Apply operations research techniques like L.P.P, scheduling and sequencing in industrial optimization problems. CO2: Solve transportation problems using various OR methods. CO3: Illustrate the use of OR tools in a wide range ofapplications in industries. CO4: Analyze various OR models like Inventory, Queing, Replacement, Simulation, Decision etc and apply them for optimization. CO5: Gain knowledge on current topics and advanced techniques of Operations Research for industrial solutions.

Course Code	BTETOE605D
Type of Course	Open Elective Course 1
Course Title	Augmented, Virtual and Mixed Reality
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To develop 3D virtual environments. CO2: To develop 3D interaction techniques and immersive virtual reality applications.

Course Code	BTETOE605E
Type of Course	Open Elective Course 1
Course Title	Python Programming
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Experience with an interpreted Language. CO2: To build software for real needs CO3: Prior Introduction to testing software

Course Code	BTETOE605F
Type of Course	
Course Title	Web Development and Design
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Develop the skill & knowledge of Web page design CO2: Understand the knowhow and can function either as an entrepreneur or can take up jobs in the multimedia and Web site development studio and other information technology sectors.

Course Code	BTHM606
Type of Course	Humanities & Social Science including Management Courses
Course Title	Employability & Skill Development
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: Have skills and preparedness for aptitude tests. CO2: Be equipped with essential communication skills (writing,verbal and non-verbal) CO3: Master the presentation skill and be ready for facinginterviews. CO4: Build team and lead it for problem solving.

FINAL YEAR SEVENTH SEMESTER

Course Code	BTETC701
Type of Course	Professional Core Course 1
Course Title	Digital Communication
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Analyze the performance of a baseband and pass band digital communication system in terms of error rate and spectralefficiency. CO2: Perform the time and frequency domain analysis of the signals in a digital communication system. CO3: Select the blocks in a design of digital communication system. CO4: Analyze Performance of spread spectrum communication system.

Course Code	BTETPE702A
Type of Course	Program Elective 3 (Group A)
Course Title	Microwave Theory and Techniques
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Formulate the wave equation in wave guide for analysis. CO2: Identify the use of microwave components and devices in microwave applications. CO3: Understand the working principles of all the microwave tubes. CO4: Understand the working principles of all the solid state devices. CO5: Choose a suitable microwave tube and solid state device for a particular application. CO6: Carry out the microwave network analysis. CO7: Choose a suitable microwave measurement instruments and carry out the required measurements.

Course Code	BTETPE702B
Type of Course	Program Elective 3 (Group A)
Course Title	RF Circuit Design
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand behavior of passive components at high frequency and modeling of HF circuit. CO2: Design HF amplifiers with gain bandwidth parameters. CO3: Understand Mixer types and characteristics. CO4: Gain the knowledge about PLLs and Oscillators with respect to their circuit topologies.

Course Code	BTETPE702C
Type of Course	Program Elective 3 (Group A)
Course Title	Satellite Communication
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Knowledge of theory and practice related to radar and Satellite communication. CO2: Ability to identify, formulate and solve engineering problems related to radar and Satellite communication CO3: The student would be able to analyze the various aspects of establishing a geo-stationary satellite communication link CO4: Acquired knowledge about Satellite Navigation System CO5: Acquired knowledge about Radar and Radar Equations.

Course Code	BTETPE702D
Type of Course	Program Elective 3 (Group A)
Course Title	Fiber Optic Communication
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the principles fiber-optic communication, the components and the bandwidth advantages CO2: Understand the properties of the optical fibers and optical components. CO3: Understand operation of lasers, LEDs, and detectors. CO4: Analyze system performance of optical communication systems. CO5: Design optical networks and understand non-linear effects in optical fibers.

Course Code	BTETPE702E
Type of Course	Program Elective 3 (Group A)
Course Title	Wireless Sensor Networks
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Design wireless sensor networks for a given application CO2: Understand emerging research areas in the field of sensor networks CO3: Understand MAC protocols used for different communication standards used in WSN CO4: Explore new protocols for WSN.

Course Code	BTETPE702F
Type of Course	Program Elective 3 (Group A)
Course Title	Mobile Computing
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: At the end of the course, the student will be able to demonstrate: CO2: A working understanding of the characteristics and limitations of mobile hardware devices including their user-interface modalities CO3: The ability to develop applications that are mobile-device specific and demonstrate current practice in mobile computing contexts. CO4: A comprehension and appreciation of the design and development of context-aware solutions for mobile devices. CO5: An awareness of professional and ethical issues, in particular those relating to security and privacy of user data and user behaviour

Course Code	BTETPE703A
Type of Course	Program Elective 3 (Group A)
Course Title	Embedded System Design
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Suggest design approach using advanced controllers to real-life situations. CO2: Design interfacing of the systems with other data handling / processing systems. CO3: Appreciate engineering constraints like energy dissipation, data exchange speeds etc CO4: Get to know the hardware – software co design issues and testing methodology for embedded system

Course Code	BTETPE703B
Type of Course	Program Elective 3 (Group A)
Course Title	Artificial Intelligence Deep Learning
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Identify the AI based problems. CO2: Apply techniques to solve the AI problems CO3: Define learning and explain various logic inferences. CO4: Discuss different learning techniques.

Course Code	BTETPE703C
Type of Course	Program Elective 3 (Group A)
Course Title	VLSI Design & Technology
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Model digital circuit with HDL, simulate, synthesis and prototype in PLDs. CO2: Understand chip level issues and need of testability CO3: Design analog & digital CMOS circuits for specified applications

Course Code	BTETPE703D
Type of Course	Program Elective 3 (Group A)
Course Title	Data Compression & Encryption
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: The student will have the knowledge of Plaintext, cipher text, RSA and other cryptographic algorithm. CO2: The student will have the knowledge of Key Distribution, Communication Model, Various models for data compression.

Course Code	BTETPE703E
Type of Course	Program Elective 3 (Group A)
Course Title	Big Data Analytics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Explain the motivation for big data systems and identify the main sources of Big Data in the real world. CO2: Demonstrate an ability to use frameworks like Hadoop, NOSQL to efficiently store retrieve and process Big Data for Analytics. CO3: Implement several Data Intensive tasks using the Map Reduce Paradigm CO4: Apply several newer algorithms for Clustering Classifying and finding associations in Big Data.

Course Code	BTETPE703F
Type of Course	Program Elective 3 (Group A)
Course Title	Cyber Security
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: The difference between threat, risk, attack and vulnerability. CO2: How threats materialize into attacks CO3: Where to find information about threats, vulnerabilities and attacks. CO4: Typical threats, attacks and exploits and the motivations behind them.

Course Code	BTETPE704A
Type of Course	Program Elective 3 (Group A)
Course Title	Consumer Electronics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: List technical specification of electronics Audio system (microphone and speaker) CO2: Trouble shoots consumer electronics products like TV, washing machine and AC. CO3: Identify and explain working of various color TV transmission blocks. CO4: Adjust various controls of color TV receiver and troubleshoot it CO5: Use various functions of Cam coder and shoot a video and take snapshots and save them in appropriate format

Course Code	BTETPE704B
Type of Course	Program Elective 3 (Group A)
Course Title	Analog Integrated Circuit Design
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Describe the models for active devices in MOS and Bipolar IC technologies. CO2: Describe layout considerations for active and passive devices in analog ICs. CO3: Analyze and design IC current sources and voltage references. CO4: Describe the noise sources and models applicable to ICs. CO5: Understand and appreciate the importance of noise and distortion in analog circuits CO6: Analyze integrated circuit noise performance CO7: Analyze and design IC operational amplifiers.

Course Code	BTETPE704C
Type of Course	Program Elective 3 (Group A)
Course Title	Soft Computing
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Use a new tool /tools to solve a wide variety of real world problems. CO2: Find an alternate solution, which may offer more adaptability, resilience and optimization CO3: Identify the suitable antenna for a given communication system. CO4: Gain knowledge of soft computing domain which opens up a whole new career option. CO5: Tackle real world research problems.

Course Code	BTETPE704D
Type of Course	Program Elective 3 (Group A)
Course Title	Advance Industrial Automation-1
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To identify suitable automation hardware for the given application. CO2: To recommend appropriate modeling and simulation tool for the given manufacturing application

Course Code	BTETPE704E
Type of Course	Program Elective 3 (Group A)
Course Title	Mechatronics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Identification of key elements of mechatronics system and its representation in terms of block diagram. CO2: Understanding the concept of signal processing and use of interfacing systems such as ADC, DAC, digital I/O CO3: Interfacing of Sensors, Actuators using appropriate DAQ micro-controller. CO4: Time and Frequency domain analysis of system model (for control application). CO5: PID control implementation on real time systems CO6: Development of PLC ladder programming and implementation of real life system.

Course Code	BTETPE704F
Type of Course	Program Elective 3 (Group A)
Course Title	Electronics in Smart City
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To know about development of Asian cities and story of smart cities in India CO2: To understand the applications of IoT in smart cities development and their advantages CO3: To understand working knowledge of SMART objects used in different IoT based architectures CO4: To distinguish the Interplay between Humans and Smart Devices

Course Code	BTHM705
Type of Course	Humanities and social Science including Management Courses
Course Title	Financial Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: The students would be able to understand and define basic terminology used in finance and accounts CO2: The students would be able to prepare& appraise Financial Statements and evaluate a company in the light of different measurement systems. CO3: The students would be able to analyze the risk and returnof alternative sources of financing. CO4: Estimate cash flows from a project, including operating,net working capital, and capital spending. CO5: To estimate the required return on projects of differing risk ,to estimate the cash flows from an investment project, calculate the appropriate discount rate, determine the value added from the project, and make a recommendation to accept or reject the project CO6: To describe and illustrate the important elements in project finance Using financial calculator and Excel in a variety ofproblems.

COURSE OUTCOMES: Mechanical Engineering

UNDERGRADUATE COURSES [UG]

Dr. Babasaheb Ambedkar Technological University

(Established as a University of Technology in the State of Maharashtra)

(under Maharashtra Act No. XXIX of 2014)

P.O. Lonere, Dist. Raigad,
Pin 402 103, Maharashtra
Telephone and Fax. : 02140 - 275142
www.dbatu.ac.in

Proposed Course Contents for

B. Tech. in Mechanical Engineering

w.e.f. June 2019

From 3rd Semester - 6th Semester

ABBREVIATIONS

PEO: Program Educational Objectives

PO: Program Outcomes

CO: Course Outcomes

L: No. of Lecture hours (per week)

T: No. of Tutorial hours (per week)

P: No. of Practical hours (per week)

C: Total number of credits

BSH: Basic Science and Humanity

BSC: Basic Sciences Course

PCC: Professional Core Course

OEC: Open Elective Course

PEC: Professional Elective Course

BHC: Basic Humanity Course

ESC: Engineering Science Course

HSMC: Humanity Science and Management Course

NCC: National Cadet Corps

NSS: National Service Scheme

CA: Continuous Assessment

MSE: Mid Semester Exam

ESE: End Semester Exam

SECOND YEAR THIRD SEMESTER

B. Tech. Mechanical Engineering

Course Structure for Semester III [Second Year] w.e.f. 2018-2019

Course Code	Type of Course	Course Title	Weekly Teaching Scheme			Evaluation Scheme				Credits
			L	T	P	CA	MSE	ESE	Total	
BTBSC301	BSC 7	Engineering Mathematics-III	3	1	--	20	20	60	100	4
BTMEC302	ESC 11	Materials Science and Metallurgy	3	1	--	20	20	60	100	4
BTMEC303	PCC 1	Fluid Mechanics	3	1	--	20	20	60	100	4
BTMEC304	PCC 2	Machine Drawing and CAD	2	--	--	20	20	60	100	2
BTMEC305	ESC 12	Thermodynamics	3	1	--	20	20	60	100	4
BTHM3401	HSMC 3	Basic Human Rights	2	--	--	50	--	--	50	Audit (AU/ NP)
BTMEL307	ESC 13	Materials Science and Metallurgy Lab	--	--	2	60	--	40	100	1
BTMEL308	PCC 3	Fluid Mechanics Lab	--	--	2	60	--	40	100	1
BTMEL309	PCC 4	Machine Drawing and CAD Lab	--	--	4	60	--	40	100	2
BTMEF310	Project 1	Field Training /Internship/Industrial Training I	--	--	--	--	--	50	50	1
		Total	16	4	8	330	100	470	900	23

Course Code	BTBSC301
Type of Course	BSC 7
Course Title	Engineering Mathematics-III
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: To develop Logical understanding of the subject. CO2: To develop mathematical skill so that students are able to apply mathematical methods & Principle's in solving problems from Engineering fields. CO3: To understand the Laplace Transform, inverse Laplace Transform, and Fourier Transform. CO4: To study the partial differential equations and their applications. CO5: To understand the differential calculus and integral calculus. CO6: To produce graduates with mathematical knowledge & computational skill.

Course Code	BTMEC302
Type of Course	ESC 11
Course Title	Materials Science and Metallurgy
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Study various crystal structures of materials CO2:Understand mechanical properties of materials and calculations of same using appropriate equations CO3: Evaluate phase diagrams of various materials CO4: Suggest appropriate heat treatment process for a given application CO5: Prepare samples of different materials for metallography CO6: Recommend appropriate NDT technique for a given application

Course Code	BTMEC303
Type of Course	PCC 1
Course Title	Fluid Mechanics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Define fluid, define and calculate various properties of fluid CO2: Calculate hydrostatic forces on the plane and curved surfaces and explain stability of floating bodies CO3: Explain various types of flow. Calculate acceleration of fluid particles CO4: Apply Bernoulli's equation and Navier-Stokes equation to simple problems in fluid mechanics CO5: Explain laminar and turbulent flows on flat plates and through pipes CO6: Explain and use dimensional analysis to simple problems in fluid mechanics CO7: Understand boundary layer, drag and lift

Course Code	BTMEC304
Type of Course	PCC 2
Course Title	Machine Drawing and CAD
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: Interpret the object with the help of given sectional and orthographic views CO2: Construct the curve of intersection of two solids CO3: Draw machine element using keys, cotter, knuckle, bolted and welded joint CO4: Assemble details of any given part. i. e. valve, pump, machine tool part etc. CO5: Represent tolerances and level of surface finish on production drawings CO6: Understand various creating and editing commands in Auto Cad

Course Code	BTMEC305
Type of Course	ESC 12
Course Title	Thermodynamics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Define the terms like system, boundary, properties, equilibrium, work, heat, ideal gas, entropy etc. used in thermodynamics. CO2: 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. CO3: Study various types of processes like isothermal, adiabatic, etc. considering system with ideal gas and represent them on p-v and T-s planes. CO4: Apply availability concept to non-flow and steady flow type systems CO5: 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.

Course Code	BTHM3401
Type of Course	HSMC 3
Course Title	Basic Human Rights
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	AUDIT (AU/NP)
Course Outcomes	CO1: Understand the history of human rights. CO2: Learn to respect others caste, religion, region and culture. CO3: Be aware of their rights as Indian citizen. CO4: Understand the importance of groups and communities in the society. CO5: Realize the philosophical and cultural basis and historical perspectives of human rights. CO6: Make them aware of their responsibilities towards the nation.

Course Code	BTMEL307
Type of Course	ESC 13
Course Title	Materials Science and Metallurgy Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: able to perform Brinell hardness test and Rockwell hardness test of given specimen and acquire the hardness value. CO2: able to carry out Erichson Cupping test of given specimen and measure formability. CO3: able to perform Non-destructive tests such as Magnaflux Test, Dye penetration test. CO4: Able to prepare specimen surface for microscopy and sulphur print test. CO5: Able to study and draw microstructures of plain carbon steels.

Course Code	BTMEL308
Type of Course	PCC 3
Course Title	Fluid Mechanics Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Understand laminar and Turbulent flow and determine Critical Reynolds number using Reynolds Apparatus CO2: Verify Bernoulli's theorem CO3: Determine pressure drop in flow though pipes and pipe fittings CO4: Verify momentum equation using impact of jet apparatus CO5: Determine viscosity using viscometer CO6: Do calibration of pressure gauges, rotameter CO7: Use manometers for pressure measurement

Course Code	BTMEL309
Type of Course	PCC 4
Course Title	Machine Drawing and Computer Aided Drafting Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-4
Credits	2
Course Outcomes	CO1: Draw Conventional representation of standard machine components, welds, materials etc. CO2: Draw sectional view of a given machine component CO3: Develop Assemble view from details of given component i.e. valve, pump, machine tool part, etc. CO4: Combine details of given machine component and draw assembled view CO5: Use various Auto-Cad commands to draw orthographic projection CO6: Draw sectional view from pictorial view of given machine component using Auto-Cad

Course Code	BTMEF310
Type of Course	Project 1
Course Title	Field Training /Internship/Industrial Training I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-0
Credits	1
Course Outcomes	CO1: To make the students aware of industrial culture and organizational setup CO2: To create awareness about technical report writing among the student

SECOND YEAR FOURTH SEMESTER

B. Tech. Mechanical Engineering

Course Structure for Semester IV [Second Year] w.e.f. 2018-2019

Course Code	Type of Course	Course Title	Weekly Teaching Scheme			Evaluation Scheme				Credits
			L	T	P	CA	MSE	ESE	Total	
BTMEC401	PCC 5	Manufacturing Processes - I	2	1	--	20	20	60	100	3
BTMEC402	PCC 6	Theory of Machines-I	3	1	--	20	20	60	100	4
BTMEC403	PCC 7	Strength of Materials	3	1	--	20	20	60	100	4
BTMEC404	BSC 8	Numerical Methods in Mechanical Engineering	2	1	--	20	20	60	100	3
BTID405	PCC 8	Product Design Engineering – I	1	--	2	60	--	40	100	2
BTBSE406A	OEC 1	Physics of Engineering Materials	3	--	--	20	20	60	100	3
BTBSE3405A		Advanced Engineering Chemistry								
BTHM3402		Interpersonal Communication Skill& Self Development								
BTMEL407	PCC 9	Manufacturing Processes Lab – I	--	--	2	60	--	40	100	1
BTMEL408	PCC 10	Theory of Machines Lab- I	--	--	2	60	--	40	100	1
BTMEL409	PCC 11	Strength of Materials Lab	--	--	2	60	--	40	100	1
BTMEL410	BSC 9	Numerical Methods Lab	--	--	2	60	--	40	100	1
		Total	14	4	10	400	100	500	1000	23
Minimum 4 weeks training which can be completed partially in third and fourth semester or in at one time.										

Course Code	BTMEC401
Type of Course	PCC 5
Course Title	Manufacturing Processes - I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Identify castings processes, working principles and applications and list various defects in metal casting CO2: Understand the various metal forming processes, working principles and applications CO3: Classify the basic joining processes and demonstrate principles of welding, brazing and soldering CO4: Study center lathe and its operations including plain, taper turning, work holding devices and cutting tool CO5: Understand milling machines and operations, cutters and indexing for gear cutting CO6: Study shaping, planing and drilling, their types and related tooling's

Course Code	BTMEC402
Type of Course	PCC 6
Course Title	Theory of Machines-I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Define basic terminology of kinematics of mechanisms CO2: Classify planar mechanisms and calculate its degree of freedom CO3: Perform kinematic analysis of a given mechanism using ICR and RV methods CO4: Perform kinematic analysis of a given mechanism analytically using vector or complex algebra method CO5: Perform kinematic analysis of slider crank mechanism using Klein's construction and analytical approach

Course Code	BTMEC403
Type of Course	PCC 7
Course Title	Strength of Materials
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: State the basic definitions of fundamental terms such as axial load, eccentric load, stress, strain, E, μ, etc. CO2: 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. CO3: 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 CO4: Analyze given beam for calculations of SF and BM CO5: Calculate slope and deflection at a point on cantilever /simply supported beam using double integration, Macaulay's , Area-moment and superposition methods CO6: Differentiate between beam and column and calculate critical load for a column using Euler's and Rankine's formulae

Course Code	BTMEC404
Type of Course	BSC 8
Course Title	Numerical Methods in Mechanical Engineering
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Describe the concept of error CO2: Illustrate the concept of various Numerical Techniques CO3: Evaluate the given Engineering problem using the suitable Numerical Technique CO4: Develop the computer programming based on the Numerical Techniques

Course Code	BTID405
Type of Course	PCC 8
Course Title	Product Design Engineering – I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:1-0-2
Credits	2
Course Outcomes	CO1: Create simple mechanical designs CO2: Create design documents for knowledge sharing CO3: Manage own work to meet design requirements CO4: Work effectively with colleagues

Course Code	BTBSE406A
Type of Course	OEC 1
Course Title	Physics of Engineering Materials
Nature of Course	Open Elective Course 1
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the different types of structures of solid, defects in solids and analysis of crystal structure by X-ray diffraction technique. CO2: Understand the origin and types of magnetism, significance of hysteresis loo in different magnetic materials and their uses in modern technology CO3: Understand the band structure of solids and conductivity, categorization of solids on the basis of band structure, significance of Fermi-Dirac probability functions CO4: Understand the principles of superconductivity, their uses in modern technology CO5: Understand the position of Fermi level in intrinsic and extrinsic semiconductors, Semiconductor conductivity CO6: Understand the electric field in dielectric CO7: Understand basics of Nano materials, synthesis methods and characterization techniques

Course Code	BTBSE3405A
Type of Course	OEC 1
Course Title	Advanced Engineering Chemistry
Nature of Course	Open Elective Course 1
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Classify and explain various types of Corrosion and should apply methods to minimize the rate of corrosion CO2: Understand and apply the concepts of Photochemical and Thermal reactions. CO3: Understand the basic concepts of Polymers, Polymerization and Moulding techniques; Determine molecular weight of High-Polymers. CO4: Understand and apply the basic techniques in Chemistry and capable to explain the concepts of Solvent Extraction. CO5: Understand and apply various types of Spectroscopic, Chromatographic techniques and also able to explain the concepts of Thermo-Gravimetric Analysis (TGA)

Course Code	BTHM3402
Type of Course	OEC 1
Course Title	Interpersonal Communication Skill& Self Development
Nature of Course	Open Elective Course 1
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Acquire interpersonal communication skills CO2: Develop the ability to work independently. CO3: Develop the qualities like self-discipline, self-criticism and self-management CO4: Have the qualities of time management and discipline. CO5: Present themselves as an inspiration for others CO6: Develop themselves as good team leaders

Course Code	BTMEL407
Type of Course	PCC 9
Course Title	Manufacturing Processes Lab – I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Perform plain turning, step turning, knurling, eccentric turning, chamfering and facing operations on lathe. CO2: Prepare setup and fabricate composite job using milling, shaping and drilling machine CO3: Making spur gears on a milling machine CO4: Prepare sand casting setup using split pattern for simple component CO5: Perform joining of two plate using TIG/MIG welding CO6: Demonstrate cutting of a sheet metal using flame cutting

Course Code	BTMEL408
Type of Course	PCC 10
Course Title	Theory of Machines Lab- I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Perform graphically kinematic analysis of any planar mechanism using ICR and RV methods CO2: Perform graphically kinematic analysis of slider crank mechanism using Klein's construction CO3: Demonstrate use of graphical differentiation method for kinematic analysis of slider crank mechanism or any other planar mechanism with a slider CO4: Sketch polar diagram for a Hooke's joint

Course Code	BTMEL409
Type of Course	PCC 11
Course Title	Strength of Materials Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Perform experiments such as Tension test, compression test and shear test on different materials to check their mechanical properties. CO2: Perform experiments such as torsion test, flexure test and deflection test on different materials. CO3: Perform impact test on mild steel, brass, Al, and cast iron specimens. CO4: Draw conclusions based on the experimental results.

Course Code	BTMEL410
Type of Course	BSC 9
Course Title	Numerical Methods Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: To write and run a computer programme to demonstrate the effect of round off error and significant number. CO2: To write and run computer programmes to find real single root of an Equation by Bisection Method and Newton-Raphson Method. CO3: To compile and run a computer programme to solve linear simultaneous algebraic equations. CO4: To write and run computer programmes to solve the integration using Multi Trapezoidal Rule and Simpson's 1/3 rule.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road, Aurangabad - 431010 (M.S.)
NAAC Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

THIRD YEAR FIFTH SEMESTER

B. Tech. Mechanical Engineering

Course Structure for Semester V [Third Year] w.e.f. 2019-2020

Course Code	Type of Course	Course Title	Weekly Teaching Scheme			Evaluation Scheme				Credits
			L	T	P	CA	MSE	ESE	Total	
BTMEC501	PCC 12	Heat Transfer	3	1	--	20	20	60	100	4
BTMEC502	PCC 13	Applied Thermodynamics – I	2	1	--	20	20	60	100	3
BTMEC503	PCC 14	Machine Design – I	2	1	--	20	20	60	100	3
BTMEC504	PCC 15	Theory of Machines-II	3	1	--	20	20	60	100	4
BTMEC505	PCC 16	Metrology and Quality Control	2	1	--	20	20	60	100	3
BTID506	PCC 17	Product Design Engineering - II	1	--	2	60	--	40	100	2
BTMEC506A	OEC 2	Automobile Engineering	3	--	--	--	--	--	--	Audit (AU/ NP)
BTMEC506B		Nanotechnology								
BTMEC506C		Energy Conservation and Management								
BTMEL507	PCC 18	Heat Transfer Lab	--	--	2	30	--	20	50	1
BTMEL508	PCC 19	Applied Thermodynamics Lab	--	--	2	30	--	20	50	1
BTMEL509	PCC 20	Machine Design Practice- I	--	--	2	30	--	20	50	1
BTMEL510	PCC 21	Theory of Machines Lab- II	--	--	2	30	--	20	50	1
BTMEF511	Project 2	Field Training /Internship/Industrial Training II	--	--	--	--	--	50	50	1
		Total	16	5	10	280	100	470	850	24

Course Code	BTMEC501
Type of Course	PCC 12
Course Title	Heat Transfer
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: 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 CO2: Describe the critical radius of insulation, overall heat transfer coefficient, thermal conductivity and lumped heat transfer CO3: Interpret the extended surfaces CO4: Illustrate the boundary layer concept, dimensional analysis, forced and free convection under different conditions CO5: Describe the Boiling heat transfer, mass transfer and Evaluate the heat exchanger and examine the LMTD and NTU methods applied to engineering problems CO6: Explain the thermal radiation black body, emissivity and reflectivity and evaluation of view factor and radiation shields

Course Code	BTMEC502
Type of Course	PCC 13
Course Title	Applied Thermodynamics – I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: 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. CO2: Study and Analyze gas power cycles and vapour power cycles like Otto, Diesel, dual, Joule and Rankine cycles and derive expressions for the performance parameters like thermal efficiency, Pm CO3: Classify various types of boiler, nozzle, steam turbine and condenser used in steam power plant. CO4: Classify various types of IC engines. Sketch the cut section of typical diesel engine and label its components. Define the terms like TDC, BDC, rc, etc. CO5: 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.

Course Code	BTMEC503
Type of Course	PCC 14
Course Title	Machine Design – I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Formulate the problem by identifying customer need and convert into design specification CO2: Understand component behavior subjected to loads and identify failure criteria CO3: Analyze the stresses and strain induced in the component CO4: Design of machine component using theories of failures CO5: Design of component for finite life and infinite life when subjected to fluctuating load CO6: Design of components like shaft, key, coupling, screw and spring

Course Code	BTMEC504
Type of Course	PCC 15
Course Title	Theory of Machines- II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Identify and select type of belt and rope drive for a particular application CO2: Evaluate gear tooth geometry and select appropriate gears, gear trains CO3: Define governor and select/suggest an appropriate governor CO4: Characterize flywheels as per engine requirement CO5: Understand gyroscopic effects in ships, aeroplanes, and road vehicles. CO6: Understand free and forced vibrations of single degree freedom systems

Course Code	BTMEC505
Type of Course	PCC 16
Course Title	Metrology and Quality Control
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Identify techniques to minimize the errors in measurement CO2: Identify methods and devices for measurement of length, angle, and gear and thread parameters, surface roughness and geometric features of parts CO3: Choose limits for plug and ring gauges CO4: Explain methods of measurement in modern machineries CO5: Select quality control techniques and its applications CO6: Plot quality control charts and suggest measures to improve the quality of product and reduce cost using Statistical tools

Course Code	BTID506
Type of Course	PCC 17
Course Title	Product Design Engineering - II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:1-0-2
Credits	2
Course Outcomes	CO1: students will be able to create prototypes CO2: students will be able to test the prototypes CO3: students will be able to understand the product life cycle management

Course Code	BTMEC506A
Type of Course	OEC 2
Course Title	Automobile Engineering
Nature of Course	Open Elective Course 2
Weekly Teaching Hours	L-T-P:3-0-0
Credits	AUDIT (AU/NP)
Course Outcomes	CO1: Identify the different parts of the automobile CO2: Explain the working of various parts like engine, transmission, clutch, brakes etc. CO3: Demonstrate various types of drive systems CO4: Apply vehicle troubleshooting and maintenance procedures CO5: Analyze the environmental implications of automobile emissions. And suggest suitable regulatory modifications CO6: Evaluate future developments in the automobile technology

Course Code	BTMEC506B
Type of Course	OEC 2
Course Title	Nanotechnology
Nature of Course	Open Elective Course 2
Weekly Teaching Hours	L-T-P:3-0-0
Credits	AUDIT (AU/NP)
Course Outcomes	CO1: Demonstrate the understanding of length scales concepts, nanostructures and nanotechnology. CO2: To impart basic knowledge on various synthesis and characterization techniques involved in Nanotechnology CO3: To educate students about the interactions at molecular scale CO4: Evaluate and analyze the mechanical properties of bulk nanostructured metals and alloys, Nano-composites and carbon nano tubes. CO5: To make the students understand about the effects of using nanoparticles over conventional methods

Course Code	BTMEC506C
Type of Course	OEC 2
Course Title	Energy Conservation and Management
Nature of Course	Open Elective Course 2
Weekly Teaching Hours	L-T-P:3-0-0
Credits	AUDIT (AU/NP)
Course Outcomes	CO1: Understand energy problem and need of energy management CO2: Carry out energy audit of simple units CO3: Study various financial appraisal methods CO4: Analyse cogeneration and waste heat recovery systems CO5: Do simple calculations regarding thermal insulation and electrical energy conservation

Course Code	BTMEL507
Type of Course	PCC 18
Course Title	Heat Transfer Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Understand the various heat transfer mode of heat transfer and its application and verify CO2: Learn the experimental methodology CO3: Describe the concept the terms like least count, calibration of the instruments

Course Code	BTMEL508
Type of Course	PCC 19
Course Title	Applied Thermodynamics Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Conduct test on Bomb calorimeter, nozzle, steam turbine, condenser, compressor etc. to study their performance CO2: Draw performance curves of these machines. CO3: Analyze the results obtained from the tests. CO4: Draw conclusions based on the results of the experiments CO5: Based on your visit to Industry, sketch its layout and write specifications

Course Code	BTMEL509
Type of Course	PCC 20
Course Title	Machine Design Practice- I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Apply design process to an open ended problem CO2: Determine suitable material and size for structural component of machine/system CO3: Apply iterative technique in design including making estimate of unknown values for first computation and checking or revisiting and re-computing CO4: Choose logically and defend selection of design factors CO5: Design of components for given part/system i.e. shaft, keys, coupling, links, screws, springs etc. CO6: Work effectively as a part of design group/team CO7: Have good communication skill, orally, graphically as well as in writing

Course Code	BTMEL510
Type of Course	PCC 21
Course Title	Theory of Machines Lab- II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Explain various types of gear boxes, gear trains, belt and rope drives CO2: Interpreting physical principles and phenomenon of governor, gyroscopic, flywheel CO3: Measure vibration parameters in single degree of freedom systems CO4: Evaluating natural frequency of 1 dof

Course Code	BTMEF511
Type of Course	Project 2
Course Title	Field Training /Internship/Industrial Training II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-0
Credits	1
Course Outcomes	CO1: To make the students aware of industrial culture and organizational setup CO2: To create awareness about technical report writing among the student

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road, Aurangabad - 431010 (M.S.)
NAAC Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

THIRD YEAR SIXTH SEMESTER

B. Tech. Mechanical Engineering

Course Structure for Semester VI [Third Year] w.e.f. 2019-2020

Course Code	Type of Course	Course Title	Weekly Teaching Scheme			Evaluation Scheme				Credits
			L	T	P	CA	MSE	ESE	Total	
BTMEC601	PCC 22	Manufacturing Processes- II	2	1	--	20	20	60	100	3
BTMEC602	PCC 23	Machine Design-II	3	1	--	20	20	60	100	4
BTMEC603	PCC 24	Applied Thermodynamics- II	2	1	--	20	20	60	100	3
BTMEC604A	PEC 1	Engineering Tribology	2	1	--	20	20	60	100	3
BTMEC604B		IC Engines								
BTMEC604C		Additive Manufacturing								
BTMEC604D		Mechanical Measurements								
BTMEC605A	OEC 3	Quantitative Techniques in Project Management	3	--	--	20	20	60	100	3
BTMEC605B		Sustainable Development								
BTMEC605C		Renewable Energy Sources								
BTMEC606A	OEC 4	Biology for Engineers	3	--	--	--	--	--	--	Audit (AU/ NP)
BTMEC606B		Solar Energy								
BTMEC606C		Human Resource Management								
BTMEL607	PCC 25	Metrology and Quality Control Lab	--	--	2	30	--	20	50	1
BTMEL608	PCC 26	Machine Design Practice-II	--	--	2	30	--	20	50	1
BTMEL609	PCC 27	IC Engine Lab	--	--	2	30	--	20	50	1
BTMEL610	PCC 28	Refrigeration and Air Conditioning Lab	--	--	2	30	--	20	50	1
BTMEM611	Project 3	Technical Project for Community Services	--	--	4	30	--	20	50	2
		Total	15	4	12	250	100	400	750	22

Course Code	BTMEC601
Type of Course	PCC 22
Course Title	Manufacturing Processes - II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand the process of powder metallurgy and its applications CO2: Calculate the cutting forces in orthogonal and oblique cutting CO3: Evaluate the machinability of materials CO4: Understand the abrasive processes CO5: Explain the different precision machining processes CO6: Design jigs and fixtures for given application

Course Code	BTMEC602
Type of Course	PCC 23
Course Title	Machine Design - II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Define function of bearing and classify bearings. CO2: Understanding failure of bearing and their influence on its selection. CO3: Classify the friction clutches and brakes and decide the torque capacity and friction disk parameter. CO4: Select materials and configuration for machine element like gears, belts and chain CO5: Design of elements like gears, belts and chain for given power rating CO6: Design thickness of pressure vessel using thick and thin criteria

Course Code	BTMEC603
Type of Course	PCC 24
Course Title	Applied Thermodynamics – II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P: 2-1-0
Credits	3
Course Outcomes	CO1: Understand fundamentals of IC Engines and different power cycles. CO2: Study the combustion in S.I. engines and fuel properties. CO3: Acquire knowledge about starting systems, fuel supply systems, engine cooling system, ignition system, etc. CO4: Understand fundamentals of refrigeration, VCR and VAR systems. CO5: Explore the basics of air conditioning systems, SHF, GSHF, RSHF etc. CO6: Study various types of power plants, their significance and applications.

Course Code	BTMEC604A
Type of Course	PEC 1
Course Title	Engineering Tribology
Nature of Course	Professional Elective Course-1
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand the basic concepts and importance of tribology. CO2: Evalute the nature of engineering surfaces, their topography and surface characterization techniques CO3: Analyze the basic theories of friction and frictional behavior of various materials CO4: Select a suitable lubricant for a specific application CO5: Compare different wear mechanisms CO6: Suggest suitable material combination for tribological design

Course Code	BTMEC604B
Type of Course	PEC 1
Course Title	IC Engines
Nature of Course	Professional Elective Course-1
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand fundamentals of IC Engines and different power cycles. CO2: Study the combustion in S.I. engines and fuel properties. CO3: Acquire knowledge about starting systems, fuel supply systems, engine cooling system, ignition system, etc. CO4: Understand Testing and Performance of SI and CI Engines. CO5: Know and classify alternative fuels and their significance. CO6: Explore fuel cell technology, types, construction, working and applications.

Course Code	BTMEC604C
Type of Course	PEC 1
Course Title	Additive Manufacturing
Nature of Course	Professional Elective Course-1
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand the importance of Additive Manufacturing CO2: Classify the different AM processes CO3: Design for AM processes CO4: Understand the applications of AM CO5: Differentiate the post processing processes

Course Code	BTMEC604D
Type of Course	PEC 1
Course Title	Mechanical Measurements
Nature of Course	Professional Elective Course-1
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Define measurement parameters, and Identify errors in measurement CO2: Identify methods and devices for measurement of length, angle CO3: Identify methods and devices for measurement of pressure, flow, force, torque, strain, velocity, displacement, acceleration, temperature

Course Code	BTMEC605A
Type of Course	OEC 3
Course Title	Quantitative Techniques in Project Management
Nature of Course	Open Elective Course 3
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Define and formulate research models to solve real life problems for allocating limited resources by linear programming CO2: Apply transportation and assignment models to real life situations CO3: Apply queuing theory for performance evaluation of engineering and management systems CO4: Apply the mathematical tool for decision making regarding replacement of items in CO5: Determine the EOQ, ROP and safety stock for different inventory models. CO6: Construct a project network and apply CPM and PERT method.

Course Code	BTMEC605B
Type of Course	OEC 3
Course Title	Sustainable Development
Nature of Course	Open Elective Course 3
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Explain the difference between development and sustainable development CO2: Explain challenges of sustainable development and climate change CO3: Explain sustainable development indicators CO4: Analyze sustainable energy options CO5: Understand social and economic aspects of sustainable development

Course Code	BTMEC605C
Type of Course	OEC 3
Course Title	Renewable Energy Sources
Nature of Course	Open Elective Course 3
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Explain the difference between renewable and non-renewable energy CO2: Describe working of solar collectors CO3: Explain various applications of solar energy CO4: Describe working of other renewable energies such as wind, biomass

Course Code	BTMEC606A
Type of Course	OEC 4
Course Title	Biology for Engineers
Nature of Course	Open Elective Course 4
Weekly Teaching Hours	L-T-P:3-0-0
Credits	Audit
Course Outcomes	CO1: Explain origin of life and Evolution, Cells, Biomolecules-Lipids CO2: Understand Biomolecules CO3: Understand Cell structure and function and cell cycle CO4: Explain Mendelian genetics CO5: Understand and Explain DNA structure, DNA replication, Transcription, Translation

Course Code	BTMEC606B
Type of Course	OEC 4
Course Title	Solar Energy
Nature of Course	Open Elective Course 4
Weekly Teaching Hours	L-T-P:3-0-0
Credits	Audit
Course Outcomes	CO1: Describe measurement of direct, diffuse and global solar radiations falling on horizontal and inclined surfaces CO2: Analyze the performance of flat plate collector, air heater and concentrating type collector CO3: Understand test procedures and apply these while testing different types of collectors CO4: Study and compare various types of thermal energy storage systems CO5: Analyze payback period and annual solar savings due to replacement of conventional systems. CO6: Design solar water heating system for a few domestic and commercial applications

Course Code	BTMEC606C
Type of Course	OEC 4
Course Title	Human Resource Management
Nature of Course	Open Elective Course 4
Weekly Teaching Hours	L-T-P:3-0-0
Credits	Audit
Course Outcomes	CO1: Describe trends in the labor force composition and how they impact human resource management practice. CO2: Discuss how to strategically plan for the human resources needed to meet organizational goals and objectives CO3: Define the process of job analysis and discuss its importance as a foundation for human resource management practice CO4: Explain how legislation impacts human resource management practice CO5: Compare and contrast methods used for selection and placement of human resources CO6: Describe the steps required to develop and evaluate an employee training program CO7: Summarize the activities involved in evaluating and managing employee performance. CO8: Identify and explain the issues involved in establishing compensation systems.

Course Code	BTMEL607
Type of Course	PCC 25
Course Title	Metrology and Quality Control Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Measure linear, angular circular features, dimensional and geometric features CO2: Measure surface roughness of components CO3: Calibration of metrological equipment

Course Code	BTMEL608
Type of Course	PCC 26
Course Title	Machine Design Practice - II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Apply design process to an open ended problems CO2: Determine suitable material and size for structural component of machine/system CO3: Apply iterative technique in design including making estimate of unknown values for first computation and checking or revisiting and re-computing CO4: Choose logically and defend selection of design factors CO5: Design of components for given part/system i.e shaft, keys, coupling, links, screws, springs etc. CO6: Work effectively as a part of design group/team CO7: Have good communication skill, orally, graphically as well as in writing

Course Code	BTMEL609
Type of Course	PCC 27
Course Title	IC Engine Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-2
Credits	1
Course Outcomes	CO1: Conduct test on IC Engines to study their performance CO2: Draw performance curves of these machines/systems CO3: Analyse the results obtained from the tests. CO4: Draw conclusions based on the results of the experiments

Course Code	BTMEL610
Type of Course	PCC 28
Course Title	Refrigeration and Air Conditioning Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P: 0-0-2
Credits	1
Course Outcomes	CO1: Conduct test on Refrigeration and air conditioning test units to study their performance CO2: Draw performance curves of these machines/systems CO3: Analyse the results obtained from the tests CO4: Draw conclusions based on the results of the experiments

Course Code	BTMEM611
Type of Course	Project 3
Course Title	Technical Project for Community Services
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P: 0-0-4
Credits	2
Course Outcomes	CO1: Visit nearby places to understand the problems of the community CO2: Select one of the problems for the study, state the exact title of the project and define scope of the problem CO3: Explain the motivation, objectives and scope of the project CO4: Evaluate possible solutions of the problem CO5: Design, produce, test and analyze the performance of product/system/process CO6: Modify, improve the product/system/process

FOURTH YEAR SEVENTH SEMESTER

Dr. Babasaheb Ambedkar Technological University

(Established as a University of Technology in the State of Maharashtra)

(under Maharashtra Act No. XXIX of 2014)

P.O. Lonere, Dist. Raigad,
Pin 402 103, Maharashtra
Telephone and Fax. : 02140 - 275142
www.dbatu.ac.in

Proposed Course Contents for

B. Tech. in Mechanical Engineering

w.e.f. June 2020

7th Semester - 8th Semester

ABBREVIATIONS

PEO: Program Educational Objectives

PO: Program Outcomes

CO: Course Outcomes

L: No. of Lecture hours (per week)

T: No. of Tutorial hours (per week)

P: No. of Practical hours (per week)

C: Total number of credits

BSH: Basic Science and Humanity

BSC: Basic Sciences Course

PCC: Professional Core Course

OEC: Open Elective Course

PEC: Professional Elective Course

BHC: Basic Humanity Course

ESC: Engineering Science Course

HSMC: Humanity Science and Management Course

NCC: National Cadet Corps

NSS: National Service Scheme

CA: Continuous Assessment

MSE: Mid Semester Exam

ESE: End Semester Exam

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road, Aurangabad - 431010 (M.S.)
NAAC Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

B. Tech. Mechanical Engineering

Course Structure for Semester VII [Fourth Year] w.e.f. 2020-2021

Course Code	Type of Course	Course Title	Weekly Teaching Scheme			Evaluation Scheme				Credits
			L	T	P	CA	MSE	ESE	Total	
BTMEC701	PCC 29	Mechatronics	2	1	--	20	20	60	100	3
BTMEC702	PCC 30	CAD/CAM	2	1	--	20	20	60	100	3
BTMEC703	PCC 31	Manufacturing Processes - III	2	1	--	20	20	60	100	3
BTMEC704A	PEC 2	Fluid Machinery	2	1	--	20	20	60	100	3
BTMEC704B		Industrial Engineering and Management								
BTMEC704C		Finite Element Method								
BTMEC704D		Surface Engineering								
BTMEC704E		Refrigeration and Air Conditioning								
BTAMC704C		Automobile Design (Product Design, PLM, CAE, Catia)								
BTMEC705A	OEC 5	Engineering Economics	3	--	--	--	--	--	--	Audit (AU/ NP)
BTMEC705B		Intellectual Property Rights								
BTMEC705C		Wind Energy								
BTMEC705D		Knowledge Management								
BTMEL706	PCC 32	Manufacturing Processes Lab - II	--	--	2	30	--	20	50	1
BTMEL707	PCC 33	Mechatronics Lab	--	--	2	30	--	20	50	1
BTMEL708	PCC 34	CAD/CAM Lab	--	--	2	30	--	20	50	1
BTMES709	Project 4	Seminar	--	--	2	30	--	20	50	1
BTMEF710	Project 5	Field Training /Internship/Industrial Training III	--	--	--	--	--	50	50	1
BTMEP711	Project 6	Project Stage-I**	--	--	6	30	--	20	50	3
		Total	11	4	14	230	80	390	700	20

***In case of students opting for Internship in the eighth semester, the Project must be industry-based.*

Course Code	BTMEC701
Type of Course	PCC 29
Course Title	Mechatronics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Define sensor, transducer and understand the applications of different sensors and transducers CO2: Explain the signal conditioning and data representation techniques CO3: Design pneumatic and hydraulic circuits for a given application CO4: Write a PLC program using Ladder logic for a given application CO5: Understand applications of microprocessor and micro controller CO6: Analyse PI, PD and PID controllers for a given application

Course Code	BTMEC702
Type of Course	PCC 30
Course Title	CAD/CAM
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: List and describe the various input and output devices for a CAD work station CO2: Carry out/calculate the 2-D and 3-D transformation positions (Solve problems on 2-Dand 3-D transformations) CO3: Describe various CAD modeling techniques with their relative advantages and limitations CO4: Describe various CAD modeling techniques with their relative advantages and limitations CO5: Develop NC part program for the given component, and robotic tasks CO6: Describe the basic Finite Element procedure CO7: Explain various components of a typical FMS system, Robotics, and CIM CO8: Classify parts in part families for GT CO9: Describe and differentiate the CAPP systems

Course Code	BTMEC703
Type of Course	PCC 31
Course Title	Manufacturing Processes – III
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Differentiate clearly between NC and CNC machines CO2: Prepare and execute a part program for producing a given product CO3: Select appropriate non-traditional machining process for a given application CO4: Compare different surface coating techniques CO5: Explain different rapid prototyping techniques CO6: Illustrate the working principle of various micro-manufacturing processes

Course Code	BTMEC704A
Type of Course	PEC 2
Course Title	Fluid Machinery
Nature of Course	Professional Elective Course 2
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand and apply momentum equation CO2: Understand and explain Hydrodynamic Machines CO3: Explain difference between impulse and reaction turbines CO4: Find efficiencies, draw velocity triangles CO5: Explain governing mechanisms for hydraulic turbines CO6: Explain working of various types of pumps, draw velocity diagrams, do simple calculations CO7: Design simple pumping systems

Course Code	BTMEC704B
Type of Course	PEC 2
Course Title	Industrial Engineering and Management
Nature of Course	Professional Elective Course 2
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Impart fundamental knowledge and skill sets required in the Industrial Management and Engineering profession, which include the ability to apply basic knowledge of mathematics, probability and statistics, and the domain knowledge of Industrial Management and Engineering CO2: Produce ability to adopt a system approach to design, develop, implement and innovate integrated systems that include people, materials, information, equipment and energy CO3: Understand the interactions between engineering, businesses, technological and environmental spheres in the modern society CO4: Understand their role as engineers and their impact to society at the national and global context

Course Code	BTMEC704C
Type of Course	PEC 2
Course Title	Finite Element Method
Nature of Course	Professional Elective Course 2
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand the basic principle of Finite element methods and its applications CO2: Use matrix algebra and mathematical techniques in FEA CO3: Identify mathematical model for solution of common engineering problem CO4: Solve structural , thermal problems using FEA CO5: Derive the element stiffness matrix using different methods by applying basic mechanics laws CO6: Understand formulation for two and three dimensional problems

Course Code	BTMEC704D
Type of Course	PEC 2
Course Title	Surface Engineering
Nature of Course	Professional Elective Course 2
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Learn the importance and need of surface engineering CO2: Describe various surface cleaning and modification techniques CO3: Understand the concepts of surface integrity CO4: Compare various surface coating technologies CO5: Select appropriate method of coating for a given application CO6: Apply measurement techniques and carry out characterization of coated surfaces

Course Code	BTMEC704E
Type of Course	PEC 2
Course Title	Refrigeration and Air Conditioning
Nature of Course	Professional Elective Course 2
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Understand the basic thermodynamic cycles in refrigeration. CO2: Apply psychromertic analysis to various air conditioning systems. CO3: Acquiring the necessary skills to investigate the performance of refrigeration and air conditioning systems. CO4: Obtain knowledge about Compound vapour compression system and vapour absorption system. CO5: Learn about Refrigerants for Vapour Compression System. CO6: Know about SHF, GSHF, RSHF, and evaporative cooling.

Course Code	BTAMC704C
Type of Course	PEC 2
Course Title	Automobile Design (Product Design, PLM, CAE, Catia)
Nature of Course	Professional Elective Course 2
Weekly Teaching Hours	L-T-P:2-1-0
Credits	3
Course Outcomes	CO1: Learn the basics of automobile design process, product life cycle and standards. CO2: Understand the fundamentals of body in white, Bonnet Design, Hood structural members. CO3: Acquiring the necessary skills about CAE1, CAE2 and CATIA tools. CO4: Acquiring the necessary skills about FEA, NVH, CFD, and PLM. CO5: Learn about sheet metal design, simulation engineering and forming simulations. CO6: Understand Die design for presses and fixture designs and gauges.

Course Code	BTMEC705A
Type of Course	OEC 5
Course Title	Engineering Economics
Nature of Course	Open Elective Course 5
Weekly Teaching Hours	L-T-P:3-0-0
Credits	Audit (AU/NP)
Course Outcomes	CO1: Apply the appropriate engineering economics analysis method(s) for problem solving: present worth, annual cost, rate-of-return, payback, break-even, Benefit-cost ratio CO2: Evaluate the cost effectiveness of individual engineering projects using the methods learned and draw inferences for the investment decisions CO3: Compare the life cycle cost of multiple projects using the methods learned, and make a quantitative decision between alternate facilities and/or systems. CO4: Compute the depreciation of an asset using standard Depreciation techniques to assess its impact on present or future value. CO5: 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. CO6: Examine and evaluate probabilistic risk assessment methods. CO7: Compare the differences in economic analysis between the private and public sectors. Recognize the limits of mathematical models for factors hard to quantify. CO8: Develop and demonstrate teamwork, project management, and professional communications skills

Course Code	BTMEC705B
Type of Course	OEC 5
Course Title	Intellectual Property Rights
Nature of Course	Open Elective Course 5
Weekly Teaching Hours	L-T-P: 3-0-0
Credits	Audit (AU/NP)
Course Outcomes	CO1: State the basic fundamental terms such as copyrights, Patents, Trademarks etc. CO2: Interpret Laws of copy-rights, Patents, Trademarks and various IP registration Processes CO3: Exhibit the enhance capability to do economic analysis of IP rights, technology and innovation related policy issues and firms commercial strategies CO4: Create awareness at all levels (research and innovation) to develop patentable technologies CO5: Apply trade mark law, copy right law, patent law and also carry out intellectual property audits CO6: Manage and safeguard the intellectual property and protect it against unauthorized use

Course Code	BTMEC705C
Type of Course	OEC 5
Course Title	Wind Energy
Nature of Course	Open Elective Course 5
Weekly Teaching Hours	L-T-P: 3-0-0
Credits	Audit (AU/NP)
Course Outcomes	CO1: Understand historical applications of wind energy CO2: Understand and explain wind measurements and wind data CO3: Determine Wind Turbine Power, Energy and Torque CO4: Understand and explain Wind Turbine Connected to the Electrical Network AC and DC CO5: Understand economics of wind energy

Course Code	BTMEC705D
Type of Course	OEC 5
Course Title	Knowledge Management
Nature of Course	Open Elective Course 5
Weekly Teaching Hours	L-T-P: 3-0-0
Credits	Audit (AU/NP)
Course Outcomes	CO1: Define KM, learning organizations, intellectual capital and related terminologies in clear terms and understand the role of knowledge management in organizations. CO2: Demonstrate an understanding of the history, concepts, and the antecedents of management of knowledge and describe several successful knowledge management systems. CO3: Identify and select tools and techniques of KM for the stages of creation, acquisition, transfer and management of knowledge. CO4: Analyze and evaluate tangible and intangible knowledge assets and understand current KM issues and initiatives. CO5: Evaluate the impact of technology including telecommunications, networks, and internet/intranet role in managing knowledge. CO6: Identify KM in specific environments: managerial and decision making communities; finance and economic sectors; legal information systems; health information systems

Course Code	BTMEL706
Type of Course	PCC 32
Course Title	Manufacturing Processes Lab – II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P: 0-0-2
Credits	1
Course Outcomes	CO1: Study different types of chips practically. CO2: In oblique turning process, to analyze the effect of process parameters on cutting ratio and shear angle. CO3: In oblique turning process, to analyze the effect of process parameters on surface roughness. CO4: In oblique turning process, to study the effect of process parameters on tool wear and cutting forces. CO5: In end milling process, to study the effect of process parameters on cutting forces. CO6: To develop a manual part program of a given component on CNC Lathe.

Course Code	BTMEL707
Type of Course	PCC 33
Course Title	Mechatronics Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P: 0-0-2
Credits	1
Course Outcomes	CO1: Understand the various types of sensors and their applications CO2: Design a pneumatic circuit for a given application CO3: Design a hydraulic circuit for a given application CO4: Write a PLC program using Ladder logic CO5: Experiment PID controller for controlling temperature CO6: Demonstrate the capacitance sensor for measuring level

Course Code	BTMEL708
Type of Course	PCC 34
Course Title	CAD/CAM Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P: 0-0-2
Credits	1
Course Outcomes	CO1: Construct CAD part models, assembly model and drafting of machine elements using CAD software. CO2: Evaluate stresses in components subjected to simple structural loading using FE software CO3: Write NC programs for turning and milling CO4: Describe case study of industrial robots

Course Code	BTMES709
Type of Course	Project 4
Course Title	Seminar
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P: 0-0-2
Credits	1
Course Outcomes	CO1: State the exact title of the seminar CO2: Explain the motivation for selecting the seminar topic and its scope CO3: Search pertinent literature and information on the topic CO4: Critically review the literature and information collected CO5: Demonstrate effective written and verbal communication

Course Code	BTMEF710
Type of Course	Project 5
Course Title	Field Training / Internship / Industrial Training III
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P: 0-0-0
Credits	1
Course Outcomes	CO1: To make the students aware of industrial culture and organizational setup CO2: To create awareness about technical report writing among the student

Course Code	BTMEP711
Type of Course	Project 6
Course Title	Project Stage-I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P: 0-0-6
Credits	3
Course Outcomes	CO1: State the exact title of the project and problem definition CO2: Explain the motivation, objectives and scope of the project CO3: Review the literature related to the selected topic of the project CO4: Design the mechanism, components of the system and prepare detailed drawings. CO5: Evaluate the cost considering different materials/manufacturing processes

FOURTH YEAR, EIGHTH SEMESTER

B. Tech. Mechanical Engineering

Course Structure for Semester VIII [Fourth Year] w.e.f. 2020-2021

Course Code	Type of Course	Course Title	Weekly Teaching Scheme			Evaluation Scheme				Credits
			L	T	P	CA	MSE	ESE	Total	
Choose any two subjects from ANNEXURE-A#			-	-	--	20	20	60	100	3
			-	-	--	20	20	60	100	3
BTMEP803	Project 7	Project Stage-II or Internship and Project*	--	--	30	50	--	100	150	15
		Total	--	--	30	90	40	220	350	21

** Six months of Internship in the industry*

\$ These subjects are to be studied on self –study mode using SWAYAM/NPTEL/Any other source

 # Student doing project in Industry will give NPTEL Examination/Examination conducted by the University i.e. CA/MSE/ESE

 # Students doing project in the Institute will have to appear for CA/MSE/ESE

ANNEXURE-A#
Recommendations of 8th Semester Courses in Self-study Mode from NPTEL/ SWYAM Platform

Sr No	Course Code	Course Name	Duration (Weeks)	Institute Offering Course	Name of Professor
1	BTMEC801A	Fundamentals of Automotive Systems	12 Weeks	IITM	Prof. C. S. Shankar Ram
2	BTMEC801B	Mechanics of Fiber Reinforced Polymer Composite Structures	12 Weeks	IITG	Prof. Debabrata Chakraborty
3	BTMEC801C	Explosions and Safety	12 Weeks	IITM	Prof. K. Ramamurthi
4	BTMEC801D	Material Characterization	12 Weeks	IITM	Prof. Sankaran.S
5	BTMEC801E	Dealing with materials data : collection, analysis and interpretation	12 Weeks	IISc	Prof. M P Gururajan
6	BTMEC801F	Non-Conventional Energy Resources	12 Weeks	IITM	Prof. Prathap Haridoss

Semester - VIII

Project Stage – II/Internship and Project

BTMEP803	Project 7	Project Stage – II or Internship and Project*	0-0-30	15 Credits

Examination Scheme:
Continuous Assessment: 50 Marks
End Semester Exam: 100 Marks

Pre-Requisites: None

Course Outcomes: At the end of the course, students will be able to:

CO1	State the aim and objectives for this stage of the project
CO2	Construct and conduct the tests on the system/product
CO3	Analyze the results of the tests.
CO4	Discuss the findings, draw conclusions, and modify the system/product, if necessary.

Mapping of course outcomes with program outcomes

Course Outcomes	Program Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1	1	1										
CO2			2	2	2	1	1					
CO3		1			1	2		1		1		
CO4			2	1	2	1	2			3		1

Course Contents:

Since Project Stage II is in continuation to Project Stage I, the students are expected to complete the total project by the end of semester VIII. After completion of project work, they are expected to submit the consolidated report including the work done in stage I and stage II.

The report shall be comprehensive and presented typed on A4 size sheets and bound. The number of copies to be submitted is number of students plus two. The assessment would be carried out by the panel of examiners for both, term work and oral examinations.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

COURSE OUTCOMES
POST GRADUATE COURSES [PG]: CIVIL ENGINEERING

FIRST YEAR FIRST SEMESTER

Draft of Proposed Course Structure
for Post Graduate Degree Programme

M. Tech. in Civil Engineering
with Specialization in
Structural Engineering

Presented to Academic Council
on 15 April 2017

Dr. Babasaheb Ambedkar Technological University
Lonere 402 103, Dist- Raigad, Maharashtra, INDIA

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

First Semester

Sr. No.	Subject Code	Name of Subject	Hours /Week			Credit	Examination Scheme				
							Theory		CA	PR/ OR	Total
			L	P	T		TH	MTE			
01	CVSE101	Theory of Elasticity and Plasticity	03	--	1	04	60	20	20	--	**100**
02	CVSE102	Matrix Methods of Structural Analysis	03	--	1	04	60	20	20	--	**100**
03	CVSE103	Structural Dynamics	03	--	1	04	60	20	20	--	**100**
04	CVSE104	Communication Skills	02	--	--	02	--	--	25	25	**50**
05	CVSE-L01	PG Lab-I	--	03	--	02	--	--	25	25	**50**
06	CVSE-E1	Elective-I	03	--	--	03	60	20	20	--	**100**
07	CVSE-E2	Elective-II	03	--	--	03	60	20	20	--	**100**
		Total for Semester I	**17**	**03**	**03**	**22**	**300**	**100**	**150**	**50**	**600**

Elective-I

CVSE-E1-01: Design of Bridges

CVSE-E1-02: Numerical Methods

CVSE-E1-03: Approximate Analysis of Structural Systems **

Elective-II

CVSE-E2-01: Advanced Pre-stressed Concrete

CVSE-E2-02: Design of Masonry Structures

CVSE-E2-03: Assessment of Structural Loading **

** Syllabus of these courses is under preparation.

Course Code	CVSE101
Type of Course	
Course Title	Theory of Elasticity and Plasticity
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Understand concept of stress and strain at a point, Stress equilibrium and Strain compatibility and Analyse Stress and Strain at a point with various perspectives, etc. under in three dimensional state of stress CO2: Establish relation between stress and strain for various materials, Elastic constants, and reduce 3D problems to 2 D problems CO3: Formulate and Analyse stress concentration problems due to various complex situations CO4: Formulate and Analyse members subjected to Torsion using various classical approaches CO5: Able to understand different post yielding behaviour of materials and Plasticity theories CO6: Able to understand various yield criteria, and concept of factor of safety in design of various structural members, concept of Viscoelastic and Viscoplastic materials.

Course Code	CVSE102
Type of Course	
Course Title	Matrix Methods of Structural Analysis
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Draw deflected shapes of various structures for differentloading and boundary conditions CO2: Understand difference in force approach and displacement approach in structural analysis CO3: Analyze various plane structural systems using direct and generalized flexibility approach CO4: Analyze various plane structural systems using direct and generalized stiffness approach CO5: Develop codes for computer based analysis of plane structures CO6: Understand effect of material non linearity and geometric non linearity on force displacement relation and stiffness matrix

Course Code	CVSE103
Type of Course	
Course Title	Structural Dynamics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Understand basics of response of structures to forced vibrationsand free vibrations CO2: Analyse response of SDoF systems to general loading and understand various methods of evaluation of dynamic response CO3: Analyse response of structures to ground excitations, supportexcitations and torsional excitations CO4: Understand and Analyse structures for natural frequency and modal analysis CO5: Analyse response of structural system by numerical evaluation using various classical approaches CO6: Understand and implement finite element approach in structuraldynamics

Course Code	CVSE104
Type of Course	
Course Title	Communication Skills
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: To participate in an online learning environment successfully by developing the implication-based understanding of Paraphrasing, deciphering instructions, interpreting guidelines, discussion boards & Referencing Styles. CO2: To demonstrate his verbal and non-verbal communication ability through presentations. CO3: To stimulate their Critical thinking by designing and developingclean and lucid writing skills. CO4: To draft effective business correspondence with brevity and clarity. CO5: To distinguish among various levels of organizational communication and communication barriers while developing an understanding of Communication as a process in an organization.

Course Code	CVSE-L01
Type of Course	
Course Title	PG Lab-I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-3-0
Credits	2
Course Outcomes	CO1: Obtain the unknown resistance and static strain using accepted principles CO2: Determine the principal stresses for various loadings CO3: Determine the response of three storeyed building under harmonic and non-harmonic base motions CO4: Understand and apply the concept of Vibration isolation and vibration absorber

Course Code	CVSE-E1-01
Type of Course	Elective-I
Course Title	Design of Bridges
Nature of Course	Elective-I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the preliminary concepts, development, various types of bridges and it's conceptual design CO2: Study various types of loadings coming on road and railway bridges. CO3: Study the behaviour of various types of bridges under different loadings. CO4: Design of slab decks of various types of RC and PSC bridges. CO5: Perform the design of substructure components like piers, abutments, wing walls and it's foundation. CO6: Study the provision and importance of joints provided in the structure. CO7: Know the various construction techniques and practices adopted for different bridges and its impact on design.

Course Code	CVSE-E1-02
Type of Course	Elective-I
Course Title	Numerical Methods
Nature of Course	Elective-I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Formulate mathematical models of various engineering problems CO2: Demonstrate understanding of common numerical methods andhow they are used to obtain approximate solutions CO3: Solve non-linear equations, simultaneous linear algebraic equations, Eigen value problems, using numerical methods CO4: Perform numerical differentiation and integration and analyzethe errors CO5: Apply curve fitting techniques to experimental data CO6: Implement knowledge of numerical methods in C-programmingor MATLAB

Course Code	CVSE-E1-03
Type of Course	Elective-I
Course Title	Approximate Analysis of Structural Systems
Nature of Course	Elective-I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To understand analysis of indeterminate structures and adopt an appropriate structural analysis technique CO2: Determine response of structures by classical, iterative and matrix methods

Course Code	CVSE-E2-01
Type of Course	Elective-II
Course Title	Advanced Pre-stressed Concrete
Nature of Course	Elective-II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the preliminary concept, terminologies and methodologies related to prestressed concrete. CO2: Analyze and design of the anchor blocks. CO3: Analyze the PSC member for flexural, shear strength and deflection. CO4: Design the simple and indeterminate structures like continuous beams and portal frames CO5: Analyze and design composite section and various slabs CO6: Design various special types of PSC structures like pipes, poles, tanks, sleepers CO7: Understand the causes of various defects in PSC structure and remedies for it.

Course Code	CVSE-E2-02
Type of Course	Elective-II
Course Title	Design of Masonry Structures
Nature of Course	Elective-II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the preliminary information of various masonry structures including materials of construction, basic properties and parameters. CO2: Understand the compressive strength of masonry structures under various conditions and situation CO3: Determine strength of masonry structure in flexure, shear, bondand factors affecting CO4: Design the load bearing masonry buildings CO5: Design the earthquake resistant masonry structures CO6: Understand the structural aspects of monuments and historical buildings

Course Code	**CVSE-E2-03**
Type of Course	Elective-II
Course Title	Assessment of Structural Loading
Nature of Course	Elective-II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Analyze structures comprising axial elements, Beams, Grids,Plane and space frames using matrix methods. CO2: Apply matrix methods for elastic instability and second ordereffects including plane frames and space frames. CO3: Analyse continuous beams and grids by flexibility and stiffness matrix methods.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

FIRST YEAR SECOND SEMESTER

Second Semester

Sr. No.	Subject Code	Name of Subject	Hours /Week			Credit	Examination Scheme				
							Theory		CA	PR/ OR	Total
			L	P	T		TH	MTE			
01	CVSE201	Theory of Plates and Shells	03	--	1	04	60	20	20	--	100
02	CVSE202	Finite Element Analysis	03	--	1	04	60	20	20	--	100
03	CVSE-S01	Seminar-I	--	04	--	02	--	--	50	50	100
04	CVSE-L02	PG Lab-II or Mini -Project	--	04	--	02	--	--	50	50	100
05	CVSE-E3	Elective-III (Departmental)	03	--	--	03	60	20	20	--	100
06	CVSE-E4	Elective-IV (Departmental)	03	--	--	03	60	20	20	--	100
07	CVSE-E5	Elective-V (Open)	03	--	--	03	60	20	20	--	100
		Total for Semester II	**15**	**08**	**02**	**21**	**300**	**100**	**200**	**100**	**700**

Elective-III

CVSE-E3-01: Design of Cold Formed Steel Structures

CVSE-E3-02: Structural Health Monitoring

CVSE-E3-03: Retrofitting of Structures

Elective- IV

CVSE-E4-01: Design of Tall Buildings

CVSE-E4-02: Earthquake Engineering & Design of Earthquake Resistant Structures

CVSE-E4-03: Structural Audits

Elective-V (Open)

CVSE-E5-01: Research Methodology

CVSE-E5-02: Soil Dynamics & Machine Foundations

CVSE-E5-03: Solution Procedures in Civil Engineering

Course Code	CVSE201
Type of Course	
Course Title	Theory of Plates and Shells
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Understand and derive governing differential equation for deflected shape of rectangular plates CO2: Solve governing differential equation of deflected shape of rectangular plate for various loading and support conditions CO3: Understand and derive governing differential equation for deflected shape of circular plates CO4: Solve governing differential equation of deflected shape of circular plate for various loading and support conditions CO5: Understand membrane theory for internal forces in differentshells CO6: Understand different theories of analysis of shells

Course Code	CVSE202
Type of Course	
Course Title	Finite Element Analysis
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Understand the different energy methods in structural analysis and basic concepts of finite element method. CO2: Analyse 1-D problems related to structural analysis like Bars, Trusses, Beams and Frames using finite element approach CO3: Find solution to problems using direct approach methods like Rayleigh – Ritz or Galerkin's Method CO4: Solve 2-D problems using knowledge of theory of elasticity CO5: Students will be able to implement the knowledge of numerical methods in FEM to find the solution to the various problems in statics and dynamics CO6: Analyse 1D, 2D, and 3D structures using different software packages based on FEM

Course Code	CVSE-S01
Type of Course	
Course Title	Seminar-I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-4-0
Credits	2
Course Outcomes	CO1: Identify topics that are relevant to the present context of the world CO2: Perform survey and review relevant information to the field of study CO3: Enhance presentation skills and report writing skills. CO4: Develop alternative solutions which are sustainable. CO5: To search literature from different sources to appraise the state-of-the-art.

Course Code	CVSE-L02
Type of Course	
Course Title	PG Lab-II or Mini -Project
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-4-0
Credits	2
Course Outcomes	CO1: Product preparations, working/non-working models, prototype development, fabrication of setups, laboratory experiment development, process modification/development, simulation, software development, integration of software and hardware, statistical data analysis, survey, creating awareness in society. CO2: The student is required to submit a report based on the work. The evaluation of the project shall be on continuous basis.

Course Code	CVSE-E3-01
Type of Course	Elective-III (Departmental)
Course Title	Design of Cold Formed Steel Structures
Nature of Course	Elective-III (Departmental)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the types of cross sections, mechanical and thermal properties and applications of cold formed steel structures. CO2: Understand the design criteria and strength of thin elements and analyse various cross section for strength in tension, compression, flexure, etc. CO3: Design the CFS flexural members CO4: Design the CFS compression members CO5: Design the CFS members subjected to axial load and bending CO6: Study and design various types of connections in cold formed steel structures

Course Code	CVSE-E3-02
Type of Course	Elective-III (Departmental)
Course Title	Structural Health Monitoring
Nature of Course	Elective-III (Departmental)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand concepts in structural health monitoring and acquire knowledge of smart materials. CO2: Understand vibration control methods in structural health monitoring CO3: Understand electrical impedance methods in structural health monitoring CO4: Understand wave propagation methods in structural health monitoring CO5: Understand advanced signal processing techniques in structural health monitoring CO6: Understand applications of structural health monitoring in different structural systems

Course Code	CVSE-E3-03
Type of Course	Elective-III (Departmental)
Course Title	Retrofitting of Structures
Nature of Course	Elective-III (Departmental)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand factors of Serviceability and Durability of Structures. CO2: Determine crack width, effect of crack on materials, effect ofmoisture on structures CO3: Understand methods for protection of steel structures and masonry structures CO4: Understand various materials and methodologies used for repairing of structures CO5: Understand and implement techniques used for repairing and maintenance of structure CO6: Understand procedure to strengthen the existing structures and structural elements

Course Code	CVSE-E4-01
Type of Course	Elective-IV (Departmental)
Course Title	Design of Tall Buildings
Nature of Course	Elective-IV (Departmental)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Identify and calculate magnitude of various loads acting on tall buildings. CO2: Understand various forms of structures, moment and force resisting systems in a structure CO3: Identify various factors causing movements /twists in the building and their analysis and design CO4: Understand various types of chimneys, their components, Analyse and design of chimneys CO5: Understand various types of Cooling Towers, their components& feasibility, analyse and design a Cooling Tower CO6: Understand various types of transmission towers, their components and suitability, analyse and design a transmission tower

Course Code	CVSE-E4-02
Type of Course	Elective-IV (Departmental)
Course Title	Earthquake Engineering & Design of Earthquake Resistant Structures
Nature of Course	Elective-IV (Departmental)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand Engineering Seismology and Seismic zones inIndia. CO2: Understand earthquake response of SDoF Linear systems andinstrumentation in measurement of earthquakes CO3: Understand factors resisting earthquake forces, and earthquakerisk analysis CO4: Perform Seismic Analysis of buildings as per IS 1893 CO5: Understand, analyse and Design structural elements and its ductile detailing using IS 13920 CO6: Understand Various Retrofitting methods for RC framed structure and masonry structures

Course Code	CVSE-E4-03
Type of Course	Elective-IV (Departmental)
Course Title	Structural Audits
Nature of Course	Elective-IV (Departmental)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Gain the knowledge of Bye laws, procedure of Structural audit and study the typical problems in structures. CO2: Aware of causes and types of deterioration in structures CO3: Develop skills for use of various Non destructive tests required during auditing of structures CO4: Strength evaluation of existing structures CO5: Acquire knowledge of legal procedure to conduct structural audits CO6: Prepare a Structural audit report

Course Code	CVSE-E5-01
Type of Course	Elective-V (Open)
Course Title	Research Methodology
Nature of Course	Elective-V (Open)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand concept of research, its types, methods, detailedprocedure to identify and solve a research problem. CO2: Understand various mathematical techniques useful in research work CO3: Understand various sampling techniques useful in research work CO4: Understand various techniques for correlating and predictingdifferent parameters with each other based on data collected CO5: Design the experiments for research work CO6: Analyse and interpret the data, results and to conclude the final results

Course Code	CVSE-E5-02
Type of Course	Elective-V (Open)
Course Title	Soil Dynamics & Machine Foundations
Nature of Course	Elective-V (Open)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the fundamentals of wave propagation in soil media. CO2: Apply theory of vibrations to solve dynamic soil problems & tocalculate the dynamic properties of soils using laboratory and field tests CO3: Analyze the behaviour of a machine foundation resting on the surface and embedded foundation CO4: Analyze the block foundation under different modes of vibrations CO5: Understand the principles of design of foundations for reciprocating and impact machines as per IS code CO6: Acquainted with types, methods & materials for vibration isolation systems

Course Code	CVSE-E5-03
Type of Course	Elective-V (Open)
Course Title	Solution Procedures in Civil Engineering
Nature of Course	Elective-V (Open)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To study the basics of structural analysis and limitations of different methods. CO2: Acquire knowledge of linear and nonlinear analysis tools CO3: Understand numerical method based tools to solve mathematical model CO4: Understand and implement computer based numerical methodsto analyze various structures. CO5: Understand experimental stress analysis concepts and modeling techniques CO6: Develop algorithms and programs to analyze different structuresusing various programming languages

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

SECOND YEAR THIRD SEMESTER

Third Semester

Sr. No.	Subject Code	Name of the subject	Hours/ Week			Credit	Examination scheme				
							Theory		CA	PR / OR	Total
			L	P	T		TH	Test			
1	CVSE301	Project Management and Intellectual Property Rights (Self Study)*	--	--	--	02	--	--	50	50	100
2	CVSEPS1	Project Stage -I	--	--	--	10	--	--	50	50	100
		Total for Semester III	--	--	--	12	--	--	100	100	200

Course Code	CVSE301
Type of Course	Self Study
Course Title	Project Management and Intellectual Property Rights
Nature of Course	Self Study
Weekly Teaching Hours	L-T-P:0-0-0
Credits	2
Course Outcomes	CO1: The students once they complete their academic projects, shall get an adequate knowledge on patent and copyright for their innovative research works CO2: During their research career, information in patent documents provide useful insight on novelty of their idea from state-of-the art search. This provide further way for developing their idea or innovations CO3: Work in teams, solve problems and manage time CO4: Write reports on project work and critical reflect on your own learning. CO5: Analyze ethical and professional issues which arise in the intellectual property law context

Course Code	CVSEPS1
Type of Course	
Course Title	Project Stage –I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-0
Credits	10
Course Outcomes	CO1: Conceptualize, design and implement solutions for specific problems CO2: Communicate the solutions through presentations and technical reports CO3: Apply project and resource managements skills, professionalethics, societal concerns CO4: Synthesize self-learning, sustainable solutions and demonstrate life-long learning CO5: To search literature from different sources to appraise the state-of-the-art in the chosen field. CO6: To compile and prepare a technical report of the collected literature and present. CO7: To formulate/define the problem for dissertation.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

SECOND YEAR FOURTH SEMESTER

Fourth Semester

Sr. No.	Subject Code	Name of the subject	Hours/Week			Credit	Examination scheme				
							Theory		CA	PR/ OR	Total
			L	P	T		TH	Test			
1	CVSEPS2	Project Stage-II	--	--	--	20	--	--	100	100	200
		Total for Semester IV	--	--	--	20	--	--	100	100	200
GRAND TOTAL											1700

* Student may select this course either from NPTEL/MOOC pool or any other approved reputed source. The submission of course completion certificate is mandatory.

Course Code	CVSEPS2
Type of Course	
Course Title	Project Stage-II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-0
Credits	20
Course Outcomes	CO1: Conceptualize, design and implement solutions for specific problems. CO2: Communicate the solutions through presentations and technical reports. CO3: Apply project and resource managements skills, professionalethics, societal concerns CO4: Synthesize self-learning, sustainable solutions and demonstrate life-long learning. CO5: To appraise literature in a given field of structural engineering. CO6: To identify and formulate problem in structural engineering based on appraisal of literature/field condition. CO7: To solve the identified problem using appropriate methodology. CO8: To write and present technical paper based on the research work.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

COURSE OUTCOMES: M. Tech – Computer Science and Engineering

POSTGRADUATE COURSES [PG]

FIRST YEAR FIRST SEMESTER

Course Code	MTCE1101
Type of Course	
Course Title	Computer Algorithms
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Argue the correctness of algorithms using inductive proofs and invariants. CO2: Analyze worst-case running times of algorithms using asymptotic analysis. CO3: Describe the divide-and-conquer paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize divide-and-conquer algorithms. Derive and solve recurrences describing the performance of divide-and-conquer algorithms. CO4: Describe the dynamic-programming paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize dynamic-programming algorithms, and analyze them. CO5: Describe the greedy paradigm and explain when an algorithmic design situation calls for it. Recite algorithms that employ this paradigm. Synthesize greedy algorithms, and analyze them. CO6: Explain the major graph algorithms and their analyses. Employ graphs to model engineering problems, when appropriate. Synthesize new graph algorithms and algorithms that employ graph computations as key components, and analyze them.

Course Code	MTCE1102:
Type of Course	
Course Title	Introduction to Machine Learning
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Have a good understanding of the fundamental issues and challenges of machine learning: data, model selection, model complexity, etc. CO2 : Have an understanding of the strengths and weaknesses of many popular machine learning approaches. CO3:Appreciate the underlying mathematical relationships within and across Machine Learning algorithms and the paradigms of supervised and un-supervised learning. CO4: Be able to design and implement various machine learning algorithms in a range of real-world applications.

Course Code	MTCE1103:
Type of Course	
Course Title	Advanced Computer Network
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1:State the fundamentals related to network security and basics of IPv6 and IPsec. CO2: State the fundamentals related to network security and basics of IPv6 and IPsec. CO3:Explain various protocols related to internet key exchange. CO4: Study Adhoc network and its protocols. CO5: Define various examples of wireless communication system, standards related to 2G and 3G wireless networks. CO6: Design wireless mobile network according to parameters such as frequency reuse, handoff strategies and system capacity. Relational

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road,
Aurangabad - 431010 (M.S.)NAAC
Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

Course Code	MTCE1104
Type of Course	
Course Title	Cloud Computing **(Elective I)**
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Understand various basic concepts related to cloud computing technologies. CO2: To demonstrate an understanding of Service models, deployment models, Virtualization. CO3: Understand different cloud programming platforms and tools. CO4: Create application by utilizing cloud platforms such as Google app Engine and Amazon Web Services (AWS) CO5: Be familiar with cloud programming using Google's 'Go' programming language.

SEMESTER II

Course Code	MTCE1201
Type of Course	
Course Title	Data Science
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Cluster Analysis, Anomaly Detection, Association Rules, Data Mining Sequences CO2: Text mining Text Clusters. CO 3: Simple regression, Multiple Regression, Multivariate RegressionAnalysis, Robust Regression, Correlation, Clustering. CO4: R graphics, Plotting, Scatter Plots Bar Charts and Plots 3D graphics CO5: Machine Learning: Data Partitioning Predicting events with machine learning, Supervised and Unsupervised learning.

Course Code	MTCE1202:
Type of Course	
Course Title	Software Architecture
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Argue the importance and role of software architecture in large-scale software systems. CO2: Design and motivate software architecture for large-scale software systems. CO3: Recognize major software architectural styles, design patterns, and frameworks. CO4: Describe a software architecture using various documentation approaches and architectural description languages. CO5: Generate architectural alternatives for a problem and selection among them.

Course Code	MTCE1203
Type of Course	
Course Title	Software testing
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Know the basic concepts of **software testing** and its essentials. CO2: Able to identify the various bugs and correcting them after knowing the consequences of the bug. CO3: Use of program's control flow as a structural model is the corner stone of testing.

Course Code	MTCE104
Type of Course	
Course Title	Mobile Computing (Elective 4)
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1:Students able to use mobile computing more effectively CO2: Students gain understanding of the current topics in MANETs and WSNs, both from an industry and research point of views. CO3: Acquire skills to design and implement a basic mobile ad hoc or wireless sensor network via simulations.

Course Code	MTSE1205
Type of Course	
Course Title	Object oriented system
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects. CO2: Understand dynamic memory management techniques using pointers, constructors, destructors, etc. CO3: Describe the concept of function overloading, operator overloading, virtual functions and polymorphism. CO4: Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming. CO5: Demonstrate the use of various OOPs concepts with the help of programs.

Course Code	MTCE1104
Type of Course	
Course Title	Natural Language Processing
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: This course introduces the fundamental concepts and techniques of natural language processing (NLP). Students will gain an in-depth understanding of the computational properties of natural languages and the commonly used algorithms for processing linguistic information. The course examines NLP models and algorithms using both the traditional symbolic and the more recent statistical approaches. CO2: .NET is a widely used Framework in Software Development. The objective of the course is to enable the student to gain mastery in various advanced .NET features used in Software Industry CO3:To apply algorithms used in Image processing for day-to-day applications. CO4: Real-Time system issues can be handled with the software and Hardware approach. CO5: The aim of this course is to introduce students to the mobile application development environment and make them aware of the various technologies in the field. This course will help to develop the technical knowledge, specialized software development skills for developing mobile applications on various platforms.

Course Code	MTCE1104:
Type of Course	
Course Title	Social Network Analysis **(Elective I)**
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Know basic notation and terminology used in network science CO2: Be able to visualize, summarize and compare networks CO3: Understand basic principles behind network analysis algorithms CO4:Develop practical skill so network analysis in R programming language CO5: Be capable of analysing real work networks

Course Code	MTCE1105
Type of Course	
Course Title	High Performance Computing **(Elective 2)**
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Can explain the concepts and terminology of high performance computing. CO2: Can write and analyze the behavior of high performance parallel programs for distributed memory architectures (using MPI). CO3: Can write and analyze the behavior of high performance parallel programs for shared memory architectures (using Pthreads and OpenMP). CO3: Can write simple programs for the GPU. CO4: Can write simple Map Reduce (Hadoop or Spark) programs

Course Code	MTCE1203
Type of Course	
Course Title	Algorithm for Big Data **(Elective3)**
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Understand fundamental properties of matrices including inverse matrices, eigenvalues and linear transformations. Be able to solve linear systems of equations CO2: Understand the notions of a vector space, a subspace, linear dependence and independence, spanning sets and bases within the familiar setting of R2,R3..Rn etc CO3: Have an insight into the applicability of linear algebra CO4: Understand importance of optimization for Data Science & apply basic concepts of mathematics to formulate and understand the type of an optimization problem CO5: Understand all the analytical methods for solving unconstrained optimization problems and convex constrained optimization problems CO6: Understand all the search methods to solve single and multivariable unconstrained optimization problems

Course Code	MTCE104
Type of Course	
Course Title	Mobile Computing **(Elective 4)**
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Comprehend the basics of mobile Computing CO2:. Express the functionality of Mobile IP and Transport Layer CO3: Classify different types of mobile telecommunication systems CO4: Implement Adhoc networks with routing protocols CO5:Use mobile operating systems in developing mobile applications CO6:Synthesize new knowledge in the area of mobile computing by using appropriate techniques

Course Code	MTCE104
Type of Course	
Course Title	Mobile Computing **(Elective 4)**
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Comprehend the basics of mobile Computing CO2: Express the functionality of Mobile IP and Transport Layer CO3: Classify different types of mobile telecommunication systems CO4: Implement Adhoc networks with routing protocols CO5:Use mobile operating systems in developing mobile applications CO6:Synthesize new knowledge in the area of mobile computing by using appropriate techniques

Course Code	MTCE1205
Type of Course	
Course Title	Pattern Recognition **(Elective 5)**
Nature of Course	Compulsory
Weekly Teaching Hours	L:3 T:1 P:0
Credits	4
Course Outcomes	CO1: Explain and compare a variety of pattern classification, structural pattern recognition, and pattern classifier combination techniques. CO2: Summarize, analyze, and relate research in the pattern recognition area verbally and in writing. CO3: Apply performance evaluation methods for pattern recognition, and critique comparisons of techniques made in the research literature. CO4: Apply pattern recognition techniques to real-world problems such as document analysis and recognition. CO5: Implement simple pattern classifiers, classifier combinations, and structural pattern recognizers.

COURSE OUTCOMES: M.Tech Electronics and Telecommunications Engineering

POSTGRADUATE COURSES [PG]

FIRST YEAR FIRST SEMESTER

Course Code	MTETC101
Type of Course	
Course Title	Signal Theory
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3---1
Credits	4
Course Outcomes	CO1: Learner will be able to apply knowledge of basicprobability theory. CO2: Learner will be able to understand concept of Random Variable. CO3: Learner will be able to estimate different aspects of Random Variable like Mean, Variance, Moments, distributionfunction, density function etc. CO4: Learner will be able to distinguish multiple RandomVariable and its properties. CO5: Learner will be able to hypothesize nature of different Random Processes. CO6: Learner will be able to adapt basic concepts of estimationon multiple and repeated data measurement.

Course Code	MTETC102
Type of Course	
Course Title	Radiation and Microwave Techniques
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Learner will be able to analyze EM Transmission characteristics of waveguide CO2: Learner will be able to analyze Transmission line circuit at microwave frequency CO3: Learner will be able to demonstrate use of smith chart for solving transmission line problem CO4: Learner will be able to analyze various microstrip line integrated networks and their parameters CO5: Learner will be able to formulate microwave communication system such as satellite and microwave antennas CO6: Learner will be able to demonstrate different applications of RF and Microwave.

Course Code	MTETC103
Type of Course	
Course Title	Signal Processing Algorithms & Applications
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Learner will be able to analyze the time and frequency response of discrete time system CO2: Learner will be able to design digital filters for various application CO3: Learner will be able to design FIR and IIR filters for various applications CO4: Learner will be able to understand the fundamentals of multi rate signal processing and its application CO5: Learner will be able to understand signal representation in terms of dimension, orthogonality etc CO6: Learner will be able to analyze least square method for power spectrum estimation

Course Code	MTETE114.1
Type of Course	
Course Title	Artificial Neural Networks and Applications
Nature of Course	Elective-I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to articulate analogy of human neural network for understanding of artificial learning algorithms. CO2: Learner will be able to analyze radial basis functionnetwork CO3: Learner will be able to analyze neural network architecture & basic learning algorithms CO4: Learner will be able to understand mathematical modelingof neurons, neural networks CO5: Learner will be able to analyze training, verification and validation of neural network models CO6: Learner will be able to design Engineering applicationsthat can learn using neural networks

Course Code	MTETE114.2
Type of Course	
Course Title	Electromagnetic Interference and Compatibility
Nature of Course	Elective-I
Weekly TeachingHours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will acquire knowledge of EMI / EMC sources and their standards CO2: Lerner will be able to measure different parameters of interference in EM CO3: Learner will be able to reduce the interference within EM devices CO4: Lerner will be able to illustrate the physical and statistical model of EM devices CO5: Lerner will be able to analyze the EM devices in terms of Computer Based Modeling and Simulation CO6: Learner will be able to design electronic systems that function without errors or problems related to electromagnetic compatibility

Course Code	MTETE114.3
Type of Course	
Course Title	Mobile Communication
Nature of Course	Elective-I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to analyze concept of basic cellular mobile system CO2: Learner will be able to analyze multipath fading channel. CO3: Learner will be able to distinguish types of fadingchannels with the concept of coherence time CO4: Learner will be able to demonstrate the multiple access techniques. CO5: Learner will be able to analyze diversity in multipathchannels CO6: Learner will be able to understand the various standards involve in evolution of communication system

Course Code	MTETE114.4
Type of Course	
Course Title	Fault Tolerant Systems
Nature of Course	Elective-I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	C01: Learner will be able to analyze the risk of computer failures and their peculiarities compared with other equipment failures. C02: Learner will be able to analyze advantages and limits of fault avoidance and fault tolerance techniques. C03: Learner will be able to distinguish threat from software defects and human operator error as well as from hardware failures. C04: Learner will be able to analyze different forms of redundancy and their applicability to different classes of dependability requirements. C05: Learner will be able to choose among commercial platforms (fault-tolerant or nonfault-tolerant) on the basis of dependability requirements C06: Learner will be able to demonstrate the use of fault tolerance in the design of application software. C07: Learner will be able to analyze relevant factors in evaluating alternative system designs for a specific set of requirements. C08: Learner will be aware of the subtle failure modes of "fault-tolerant" distributed systems, and the existing techniques for guarding against them. CO9: Learner will be able to analyze cost-dependability trade- offs and the limits of computer system dependability.

Course Code	MTETE114.5
Type of Course	
Course Title	ANALOG AND MIXED SIGNAL PROCESSING
Nature of Course	Elective-I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to distinguish between fundamental concepts of analog an discrete time signal processing. CO2: Learner will be able to design switched capacitor filters. CO3: Learner will be able to demonstrate basics of analog to digital data conversion CO4: Learner will be able to design analog and digital PLLs CO5: Learner will be able to understand fundamentals of greendata converters

Course Code	MTETE125.1
Type of Course	
Course Title	RF AND MILLIMETER WAVE CIRCUIT DESIGN
Nature of Course	Elective-II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	C01: Learner will be able to distinguish the type of network and application frequencies. C02: Learner will be able to interpret the behavior of passive network components at RF and Millimeter wave frequencies. C03: Learner will be able to analyze distributed transmission media and prepare a smith chart of the same C04: Learner will be able to categorize noise and to predict the effects of it on circuit performance. C05: Learner will be able to construct microwave amplifiers, oscillators and Mixer circuit for given specifications at RF and Millimeter wave frequencies. C06: Learner will be able to perform frequency synthesis forthe development of wireless communication systems and allied areas.

Course Code	MTETE125.2
Type of Course	
Course Title	SYSTEM ON CHIP
Nature of Course	Elective-II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	C01: Learner will be able to interpret nature of hardware and software, its data flow modeling and implementation techniques. C02: Learner will be able to analyze the micro-programmed architecture of cores and processors. C03: Learner will be able to demonstrate system on chip design models. C04: Learner will be able to hypothesize and synthesizeworking of advanced embedded systems C05: Learner will be able to develop design SOC controller. C06: Learner will be able to design, implement and test SOCmodel.

Course Code	MTETE125.3
Type of Course	
Course Title	OPTICAL FIBER COMMUNICATION
Nature of Course	Elective-II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	C01: Learner will be able to recognize and classify thestructures of Optical fiber and types. C02: Learner will be able to demonstrate electromagnetic and mathematical analysis of light wave propagation. C03: Learner will be able to analyze fabrication techniques of different optical fibers. C04: Learner will be able to interpret behavior of pulse signaland various loss mechanism. C05: Learner will be able to interpret Dispersion compensation mechanism, Scattering effects and modulation techniques. C06: Learner will be able to interpret working of Fiber based devices.

Course Code	MTETE125.4
Type of Course	
Course Title	STATISTICAL SIGNAL PROCESSING
Nature of Course	Elective-II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to generalize the properties of statistical models in the analysis of Signals using Stochastic processes. CO2: Learner will be able to compare different Stochastic Processes and Models CO3: Learner will be able to demonstrate optimum linear filter algorithms and structures. CO4: Learner will be able to Differentiate the prominence of various spectral estimation techniques for Achieving higher resolution in the estimation of power spectral density. CO5: Learner will be able to visualize Least Square Filtering and Computation techniques CO6: Learner will be able to interpret adaptive filtering and its applications.

Course Code	MTETE125.5
Type of Course	
Course Title	MICROELCTRONICS
Nature of Course	Elective-II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to discuss MOS structure in terms of different parameters CO2:Learner will be able to express different CMOS technologies CO3: Learner will get knowledge of design rules for the CMOS design CO4: Learner will be able to understand how devices and integrated circuits are fabricated and describe discuss modern trends in the microelectronics industry CO5: Learner will be able to determine the frequency range of simple electronic circuits and understand the high frequency limitations of BJTs and MOSFETs CO6: Learner will be able to design simple devices and circuits to meet stated operating specifications.

Course Code	MTETC106
Type of Course	
Course Title	Communication Skills
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: Learner will be able to understand the fundamental principles of effective business communication CO2: Learner will be able to apply the critical and creative thinking abilities necessary for effective communication in today's business world CO3: Learner will be able to organize and express ideas in writing and speaking to produce messages suitably tailored for the topic, objective, audience, communication medium and context CO4: Learner will be able to demonstrate clarity, precision, conciseness and coherence in your use of language CO5: Learner will be able to become more effective confident speakers and deliver persuasive presentations

Course Code	MTETC201
Type of Course	
Course Title	Estimation and Detection Theory
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Learner will have basic knowledge of linear algebra. CO2: Acquire basics of statistical decision theory used forsignal detection and estimation. CO3: Examine the detection of deterministic and randomsignals using statistical models. CO4: Examine the performance of signal parameters usingoptimal estimators. CO5: Study different estimation schemes such as ML andMMSE estimators.

Course Code	MTETC202
Type of Course	Information Theory and Coding
Course Title	
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Learner will be able to formulate equations for entropy mutual information and channel capacity for all types of channels. CO2: Learner will be able to distinguish between different typeserror correcting codes based on probability of error CO3: Learner will be able to design a digital communication system by selecting an appropriate error correcting codes for a particular application. CO4: Learner will be able to explain various methods of generating and detecting different types of error correcting codes CO5: Learner will be able to formulate the basic equations of linear block codes. CO6: Learner will be able to compare the performance of digital communication system by evaluating the probability of error for different error correcting codes

Course Code	MTETE233.1
Type of Course	
Course Title	MULTIRATE DIGITAL SIGNAL PROCESSING
Nature of Course	Elective-III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to develop efficient realizations for up sampling and down sampling of signals using the polyphase decomposition CO2: Learner will be able to design and implement Finite Impulse Response (FIR) and Infinite Impulse Response (IIR) digital filters to meet specifications CO3: Learner will be able to design digital filter banks based onthe techniques presented CO4: Learner will be able to analyze fundamental concepts of wavelets. CO5: Learner will be able to distinguish between wavelets and multirate filter banks, from the point of view of implementation.

Course Code	MTETE233.2
Type of Course	
Course Title	Emdedded System Design
Nature of Course	Elective-III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will have understanding of fundamental embedded systems design paradigms, architectures, possibilities and challenges, both with respect to software and hardware CO2: Learner will be able to analyze a wide competence from different areas of technology, especially from computer engineering, study of processor for deep understanding analyze case study of Pentium processor CO3: Learner will be able to demonstrate architecture of 8051, Instruction set, Addressing modes. Programming8051 for various applications. Interfacing of LED/LCD, keyboard, stepper motor, ADC/DAC and sensors, RTC, serial communication with micro-controller CO4: Learner will be able to analyze deep state-of-the-art theoretical knowledge in the areas of real-time systems, artificial intelligence, learning systems, sensor and measuring systems, and their interdisciplinary nature needed for integrated hardware/software development of embedded systems. CO5: Learner will have ability to analyze a system both as whole and in the included parts, to understand how these parts interact in the functionality and properties of the system, and understanding and experience of state-of-the-practice industrial embedded systems and intelligent embedded system development.

Course Code	MTETE233.3
Type of Course	
Course Title	WIRELESS SENSOR NETWORK DESIGN
Nature of Course	Elective-III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Student will understand the need of WSN and also will analyze the challenges in creating WSN CO2: Student will be able to design the architecture of WSN CO3: Student will be able analyze the power and security constraints in WSN CO4: Student will study different operating system to operate WSN CO5: Student will be able to understand the basic functioning of WSN at physical layer CO6: Student will understand different protocols at networklayer to for multiple channel accessing

Course Code	MTETE233.4
Type of Course	
Course Title	VLSI AND MICROSYSTEMS
Nature of Course	Elective-III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: The student will learn the different abstract levels inVerilog for modeling digital circuits. CO2: The student will learn the designing of combinational and sequential circuits in CMOS. CO3: The student will be able to understand the impact of the physical and chemical processes of integrated circuit fabrication technology on the design of integrated circuits. CO4: The student will be able to understand CMOS analog circuits design. CO5: The student will be able to understand physics of the Crystal growth, wafer fabrication and basic properties of siliconwafers. CO6: different semiconductor devices.

Course Code	MTETE233.5
Type of Course	
Course Title	NUMERICAL METHODS IN ELECTROMAGNETICS
Nature of Course	Elective-III
Weekly TeachingHours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: To understand the main principles and laws that govern electromagnetic wave propagation CO2: To identify the most suitable numerical technique for the solution of a particular problem in Electromagnetics CO3: To understand the basic properties of transmission lines; analyze electromagnetic wave propagation in generic transmission line geometries CO4: To learn how to use numerical methods to solve for electric fields from charge distributions and conducting boundaries CO5: To understand the behavior of magnetic and electric fieldsin the presence of dielectric and magnetic materials; appreciate how to simply modify expressions for capacitance and inductance from free space expressions CO6: To understand the behavior of magnetic and electric fieldsin the presence of dielectric and magnetic materials

Course Code	MTETE244.1
Type of Course	
Course Title	Advanced Biomedical Signal Processing
Nature of Course	Elective-IV
Weekly TeachingHours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to demonstrate a systematic knowledge of the complex physical and physiological principles that underpin the measurement of biomedical signals. CO2: Learner will be able to demonstrate an advanced understanding of the principles of digital signal processing. CO3: Learner will be able to systematically apply advanced methods to extract relevant information from biomedical signal measurements. CO4: Learner will be able to critically assess the appropriateness of cutting-edge biomedical signal processing techniques for various problems in the field. CO5: Learner will be able to evaluate the effectiveness of techniques applied to biomedical signals against specific benchmarks.

Course Code	MTETE244.2
Type of Course	
Course Title	Reconfigurable Computing
Nature of Course	Elective-IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: The student will understand concept of static and dynamicreconfiguration. CO2: The student will use the basics of the PLDs for designingreconfigurable circuits. CO3: The student will understand the reconfigurable system design using HDL CO4: The student will demonstrate different architecyres of reconfigurable computing. CO5: The student will understand different applications of reconfigurable computing

Course Code	MTETE244.3
Type of Course	
Course Title	DIGITAL VLSI DESIGN
Nature of Course	Elective-IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to understand MOSFET device structures their physical operations, Current voltage characteristics. Fabrication process of MOS device, Making circuit with MOS devices their design equation. designing layout of such circuits, studying pass transistors CO2: Learner will be able to understand VHDL language for synthesizing Digital Circuits. Digital circuits include asynchronous and synchronous design issues and state machine synthesizing this circuits. Building state machines with Moore and mealy machines. Understanding how to write package,sub program and test benches CO3: Learner will be able to understand Programming Technologies, Programmable Logic Block Architectures, Programmable Interconnects, Programmable I/O blocks in FPGAs, Dedicated Specialized Components of FPGAs, and Applications of FPGAs. CO4: Learner will be able to understand designing of SRAM and DRAM. CO5: Learner will be able to implement Floor planning concepts, shape functions and floor plan sizing, understanding types of local routing problems Area routing, channel routing, global routing, algorithms for global routing. CO6: Learner will be able to analyze Need of Design for Testability (DFT), Controllability, predictability, testability, built in Self Test (BIST), Partial and full scan check. Understanding the system which connects host to target and need of boundary scan check, JTAG, Test Access Port (TAP) controller.

Course Code	MTETE244.4
Type of Course	
Course Title	RADAR SIGNAL PROCESSING
Nature of Course	Elective-IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to understand the history andapplication of radar system CO2: Learner will be able to understand the signal models of radar system CO3: Learner will be able to sample and quantize the signals inradar system CO4: Learner will be able to analyze the different waveformsand match filters in radar system CO5: Learner will be able to modify the radar system models by analyzing the Doppler frequency CO6: Learner will be able to model the radar system and analyze the signal in it noise

Course Code	MTETE244.5
Type of Course	
Course Title	ELECTROMAGNETICS, ANTENNA AND PROROGATION
Nature of Course	Elective-IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to gain the knowledge of basic electric field theory CO2: Learner will be able to understand basic magnetic field and combine EMF theory. CO3: Learner will be able to study various antennas, arrays and radiation pattern in antennas CO4: Learner will be able to learn the basic working of antenna.C05: Learner will be able to learn planar and broadband antennas CO6: Learner will be able to design antennas for mobile communication.

Course Code	MTETE255.1
Type of Course	
Course Title	INTERNET OF THINGS
Nature of Course	Elective-V- (Open to all)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to understand the meaning of internet in general and IOT in terms of layers, protocols, packets peer to peer communication CO2: Learner will be able to interpret IOT working at transport layer with the help of various protocols CO3: Learner will be able to understand IOT concept at data link layer CO4: Learner will be able to apply the concept of mobile networking to the internet connected devices CO5: Learner will be able to measure and schedule the performance of networked devices in IOT CO6: Learner will be able to analyze the challenges involve in developing IOT architecture

Course Code	MTETE255.2
Type of Course	
Course Title	LINEAR ALGEBRA
Nature of Course	Elective-V- (Open to all)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will learn to solve and analyze linear system of equation CO2: Learner will analyze the direct notations, duality,adjointness, bases, dual bases in linear algebra CO3: Learner will understand the concept of Linear transformations and matrices, equivalence, similarity CO4: Learner will be able to find eigen values and eigen vectorsusing characteristics polynomials CO5: Learner will learn to find the singular value decomposition of the matrix CO6: Learner will be to find the inverse of matrix

Course Code	MTETE255.3
Type of Course	
Course Title	NEURAL NETWORKS IN EMBEDDED APPLICATIONS
Nature of Course	Elective-V- (Open to all)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to understand concept of fuzzy logic CO2: Learner will be able to understand embedded digitalsignal processor, Embedded system design and developmentcycle, applications in digital camera CO3: Learner will be able to understand embedded systems, characteristics, features and applications of an embedded system CO4: Learner will be able to design and utilization of fuzzy logic controller for various industrial applications CO5: Learner will be able to implement of radial basis function, neural network on embedded system: real time face tracking and identity verification, Overview of design of ANN based sensing logic and implementation for fully automatic washing machine

Course Code	MTETE255.4
Type of Course	
Course Title	RESEARCH METHODOLOGY
Nature of Course	Elective-V- (Open to all)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will learn the meaning, objective , motivation andtype of research CO2: Learner will be able to formulate their research work withthe help of literature review CO3: Learner will be able to develop an understanding of various research design and techniques CO4: Learner will have an overview knowledge of modelingand simulation of research work CO5: Learner will be able to collect the statistical data with different methods related to research work CO6: Learner will be able to write their own research work withethics and non-plagiarized way

Course Code	MTETE255.5
Type of Course	
Course Title	WAVELET TRANSFORMS AND ITS APPLICATIONS
Nature of Course	Elective-V- (Open to all)
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learner will be able to understand the meaning of wavelet transform CO2: Learner will understand the terminologies used in Wavelet transform with its properties CO3: Learner will be able to model various filter bank using wavelet transformation CO4: Learner will understand bases , orthogonal bases inwavelet transform CO5: Learner will learn different types of wavelet transform C06: Learner will be able to design practical system usingwavelet transform

COURSE OUTCOMES: M.Tech Mechanical

POSTGRADUATE COURSES [PG]

Dr. Babasaheb Ambedkar Technological University
(Established as a University of Technology in the State of Maharashtra)

(under Maharashtra Act No. XXIX of 2014)

P.O.: Lonere, Dist.: Raigad,
Pin 402 103, Maharashtra
Telephone and Fax. : 02140 - 275142
www.dbatu.ac.in

Course Structure and Contents

for

M.Tech. in Mechanical Engineering

From 1st Semester – 4th Semester

Abbreviations

PEO: Program Educational Objectives

PO: Program Outcomes

CO: Course Outcomes

L: No. of Lecture hours (per week)

T: No. of Tutorial hours (per week)

P: No. of Practical hours (per week)

C: Total number of credits

BSH: Basic Science and Humanity

BSC: Basic Sciences Course

PCC: Professional Core Course

OEC: Open Elective Course

PEC: Professional Elective Course

BHC: Basic Humanity Course

ESC: Engineering Science Course

HSMC: Humanity Science and Management Course

NCC: National Cadet Corps

NSS: National Service Scheme

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road, Aurangabad - 431010 (M.S.)
NAAC Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

FIRST YEAR FIRST SEMESTER

Course Code	Type of Course	Name of the Course	Hours/Week			Credit	Examination Scheme				
							Theory		CA	PR/OR	Total
			L	T	P		TH	Test			
MMECH11	PCC	Engineering Thermodynamics	3	1	--	4	60	20	20	--	100
MMECH12	PCC	Machining and Forming Processes	3	1	--	4	60	20	20	--	100
MMECH13	PCC	Mechanical Vibrations	3	1	--	4	60	20	20	--	100
MDE14A	Elective I	Advanced Machine Design	3	--	--	3	60	20	20	--	100
MTE14B		Utilization of Solar Energy									
MTE14C		Advanced I.C. Engines									
MME14D		Additive Manufacturing									
MMECH15A	Elective II	Manufacturing Planning and Control	3	--	--	3	60	20	20	--	100
ME-XX15C		Hydraulic, Pneumatic and Fluidic Control									
MTE15D		Wind Energy									
MME15E		Finite Element Method									
BSH16	HSMC	Communication Skills	2	--	--	2	--	--	25	25	50
MMECH17	PCC	Mechanical Engineering Lab	--	--	3	2	--	--	25	25	50
		Total	**17**	**3**	**3**	**22**	**300**	**100**	**150**	**50**	**600**

Course Code	MMECH11
Type of Course	PCC
Course Title	Engineering Thermodynamics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Review the laws of thermodynamics CO2: Explain the use of Maxwell's relations, Clapeyron equation and apply equations of state for real gasesand compareCO3: Analysis of second law of thermodynamics for various processes CO4: Analyze gas turbine cycles CO5: Illustrate the ideal gas, real gas, its deviation with compressibility chart

Course Code	MMECH12
Type of Course	PCC
Course Title	Machining and Forming Processes
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Classify conventional and non-conventional machining processes CO2: Understand mechanism of metal cutting, introduction totool life, cutting fluids CO3: Describe the mechanism and mechanics of grindingprocesses, various non-conventional machining processes CO4: Rolling, extrusion and wire drawing processes CO5: Forging in plain stain, calculations of forging loads in Closed die forging ,residual stresses in forgings, Forging defects CO6: Sheet metal working processes

Course Code	MMECH13
Type of Course	PCC
Course Title	Mechanical Vibrations
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: To develop in our students the ability to engagethemselves to solve vibration problems CO2: To be creative problem solvers whilst dealing with machinery involving periodic phenomena CO3: To integrate empirical analysis and add to the world offield expertise where possible CO4: To adapt to recent advances in knowledge

Course Code	MDE14A
Type of Course	Elective I
Course Title	Advanced Machine Design
Nature of Course	Open Elective Course I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1:To analyze variance, factorial design and regression and understand reliability theory, design and analysis of reliability CO2:Students will have the ability to analyze behaviour of mechanical elements under fatigue and creep CO3: To study optimization and its methods CO4:To study composite materials and its characteristics CO5: To design mechanical components for various materialsand process

Course Code	MTE14B
Type of Course	Elective I
Course Title	Utilization of Solar Energy
Nature of Course	Open Elective Course I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Describe measurement of direct, diffuse and global solar radiations falling on horizontal and inclined surfaces, Basic earth sun angles, Beam and diffuse radiations, Radiation on titled surfaces CO2: Analyze the performance by conducting research on flat plate collector, air heater and concentrating type collector CO3: Understand test procedures and apply these while testing different types of collectors CO4: Demonstrate and Design various types of thermal energy storage systems CO5: Analyze payback period and annual solar savings due to replacement of conventional systems CO6: Demonstrate the importance of solar energy effectively to increase awareness of it in society

Course Code	MTE14C
Type of Course	Elective I
Course Title	Advanced I.C. Engines
Nature of Course	Open Elective Course I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Demonstrate energy management principles, identifyneed, organizing it. Carry out energy auditing CO2: Conduct economic analysis of any industry or powerplant, obtain conclusion and suggest it to industry CO3: Interpret financial appraisal methods, and thermodynamic analysis, and estimate financial budget of visited industry

Course Code	MME14D
Type of Course	Elective I
Course Title	Additive Manufacturing
Nature of Course	Open Elective Course I
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the importance of Additive ManufacturingCO2: Classify the different AM processes CO3: Design for AM processes CO4: Understand the applications of AM CO5: Apply the AM Processes bio-medical applications

Course Code	MMECH15A
Type of Course	Elective II
Course Title	Manufacturing Planning and Control
Nature of Course	Open Elective Course II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Apply the systems concept for the design of production and service systems CO2: Make forecasts in the manufacturing and service sectors using selected quantitative and qualitative techniques CO3: Apply the principles and techniques for planning and control of the production and service systems to optimize/make best use of resources CO4: Understand the importance and function of inventory and to be able to apply selected techniques for its control and management under dependent and independent demand circumstances CO5: Understand the lot sizing and production scheduling CO6: Study about quality planning, cost planning and control

Course Code	ME-XX15C
Type of Course	Elective II
Course Title	Hydraulic, Pneumatic and Fluidic Control
Nature of Course	Open Elective Course II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the type of control system and their utilityCO2: Describe the hydraulic power generation CO3: Design pneumatic and hydraulic circuits for a givenapplication CO4: Discuss steady state operating forces, transient forces andvalve instability CO5: Design of pure fluid digital elements, Lumped and distributed parameter fluid systems

Course Code	MTE15D
Type of Course	Elective II
Course Title	Wind Energy
Nature of Course	Open Elective Course II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Identify and describe history of wind energy and its scope in future CO2: survey and analyze through a literature review world distribution of wind, Weibull statistic, variation in wind energy etc. CO3: Conduct an experiment to use various wind energy measurement indicators, an emometers, and apply it to analyze and check data obtained from surveys CO4: Demonstrate and calculate performance parameters wind energy turbine CO5: Illustrate various electrical systems used in wind energy power plant CO6: Examine and justify economics of wind system

Course Code	MME15E
Type of Course	Elective II
Course Title	Finite Element Method
Nature of Course	Open Elective Course II
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the basics principle of FE method CO2: Identify mathematical model for solution of commonproblems CO3: Solve structural, thermal problem using FE in 1D CaseCO4: Derive element stiffness matrix by different methods CO5: Understand the formulation for 2D and 3D case CO6: Recognize need for and engage in lifelong learning

Course Code	BSH16
Type of Course	HSMC
Course Title	Communication Skills
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: To obtain interpersonal communication skills. CO2: To setup the ability to work independently. CO3: Have the qualities of time management and disciplineCO4: To develop presentation and speaking skills. CO5: Develop the qualities like self-discipline, self-criticism and self-management.

Course Code	MMECH17
Type of Course	PCC
Course Title	Mechanical Engineering Lab
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-3
Credits	2
Course Outcomes	CO1: Conduct test on hydraulic turbines like Pelton wheel, Francis turbine, IC Engines, Refrigeration and air conditioning test units, solar system etc. to study their performance and analyze the result CO2: Draw and analyze performance curves of these machines/systems CO3: Analyze the results obtained from the tests

FIRST YEAR SECOND SEMESTER

Course Code	Type of Course	Name of the Course	Hours/Week			Credit	Examination Scheme				
							Theory		CA	PR/OR	Total
			L	T	P		TH	Test			
MMECH21	PCC	Advanced Fluid Mechanics and Heat Transfer	3	1	--	4	60	20	20	--	100
MMECH22	PCC	Mechanical Design Analysis	3	1	--	4	60	20	20	--	100
MMECH23A	Elective III	Numerical Methods and Computational Techniques	3	--	--	3	60	20	20	--	100
ME-XX23B		CAD- CAE									
MTE23B		Computational Fluid Dynamics									
MTE23C		Advanced Refrigeration									
MTE23D		Design of Heat Exchangers									
MTE23E		Alternative Fuels for I.C. Engines									
MTE24A	Elective IV	Steam and Gas Turbines	3	--	--	3	60	20	20	--	100
MME24B		Surface Engineering									
MTE24B		Cryogenic Engineering									
MMECH24C		Nanotechnology									
MME24F		World Class Manufacturing									
MOE25A	Elective V	Research Methodology	3	--	--	3	60	20	20	--	100
MOE25B		Design of Experiments									
MOE25C		Advanced Optimization Techniques									
MOE25D		Environmental Engineering and Pollution Control									
MOE25E		Soft Computing Techniques									
MOE25F		Manufacturing Automation									
MOE25G		Modeling and Simulation									
MMECH26	PCC	Seminar	--	4	--	2	--	--	50	50	100
MMECH27	PCC	Mini Project	--	--	4	2	--	--	50	50	100
		Total	**15**	**6**	**4**	**21**	**300**	**100**	**200**	**100**	**700**

Course Code	MMECH21
Type of Course	PCC
Course Title	Advanced Fluid Mechanics and Heat Transfer
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: Analyze steady state and transient heat conduction problems of real life Thermal systems CO2:Analyze extended surface heat transfer problems and problems of phase change heat transfer like boiling and condensation CO3: Apply the basic principles of classical heat transfer in real engineering application CO4: Analyze the analytical and numerical solutions for heat transfer problem CO5: Understand the basic concepts of turbulence and their impact on heat transfer CO6: Analyze convective heat transfer in common geometries like tube, plate, cylinder

Course Code	MMECH22
Type of Course	PCC
Course Title	Mechanical Design Analysis
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:3-1-0
Credits	4
Course Outcomes	CO1: To analyze variance, factorial design and regression and understand reliability theory, design and analysis of reliability CO2: Students will have the ability to analyse behaviour ofmechanical elements under fatigue and creep CO3: To study optimization and its methods CO4: To study composite materials and its characteristics CO5: To design mechanical components for various materialsand process

Course Code	MMECH23A
Type of Course	ElectiveIII
Course Title	Numerical Methods and Computational Techniques
Nature of Course	Open Elective Course III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Describe the concept of error CO2: Illustrate the concept of various Numerical Techniques CO3: Evaluate the given Engineering problem using thesuitable Numerical Technique CO4: Develop the computer programming based on the Numerical Techniques

Course Code	ME-XX23B
Type of Course	ElectiveIII
Course Title	CAD- CAE
Nature of Course	Open Elective Course III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Demonstrate - Polynomial and spline interpolation, Bezier curves, B-splines to surfacesrepresentation, patches and composite surfaces CO2: Design and create Solid model assembly of thermal and fluid engineering system in CAD software CO3: Analyze simple Engineering problem by selecting appropriate Mesh generation CO4: Modelling and Meshing of Thermal and Fluid Flow equipment in CAD CO5: Simulate and demonstrate Thermal and Fluid systems by using ANSYS, EES, and MATLAB etc. CO6: Understand and simulate computer aided manufacturing

Course Code	MTE23B
Type of Course	Elective III
Course Title	Computational Fluid Dynamics
Nature of Course	Open Elective Course III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1:Identify applications of finite volume and finite element methods to solve Navier-Stokes equations CO2: Evaluate solution of aerodynamic flows. Appraise & compare current CFD software.Simplify flow problems and solve them exactly CO3: Design and setup flow problem properly within CFD context, performing solidusing CAD package and producing grids via meshing tool CO4: Interpret both flow physics and mathematical properties of governing Navier-Stokes equationsand define proper boundary conditions for solution CO5: Use CFD software to model relevant engineering flow problems. Analyse the CFDresults. Compare with availabledata, and discuss the findings

Course Code	MTE23C
Type of Course	Elective III
Course Title	Advanced Refrigeration
Nature of Course	Open Elective Course III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1:Formulate and solve vapour compression refrigeration and multi-stage vapour compression systems CO2: Study and identify various types of refrigerants and their properties, such as zoetrope, azeotropic etc. CO3: Illustrate Nomenclature, Refrigerants, alternative refrigerants, CFC/HCFC phase-out regulations, action with lubricating oil, retrofitting, refrigerant blends, and effects on refrigeration components CO4: Design and analyse vapour absorption system CO5: select refrigerant control techniques, and do piping designing for refrigeration plant

Course Code	MTE23D
Type of Course	Elective III
Course Title	Design of Heat Exchangers
Nature of Course	Open Elective Course III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1:Demonstrate and of heat exchanger design methodology,and design considerations CO2: Analyse performance of Heat exchanger by applyingbasic design theory CO3:Design and conduct experiment on one from double pipe,shell and tube, tube fin, plate type and plate-fin heat exchanger CO4: Demonstrate selection criteria of HEX and conduct anindependent research to suggest suitable HEX CO5: Model and illustrate heat exchanger based on I-law and irreversibility CO6: Study and analyze losses in HEX, and upcoming advancements

Course Code	MTE23E
Type of Course	Elective III
Course Title	Alternative Fuels for I.C.Engines
Nature of Course	Open Elective Course III
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Demonstrate Structure of petroleum, Refining process, Products of refining process, Select suitable fuels for use in SI engines. Understand various performances rating in SI engines CO2: Illustrate properties of petroleum products and classifythem on their characteristic CO3: Describe and analyze Need for alternative fuels such as Ethanol, Methanol, LPG, CNG, Hydrogen and their manufacturing procedure. CO4: calculate and estimate performance and emission characteristics of alternative fuels CO5: Analyze environmental effects of combustion of various fuels, suggest modification in their usage

Course Code	MTE24A
Type of Course	Elective IV
Course Title	Steam and Gas Turbines
Nature of Course	Open Elective Course IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Illustrate properties of Steam, Draw P-V, T-s, H- s(Mollier) diagrams for steam, Describe Theoretical steam turbine cycle CO2: Demonstrate and analyse vortex flow, energy lines and reheat factors of steam turbines. Solve problems of finding performance steam turbine power plant CO3: Demonstrate simple Brayton cycle for gas turbine analyze its performance on computer simulation, suggest suitable modification and then analyse it CO4: Study and apply various Performance Improvement Techniques in steam and gas Turbines CO5: Design and suggest and analyze cooling accessories and protective material for steam turbine CO6: Visit thermal power plant and enumerate performance and maintenance and troubleshooting criteria for steam turbine

Course Code	MME24B
Type of Course	Elective IV
Course Title	Surface Engineering
Nature of Course	Open Elective Course IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Learn the importance and need of surface engineering CO2: Describe various surface cleaning and modificationtechniques CO3: Understand the concepts of surface integrity CO4: Compare various surface coating technologies CO5: Select appropriate method of coating for a givenapplication CO6: Apply measurement techniques and carry out characterization of coated surfaces

Course Code	MTE24B
Type of Course	Elective IV
Course Title	Cryogenic Engineering
Nature of Course	Open Elective Course IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Demonstrate and identify role of cryogenics in the industrial applications CO2: Describe mechanical, thermal, thermo-electric properties of cryogenic fluids CO3: Illustrate Ideal separation, properties of mixtures, Rectifiers column, separation of air, purification CO4: List and give details about various types of cryogenic refrigeration system, such as J-T Refrigeration systems, Philips refrigerator, Vuilleumier refrigerator, Solve refrigerator, G-M refrigerator CO5: Study and describe Insulation and storage systems in cryogenic engineering

Course Code	MMECH24C
Type of Course	Elective IV
Course Title	Nanotechnology
Nature of Course	Open Elective Course IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Demonstrate the understanding of length scales concepts, nanostructures and nanotechnology CO2: Identify and to compare various synthesis and characterization techniques involved in Nanotechnology CO3: Define and interpret the interactions at molecular scale CO4: Evaluate and analyse the mechanical properties of bulkNano-structured metals and alloys, Nano-composites andcarbon nanotubes CO5: Compare and analyse the effects of using nanoparticlesover conventional methods

Course Code	MME24F
Type of Course	Elective IV
Course Title	World Class Manufacturing
Nature of Course	Open Elective Course IV
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Define challenges in world class manufacturing CO2: Study various world class manufacturing strategies CO3: Understand total quality and employee involvement in manufacturing CO4: Discuss different world class information system forchange management CO5: Identify various methods and processes for WCM usingbrain storming CO6: Describe method to monitor performance in WCM

Course Code	MOE25A
Type of Course	Elective V
Course Title	Research Methodology
Nature of Course	Open Elective Course V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand and Describe importance of research CO2: Classify and select appropriate resources for Research CO3: Analyse the contents of literature and identify furtherscope CO4: Formulate a Research Problem CO5: Develop effective written and oral Presentation skills

Course Code	MOE25B
Type of Course	Elective V
Course Title	Design of Experiments
Nature of Course	Open Elective Course V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Define Taguchi, factorial experiments, variability, orthogonal array, quality loss CO2: Plan and design the experimental investigations efficiently and effectively CO3: Understand strategy in planning and conducting experiments CO4: Evaluate variability in the experimental data using ANOVA CO5: Practice statistical software to achieve robust design of experiments

Course Code	MOE25C
Type of Course	Elective V
Course Title	Advanced Optimization Techniques
Nature of Course	Open Elective Course V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Enables to acquire mathematical methods and apply in engineering disciplines CO2: Apply methods of optimization to solve a linear, non-linear programming problem by various methods CO3: Optimize engineering problem of nonlinear-programming with/without constraints, by using this technique CO4: Use of dynamic programming problem in controlling in industrial managements CO5: Simulate Thermal engineering system problem. Understand integer programming and stochastic programmingto evaluate advanced optimization techniques

Course Code	MOE25D
Type of Course	Elective V
Course Title	Environmental Engineering and Pollution Control
Nature of Course	Open Elective Course V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Identify effects of industrialization on environmentalpollution in various field CO2: Describe photochemical smog, acid Rain, Greenhouseeffect, ozone depletion, global warming CO3: Suggest pollution control techniques for vehicles, refrigeration, industries, chemical and power plant CO4: Do Case study on any industry and analyze carbonexertion rate, water pollution, soil pollution etc. CO5: Design pollution control devices for vehicle, analyze and find out replacement CFC refrigerant with HC refrigerant

Course Code	MOE25E
Type of Course	Elective V
Course Title	Soft Computing Techniques
Nature of Course	Open Elective Course V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Classify different optimization and evolutionary algorithms CO2: Apply optimization techniques to real life problems CO3: Learn and apply neural network prediction algorithm tosolve engineering problems CO4: Understand and apply fuzzy based logic function forpredicting results CO5: Acquire and use knowledge of genetic algorithm tooptimize real life problems CO6: Study different hybrid soft computing methods and its applications

Course Code	MOE25F
Type of Course	Elective V
Course Title	Manufacturing Automation
Nature of Course	Open Elective Course V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Understand the concept of automation and human factors CO2: Designing a Pneumatic and Hydraulic system for a given application CO3: Demonstrate the use of different sensors for automation CO4: Design automation systems for a given application CO5: Understand the circuit optimization techniques

Course Code	MOE25G
Type of Course	Elective V
Course Title	Modelling and Simulation
Nature of Course	Open Elective Course V
Weekly Teaching Hours	L-T-P:3-0-0
Credits	3
Course Outcomes	CO1: Define simulation, its limitations and applications CO2: Apply simulation to queuing and inventory situations CO3: Acquire knowledge to generate the random numbers for simulation models CO4: Analyse the data and verify model of simulation CO5: Learn software's and programming languages for developing simulation model CO6: Discuss case studies in manufacturing simulation

Course Code	MMECH26
Type of Course	PCC
Course Title	Seminar
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-4-0
Credits	2
Course Outcomes	CO1: Identify the topic for seminar from the recent areas and technologies in thermal and fluids engineering or related areas CO2: Carry out detailed comprehensive survey of the literature related to the topic selected. Use information available from various sources like research papers, patents, websites,discussion with experts on the topic etc. CO3: Comprehend the information, organize it and write technical report. Give presentations on thetopic to the group of students CO4: Identify and report latest developments and unresolved issues in the selected topic/area CO5: Analyse the impact of the technologies on the environment. Identify green technologies related to selected topic

Course Code	MMECH27
Type of Course	PCC
Course Title	Mini Project
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-4
Credits	2
Course Outcomes	CO1: Identify methods and materials to carry out experiments/develop code CO2: Reorganize the procedures with a concern for society, environment and ethics CO3: Analyse and discuss the results to draw valid conclusions CO4: Prepare a report as per recommended format and defendthe work CO5: Explore the possibility of publishing papers in peer reviewed journals/conference proceedings

SECOND YEAR FIRST SEMESTER

Course Code	Type of Course	Name of the Course	Hours/Week			Credit	Examination Scheme				
							Theory		CA	PR/OR	Total
			L	T	P		TH	Test			
MMECH31 MMECH32	PCC	Project Management (Self Study Course) OR Intellectual Property Rights (Self Study Course)	-- --	-- --	-- --	2 2	-- --	-- --	50 50	50 50	100 100
MMECH33	PCC	Project Stage -I	---	--	--	10	--	--	50	50	100
		Total	---	--	--	**12**	--	--	**100**	**100**	**200**

Course Code	MMECH31
Type of Course	PCC
Course Title	Project Management
Nature of Course	Self-Study Course
Weekly Teaching Hours	L-T-P:0-0-0
Credits	2
Course Outcomes	CO1: Overview of project management, its growth, and implementation. CO2: Acquire project planning and scheduling skills. CO3: Apply the mathematical tool for decision making. CO4: Work break down and construct a project network andapply CPM and PERT method CO5: Expertise in project monitoring and control by using PERT. CO6: Developing skills about Computers applications in Project Management and post-project analysis.

Course Code	MMECH32
Type of Course	PCC
Course Title	Intellectual Property Rights
Nature of Course	Self-StudyCourse
Weekly Teaching Hours	L-T-P:0-0-0
Credits	2
Course Outcomes	CO1: Enumerate and demonstrate fundamental terms such ascopy-rights, Patents, Trademarks etc. CO2: Interpret and follow Laws of copy-rights, Patents, Trademarks and various IP registrationProcesses to register own project research CO3: Exhibit the enhance capability to do economic analysis of IP rights, technology and innovationrelated policy issues and firms commercial strategies CO4: Develop awareness at all levels (research and innovation) of society to develop patentable technologies CO5: Apply trade mark law, copy right law, patent law and alsocarry out intellectual property audits CO6: Manage and safeguard the intellectual property and protect it against unauthorized use

Course Code	MMECH33
Type of Course	PCC
Course Title	Project Stage-I
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-0
Credits	10
Course Outcomes	CO1: Identify problems and to plan methodologies to solve problems CO2: Carry out exhaustive literature review, study &evaluate collected literature critically and identify the gaps based on the review CO3: Select the specific problem for the study as a project CO4: Demonstrate technical writing while preparing project report and present it to evaluation committee to demonstrate presentation skills acquired

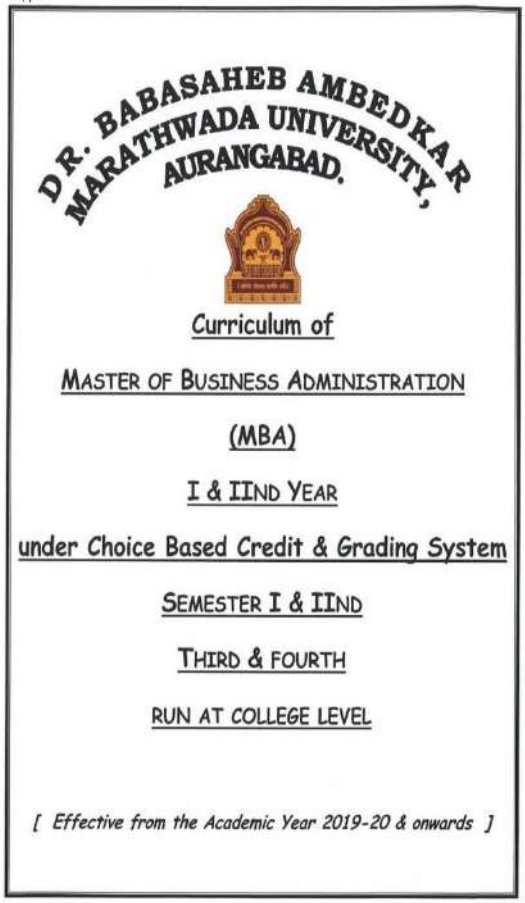
SECOND YEAR SECOND SEMESTER

Course Code	Type of Course	Name of the Course	Hours/Week			Credit	Examination Scheme				
							Theory		CA	PR/OR	Total
			L	T	P		TH	Test			
MMECH41	PCC	Project Stage -II	---	--	--	20	--	--	100	100	200
		Total	---	--	--	20	--	--	100	100	200

Course Code	MMECH41
Type of Course	PCC
Course Title	Project Stage-II
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:0-0-0
Credits	20
Course Outcomes	CO1: Solve identified technical problem using acquired knowledge and skill CO2: Use latest equipment, instruments, software tools, infrastructure and learning resources available to solve the identified project problem. Procure resources, if required CO3: Interpret theoretical/experimental findings using availabletools CO4: Compare the results obtained with results of similar studies CO5: Draw conclusions based on the results

COURSE OUTCOMES: MBA

(POST GRADUATE COURSE [PG])



FIRST YEAR FIRST SEMESTER

Course Code	IC 001
Type of Course	Generic Foundation Course
Course Title	Constitution of India
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	C01: To make the students learn about the history, philosophyand the contours of constitutional rights and duties. C02: To make the students understand the organs of governancelike parliament, executive & judiciary.

Course Code	MANB 401
Type of Course	Generic Foundation Course
Course Title	Management Practices & Organizational Behaviour
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The subject intends to empower the students to understandthe nuances of organizational functioning with special reference to human behaviour, group dynamics, organizational learning & thereon; thereby making them capable of working in an organizational set-up.

Course Code	MANB402
Type of Course	Generic Foundation Course
Course Title	Statistical Methods
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The objective of the course is to make student familiar with statistical techniques relevant to management science andfocus on applied aspects of subject.

Course Code	MANB403
Type of Course	Generic Foundation Course
Course Title	Managerial Economics
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The objective of the course is to acquaint the students with concepts and technologies needed in economics and to enable them to apply this knowledge in business decision making at firm level.

Course Code	MANB404
Type of Course	Generic Foundation Course
Course Title	Research Methodology
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To equip the students with the basic understanding of the Research Methodology and to provide an insight into the application of modern analytical tools and techniques for the purpose of management decision making.

Course Code	MANB405
Type of Course	Generic Foundation Course
Course Title	Accounting for Managers
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The basic purpose of this course is to develop an insight of postulates, principles and techniques of accounting. C02: To plan the work & take decisions on the basis of accounting information.

Course Code	MANB406
Type of Course	Generic Foundation Course
Course Title	Environment Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	C01: UNs Resolution for 2010 & the World Millennium Goals have Environment & Sustainable Development as the core objective. C02: The course is designed to make the budding managers sensitize to Environment along with developing an understanding of inclusive & sustainable growth; thereby creating Managers that cater to the societal demands along with the organizational priorities.

Course Code	MANB407
Type of Course	Skill Based Foundation Course
Course Title	IT for Managers
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	C01: Keen stress on the Advanced concepts of InformationSystems in Organization along with advanced concepts in MS- Excel is rendered.

Course Code	MANB408
Type of Course	Skill Based Foundation Course
Course Title	Yoga
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	C01: The objective of this course is to promote holistic development of the students. C02: C02: The course should be undertaken and assessed by Qualified Yoga Teacher.

Course Code	MANB451
Type of Course	Skill Based Foundation Course
Course Title	Community Service
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	C01: To make the students participate and conduct any of the community service for the betterment and benefit of the society. C02: To inculcate the feeling of compassion and spirit of helping others by means of community service.

Course Code	MANB452
Type of Course	Core Course
Course Title	Mini Project
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	C01: To give an exposure of the company and the industry to the student by completing the project successfully. C02: To make the students learn about how to write a project report and the kind of formatting needed for the same.

FIRST YEAR SECOND SEMESTER

Course Code	MANB409
Type of Course	Generic Foundation Course
Course Title	Optimization Technique
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The objective of the course is to develop an understanding of a basic optimization techniques and their role in Managerial Decision Making.

Course Code	MANB410
Type of Course	Generic Foundation Course
Course Title	Human Resource Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: In a complex world of industry and business organizational efficiency is largely dependent on the contribution made by the members of the organization. The Objectives of this course is to sensitize students to the various facets of managing people and to create an understanding of the policies and practices of human resource management.

Course Code	MANB411
Type of Course	Generic Foundation Course
Course Title	Financial Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The purpose of this course is in creating awareness and understanding of three core areas of Financial Management- Investment Decisions, Financing Decisions and Dividend Decisions

Course Code	MANB412
Type of Course	Generic Foundation Course
Course Title	Marketing Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The purpose of this course is to develop and understanding of the underlying concepts, strategies and issues involved in the marketing of products and services.

Course Code	MANB413
Type of Course	Generic Foundation Course
Course Title	Productions & Operations Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The Course is designed to acquaint the students with decision making in: Planning, scheduling and control of Production and Operation function in both manufacturing and services; Productivity improvement in operations through layout engineering and quality management etc.; Effective and efficient flow, replenishment and control of material with reference to both manufacturing and services organizations.

Course Code	MANB414
Type of Course	Generic Foundation Course
Course Title	Business Law
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The Course bears the onus of developing technical insights in students about the legislative framework of Indian Business Scene.

Course Code	MANB415
Type of Course	Generic Foundation Course
Course Title	Indian Ethos & Values
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	CO1: The objective of the course is to understand the conceptslike morals. Ethics, values and principals and it's applicability in the current business scenario.

Course Code	MANB417
Type of Course	Generic Foundation Course
Course Title	Creativity & Innovation
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	C01: To make the students think in a creative manner and come up with an innovative solution in the current scenario.

Course Code	MANB417
Type of Course	Generic Foundation Course
Course Title	Creativity & Innovation
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	C01: To make the students think in a creative manner and come up with an innovative solution in the current scenario.

Course Code	MANB416
Type of Course	Skill Based Foundation Course
Course Title	International Business Environment
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	C01: The objective of the course is to provide the student with a background of various environment factors that have major repercussions on business and sharpen their mind to watch and update the changes that occur constantly in this sphere.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road, Aurangabad - 431010 (M.S.)
NAAC Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

MBA THIRD SEMESTER FINANCE SPECIALIZATION

Course Code	MANB501F
Type of Course	Core Course
Course Title	Money, Banking and Finance
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The subject aims to introduce basic Concepts and Principles in Money and Banking. C02: Other aim is, along with development, understanding the nuances of Monetary Policy and Financial Markets.

Course Code	MANB501F
Type of Course	Core Course
Course Title	Money, Banking and Finance
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The subject aims to introduce basic Concepts and Principles in Money and Banking. C02: Other aim is, along with development, understanding the nuances of Monetary Policy and Financial Markets.

Course Code	MANB502F
Type of Course	Core Course
Course Title	Working Capital Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: Critical understanding of Concepts of Working Capital and its effective management for reduced risks & increased profitability.

Course Code	MANB503F
Type of Course	Core Course
Course Title	Corporate Taxation
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The course aims at the understanding of the varioussources of income at an individual & corporate level and how taxes are imposed on it accordingly.

Course Code	MANB504F
Type of Course	Core Course
Course Title	Investment Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The objective of this course intends to enable the students to understand the nuances of finance which will facilitate the decision making process.

Course Code	MANB505F
Type of Course	Core Course
Course Title	Financial Decision Analysis
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The objective of this course is to impart an intensive knowledge about the solutions, use of quantitative techniques in financial decision areas.

Course Code	MANB506F
Type of Course	Core Course
Course Title	Financial Services
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To enable the students understand the intricacies of financial services & subsequent application of the same in the industry.

Course Code	MANB551
Type of Course	Core Course
Course Title	In Plant Training Report
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To enable the students understand the actual working environment of the industry, processes & practices, working conditions, technicalities involved into it. C02: To make the students learn the process of writing the project and understand the format of an Inplant Project Report.

MBA THIRD SEMESTER MARKETING SPECIALIZATION

Course Code	MANB501M
Type of Course	Core Course
Course Title	Consumer Behaviour
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The basic objective of the course is to understand the consumer buying behaviour, decision making and its use and application at the market place.

Course Code	MANB502M
Type of Course	Core Course
Course Title	Advertising Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The aim of this paper is to acquaint the students withconcepts, techniques and give experience of concepts for developing an effective advertising program.

Course Code	MANB503M
Type of Course	Core Course
Course Title	Retail Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To understand the retail business in totality and to makethe students learn about the retail, its layout, merchandising and all other aspects related to retail.

Course Code	MANB504M
Type of Course	Core Course
Course Title	Brand Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The purpose of this course is to develop an understanding of the underlying concepts, strategies and issues involved in the Brand management, critical from the point of view of the top executives.

Course Code	MANB505M
Type of Course	Core Course
Course Title	Sales & CRM
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The purpose of this paper is to acquaint the student with concepts which are helpful in developing a sound sales and distribution policy, organizing and managing the sales force and customer relationship.

Course Code	MANB506M
Type of Course	Core Course
Course Title	Digital Marketing
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The basic objective of this course is to develop an understanding about the digital Marketing and its Applicationin marketing function of firms.

Course Code	MANB551
Type of Course	Core Course
Course Title	In Plant Training Report
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To enable the students understand the actual working environment of the industry, processes & practices, working conditions, technicalities involved into it. C02: To make the students learn the process of writing the project and understand the format of an Inplant Project Report.

MBA THIRD SEMESTER HUMAN RESOURCE MANAGEMENT SPECIALIZATION

Course Code	MANB501H
Type of Course	Core Course
Course Title	Laws Governing HR
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The Course bears the onus of developing technical insightsin students about the legislative framework of Indian Business scene which are closely associated with human resource and its management.

Course Code	MANB502H
Type of Course	Core Course
Course Title	Human Resource Planning & Development
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To equip the students with the basic understanding of the Human Resource Planning. C02: To provide an insight into the application of HumanResource Forecasting tools and techniques for the purpose of management decision-making.

Course Code	MANB503H
Type of Course	Core Course
Course Title	Training & Development
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The course aims at exposing the learner to the Concept and practice of training and development in the modern organizational setting through the pedagogy of case discussions and recent experiences.

Course Code	MANB504H
Type of Course	Core Course
Course Title	Performance & Compensation Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To equip the students with the basic understanding of the Performance Management Systems and Compensation practices. C02: To provide an insight into the application of modern assessment tools and techniques for the purpose of management decision making.

Course Code	MANB505H
Type of Course	Core Course
Course Title	HRD & Strategies & Systems
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The course aims at arming students to align HR Department's Functioning with the Strategic Goals of the Organizations.

Course Code	MANB506H
Type of Course	Core Course
Course Title	Cross Culture & Global HRM
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The course aims at arming students to align HRDepartment's Functioning with the Strategic Goals of the Organizations.

Course Code	MANB551
Type of Course	Core Course
Course Title	In Plant Training Report
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To enable the students understand the actual working environment of the industry, processes & practices, working conditions, technicalities involved into it. C02: To make the students learn the process of writing the project and understand the format of an Inplant Project Report.

SHREEYASH PRATISHTHAN'S
SHREEYASH COLLEGE OF ENGINEERING & TECHNOLOGY
Satara Parisar, Beed By-Pass Road, Aurangabad - 431010 (M.S.)
NAAC Accredited, ISO Certified Institute
Visit Us at: www.sycet.org

MBA THIRD SEMESTER PRODUCTION & OPERATIONS SPECIALIZATION

Course Code	MANB501P
Type of Course	Core Course
Course Title	Production Planning And Control
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To equip the students with the basic functioning ofProduction Planning. C02: To provide an insight into the application of computers in production planning & control procedure for the purpose of management decision making.

Course Code	MANB502P
Type of Course	Core Course
Course Title	Purchasing And Materials Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The key objective of this course is to acquaint the students with Decision-making for effective and efficient purchase, storage and flow of materials in manufacturing and serviceOrganization. C02: To make the students learn about cost-reduction techniques in pre-purchase, purchase and port-purchase system; modern material planning and delivery systems like MRP and JIT and material handling and logistics systems.

Course Code	MANB503P
Type of Course	Core Course
Course Title	Service Operations Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To equip the students with the basic functioning of Service Operations and to Understand the challenges in operations management of services.

Course Code	MANB504P
Type of Course	Core Course
Course Title	Applied Operations Research
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To make the students learn the principals of operation research and their applications in decision making process. C02: The students will also learn the ways of analyzing the data with the use of soft wares.

Course Code	MANB505P
Type of Course	Core Course
Course Title	Logistics Management
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The objective of this course is to give students a managerial knowledge of basic concepts and principles of Logistics Management. These include the management of core logistics functions, cost integration. It also includes relationships with suppliers, customers and other firm functions such as manufacturing, marketing and finance.

Course Code	MANB506P
Type of Course	Core Course
Course Title	World Class Manufacturing
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The core operations management subject is designed with the intention to create quality-consciousness amongst the future operations managers. C02: The content orients the students with ways – means – techniques – procedures for developing excellent manufacturing systems.

Course Code	MANB551
Type of Course	Core Course
Course Title	In Plant Training Report
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To enable the students understand the actual working environment of the industry, processes & practices, working conditions, technicalities involved into it. C02: To make the students learn the process of writing the project and understand the format of an Inplant Project Report.

MBA FOURTH SEMESTER PRODUCTION & OPERATIONS SPECIALIZATION

Course Code	**MANB507**
Type of Course	Core Course
Course Title	**Business Policy & Strategic Management**
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To enable the students understand the actual working environment of the industry, processes & practices, working conditions, technicalities involved into it. C02: To make the students learn the process of writing the project and understand the format of an Inplant Project Report.

Course Code	**MANB507**
Type of Course	Core Course
Course Title	**Business Policy & Strategic Management**
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: The course is designed to make the budding managers sensitized to develop holistic perspective in strategic management and business policy understanding of strategies; thereby creating Managers that cater to the societal demands along with the organizational priorities.

Course Code	**MANB508**
Type of Course	Core Course
Course Title	**DSS & MIS**
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:2-0-0
Credits	2
Course Outcomes	C0: The course objective is to bring home a systemic knowledge of the MIS so that it is appreciated and understood for its wide application in business and industry.

Course Code	**MANB509**
Type of Course	Core Course
Course Title	**Entrepreneurship Development**
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To impart the knowledge of entrepreneurship and project management and its importance in the realm of the socio economic importance of the nation.

Course Code	**MANB510**
Type of Course	Core Course
Course Title	**Quality Management**
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To make the students quality conscious irrespective of the nature of industry or the sector in which they work.

Course Code	**MANB511**
Type of Course	Core Course
Course Title	**Indian Economy**
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:4-0-0
Credits	4
Course Outcomes	C01: To make the students learn about the factors affecting the Indian economy in general and in particular.

Course Code	**MANB507**
Type of Course	Core Course
Course Title	**Major Project**
Nature of Course	Compulsory
Weekly Teaching Hours	L-T-P:8-0-0
Credits	8
Course Outcomes	C01: To enable the students learn the concepts related to their specialization by means of actually working in the industry and doing the project in that specific area. C02: To inculcate the knowledge of marking a project report in a structured format.