



Pradnya Niketan Education Society, Pune's
**N. K. ORCHID COLLEGE OF ENGINEERING
 & TECHNOLOGY, SOLAPUR**

NAAC Accredited, Approved by AICTE, New Delhi & Affiliated to DBATU, Lonere
 E-mail : office@orchidengg.ac.in, Website : www.orchidengg.ac.in, Phone No. 9423084363
 Post Box No. 154, Gut No. 16, Solapur-Tuljapur Road, Tale Hipparaga, Solapur- 413 002.

2.6.1.1 Course outcomes of all courses (A.Y. 2021-22)		
SE-I (DBATU) Theory Courses		
Course no.	Course code	Course name
C202	BTEEC302	Electrical Machines-I
COs	After the successful completion of this course student will be able to:	
1	Know construction and operating principles of three induction motors	
2	Get detailed acquaintance of construction, operating principles of three phase induction motors.	
3	Find equivalent circuit parameters and performance parameters for single & three phase induction motors.	
4	Know construction and operating principles of Single-Phase induction motors	
5	Get detailed acquaintance of construction, operating principles of single-phase induction motor.	
Course no.	Course code	Course name
C203	BTEEC303	Electrical and Electronics Measurement
COs	After the successful completion of this course student will be able to:	
1	Appreciate the fundamentals of Electrical instruments.	
2	Represent signals in frequency meter	
3	Elucidate the circuit diagram of different type instruments	
4	Use power, Frequency, Resistance meter	
Course no.	Course code	Course name
C204	BTEEC304	Basic Human Rights
COs	After the successful completion of this course student will be able to:	
1	Understand fundamentals of human rights	
2	Use Laws and regulation of human rights	
3	Know about Institutions of human rights	
Course no.	Course code	Course name
C205	BTES305	Engg. Material
COs	After the successful completion of this course student will be able to:	
1	Get acquainted with semiconducting materials, metals and Superconductors and its various applications.	
2	Apply electromagnetic field theory in electromagnetic energy conversion devices.	
3	Analyze electromagnetic wave propagation and Poynting vector.	



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SE-I (DBATU) Laboratory Courses			
Course no.		Course code	Course name
C207		BTEEL306	Electrical Machines-I Lab
COs	After the successful completion of this course student will be able to:		
1	Perform OC & SC Test on Single phase transformer		
2	Find the circuit parameters of transformer and draw its characteristic		
3	Elucidate the Three phase induction motor, construction & circuit diagrams		
4	Control the speed of Induction Motor		
5	Understand starting methods of Induction motor		
Course no.		Course code	Course name
C208		BTEEL307	Electrical and Electronics Measurement Lab
COs	After the successful completion of this course student will be able to:		
1	Appreciate the low resistance using kelvin's double		
2	Represent the medium resistance using Wheatstone's bridge		
3	Elucidate the high resistance by loss of charge method		
4	Acquire insulation resistance using Megger		
5	Design various type of indicating instruments		
Course no.		Course code	Course name
C209		BTEEP308	Mini Project-I
COs	After the successful completion of this course student will be able to:		
1	Understand concepts of project management		
2	Develop a project plan.		
3	Understand the project implementation strategy.		
4	Analyze post project affects.		
Course no.		Course code	Course name
C210		BTES211P	Internship-I Evaluation
COs	After the successful completion of this course student will be able to:		
1	Conceptualize the role and developmental nature of experiential learning.		
2	Develop procedures and policies for experiential learning.		
3	Analyze and develop a right work attitude, self-confidence, interpersonal skills, and ability to work as a team in a real organizational setting.		
SE-II (DBATU) Theory Courses			
Course no.		Course code	Course name
C212		BTEEC401	Network Theory
COs	After the successful completion of this course student will be able to:		



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1	Understand various network elements and network topology		
2	Implement various network theorem for problem solving		
3	Analyze circuits in both time domain and frequency domain		
4	Develop skills in field of signal spectra		
5	Analyze two port network functions		
Course no.		Course code	Course name
C213		BTEEC402	Power System
COs	After the successful completion of this course student will be able to:		
1	Create models of different types of Generation resources of power plants.		
2	Analysis of line parameter of transmission system and underground cables and the performance of line in the different loading conditions.		
3	Model of different types of transmission lines.		
4	Understand modelling of different types of Insulators and tower and derive and interpret its reliability.		
Course no.		Course code	Course name
C214		BTEEC403	Electrical Machine-II
COs	After the successful completion of this course student will be able to:		
1	Appreciate the fundamentals of Electrical Machine		
2	Represent different types D.C Machine		
3	Elucidate the circuit diagram of different types of Synchronous Machines		
4	Invent Types of Synchronous Machine		
5	Design Synchronous Motor		
Course no.		Course code	Course name
C215		BTBS404	Analog and Digital Electronics
COs	After the successful completion of this course student will be able to:		
1	Differentiate between various electronics components such as diodes, BJTs and FETs.		
2	Understand the applications and design of analogue and digital circuits.		
3	Understand of various types of amplifier circuits.		
4	Learn basic techniques for the design of digital circuits and fundamental concepts used in the design of digital systems.		
5	Understand the concepts of combinational logic circuits and sequential circuits.		
Course no.		Course code	Course name
C216		BTEEPE405(B)	Signals & System
COs	After the successful completion of this course student will be able to:		
1	Classify different types of CT & DT Signals.		
2	Comment on property of the system		



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3	Find the property of LTI Systems		
4	Convert time domain signal to frequency domain signal and comment on system property.		
5	Evaluate discrete time signal using DTFT and Z transform.		
SE-II (DBATU) Laboratory Courses			
Course no.		Course code	Course name
C218		BTEEL406	Network Theory Lab
COs	After the successful completion of this course student will be able to:		
1	Analyze implications of the fundamentals of Ohm's law, Kirchhoff's current and voltage laws		
2	Make practical implementation of the fundamental electrical theorems and modelling of simple electrical systems		
3	Measure accurate voltage, current, power and impedance of any circuit		
4	Teamwork skills for working effectively in groups and develop analytical skills to compare experimental results with theoretical concepts		
Course no.		Course code	Course name
C219		BTEEL407	Power System Lab
COs	After the successful completion of this course student will be able to:		
1	Develop Modelling different types of Generation resources of power plants.		
2	Analyze of line parameter of overhead transmission system and underground cables		
3	Develop Modelling of different types of transmission lines.		
4	Develop Modelling of different types of Insulators and tower and derive and interpret its reliability.		
Course no.		Course code	Course name
C220		BTEEL408	Electrical Machine-II
COs	After the successful completion of this course student will be able to:		
1	Appreciate the fundamentals of Electrical Machine		
2	Represent different types D.C Machine		
3	Elucidate the circuit diagram of different type Synchronous Machine.		
4	Invent Types of Synchronous Machine		
5	Understand Design aspects of Synch. Motor		
Course no.		Course code	Course name
C221		BTEEL409	Analog and Digital Electronics lab
COs	After the successful completion of this course student will be able to:		
1	Introduce components such as diodes, BJTs and FETs.		



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2	Know the applications of analogue and digitalComponents.		
3	Give Understand of various types of amplifier circuits.		
4	Learn basic techniques for the design of digitalcircuits.		
Course no.		Course code	Course name
C222		BTEEP410	Internship-II
COs	After the successful completion of this course student will be able to:		
1	Demonstrate the application of knowledge and skill sets acquired from thecourse.		
2	Communicate and collaborate effectively and appropriately with different professionals		
3	Exhibit professional ethics by displayingpositive dispositionduring internship		
TE-I (DBATU) Theory Courses			
Course no.		Course code	Course name
C301		BTEEC501	Power SystemAnalysis
COs	After the successful completion of this course student will be able to:		
1	Develop the Modelling of Power system, analysis of Load flow in various types of method and itsuse in practically field.		
2	Analyze the swing equation and equal areacriteria in details with several loading condition.		
3	Execute the different types of control methods of Voltage and reactive power in details.		
4	Monitor and control of Power system withSCADA and DAC system. Economy ofpower system.		
Course no.		Course code	Course name
C302		BTEEC502	Microprocessor & Microcontroller
COs	After the successful completion of this course student will be able to:		
1	Understand working of 8085microprocessors		
2	Work with microcontroller		
3	Understand instruction sets		
Course no.		Course code	Course name
C303		BTEEC503	Power Electronics
COs	After the successful completion of this course student will be able to:		
1	Understand the characteristics of various power electronic semiconductor devices.		
2	Design and analyze power electronic converter circuits.		
3	Evaluate the performance of powerelectronic circuits applied in various applications.		
4	Recognize the critical areas in applicationlevels and derive suitable solutions.		



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Course no.		Course code	Course name
C304		BTEEPE504(B)	Power Quality Issues
COs	After the successful completion of this course student will be able to:		
1	Understand various issues affecting power quality,their production, monitoring.		
2	Learn various methods of power quality monitoring		
3	Identify the different standards of power quality		
4	Understand the effects of various power quality phenomenon in various equipment.		
5	Identify various grounding and earthing problems and solution for same.		
Course no.		Course code	Course name
C305		BTEEPE505(B)	Electrical Safety
COs	After the successful completion of this course student will be able to:		
1	Concept of industrial electrical safety		
2	Understand concept of domestic electrical safety		
3	Get acquainted with electrical safety standards		
TE-I (DBATU) Laboratory Courses			
Course no.		Course code	Course name
C307		BTEEL507	PSA Lab
COs	After the successful completion of this course student will be able to:		
1	Develop Modelling of Power system, analysis of Load flow in various types of method and its use in practically field.		
2	Analyze of swing equation and equal area criteria in details with several loading condition.		
3	Execute the different types of control methods of Voltage and reactive power in details.		
4	Monitor and control of Power system with SCADA and DAC system.		
5	Understand Economy of power system.		
Course no.		Course code	Course name
C309		BTEEL509	PE Lab
COs	After the successful completion of this course student will be able to:		
1	Understand the fundamental principle and components of power electronics.		
2	Identify the various components used in Analog electronics.		
3	Describe the operation of different types of converter circuits.		
4	Recognized the different commutation circuits and gate signal generation techniques		
Course no.		Course code	Course name
C310		BTEEL510	Mini Project Lab
COs	After the successful completion of this course student will be able to:		



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1	Understand concepts of project management.		
2	Develop a project plan.		
3	Understand the project implementation strategy.		
4	Analyze post project affects.		
Course no.		Course code	Course name
C312		BTEEC601	Switch GearProtection
COs	After the successful completion of this course student will be able to:		
1	Interpret the significance of differenttypes of faults occurs in power system.		
2	Distinguish and analyze various relay and parameters associated.		
3	Analyze, test and use of various circuitbreakers.		
4	Demonstrate and examine different protection scheme.		
5	Examine and test power system for proper protection of system faults		
Course no.		Course code	Course name
C313		BTEEC602	Electrical MachineDesign
COs	After the successful completion of this course student will be able to:		
1	Interpret the significance of fundamental aspect ofElectrical Machine Design, modern trendsin design.		
2	Design and formulating the dcmachines.		
3	Design, formulating, andconstructing of transformers.		
4	Design, formulating, and constructing of 3- phase induction motor.		
5	Design a 3- phase synchronous electrical machines andComputer Aided Design (CAD).		
Course no.		Course code	Course name
C314		BTEEC603	Control SystemEngineering
COs	After the successful completion of this course student will be able to:		
1	Obtain models of dynamic systems in theform of transfer function and state space model.		
2	Work with control techniques on variouscontrollers.		
3	Analyze the system response in both time domain and frequencydomain		
4	Design various controllers in both timedomain and frequency domain		
5	Analyze different typesof plots and find stability through them.		
Course no.		Course code	Course name
C315		BTEEPE604(C)	Mod. Sim. & Con. ofED
COs	After the successful completion of this course student will be able to:		
1	Solve numerical on starting, speed controland braking and analyses the construction, characteristics, and application of D.C.		
2	Understand the working of various phase-controlled converters used in DC Drives		



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3	Understand the working of various phase-controlled converters used in AC Drives		
4	Acquire the knowledge of rotor side control such as Slip power recovery static Scherbius Drive, Static Kramer Drive.		
5	Understand and analyses various phase-converters used in synchronous		
Course no.		Course code	Course name
C316		BTEEEP605(B)	Power Plan Engineering
COs	After the successful completion of this course student will be able to:		
1	Understand the working principle of different power plants		
2	Review basic components of power system, energy sources.		
3	Discuss and analyze the mathematical and working principles of different electrical power plants.		
4	Understand principle of construction and operation of different conventional power plants.		
TE-II (DBATU) Laboratory Courses			
Course no.		Course code	Course name
C318		BTEEL606	SGP Lab
COs	After the successful completion of this course student will be able to:		
1	Analyze various abnormal conditions that could occur in power system.		
2	Distinguish and analyze various relay and parameters associated.		
3	Examine various conventional relays, their design, and latest developments.		
4	Test various relays for different characteristics and compare the performance characteristics provided by manufacturers		
Course no.		Course code	Course name
C319		BTEEL607	Machine Design Lab
COs	After the successful completion of this course student will be able to:		
1	Interpret the significance of analysis, synthesis and hybrid methods of computer aided design of small a.c. electrical machines and advantages of computer aided design.		
2	Analyze and design the 3-phase induction motor.		
3	Analyze and design the 3-phase synchronous electrical machines.		
4	Various formulae for calculations for small a.c. electrical machines.		
5	Analyze various design phenomena related to a.c. electrical machines.		
Course no.		Course code	Course name
C320		BTEEL608	Control System Lab
COs	After the successful completion of this course student will be able to:		
1	Write M-Codes for different forms of transfer function of a given system		
2	Analyse the system in time, frequency, and S-Domain		



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3	Comment on stability of system through its Nyquist and Bode plot		
Course no.		Course code	Course name
C321		BTEEM609	Seminar
COs	After the successful completion of this course student will be able to:		
1	Deliver a technical note in stage.		
2	Ensure effective information transfer over a group of students.		
3	Demonstrate the model.		
Course no.		Course code	Course name
C322		BTEEL607	Internship-III
COs	After the successful completion of this course student will be able to:		
1	Demonstrate the application of knowledge and skill sets acquired from the course.		
2	Communicate and collaborate effectively and appropriately with different professionals in the work environment through written and oral means.		
3	Exhibit professional ethics by displaying positive disposition during internship		
BE-I (DBATU) Theory Courses			
Course no.		Course code	Course name
C401		BTEEC701	Power System Operation & Control
COs	After the successful completion of this course student will be able to:		
1	Understand the fundamental concepts of power system.		
2	Obtain mathematical model of Synchronous machine, excitation, and speed governing system.		
3	Analyze the transient stability of power system.		
4	Understand the economic operation of power system.		
5	Explain various techniques of reactive power and voltage Control		
Course no.		Course code	Course name
C402		BTEEC702	High Voltage Engineering
COs	After the successful completion of this course student will be able to:		
1	Learn conduction and breakdown in gases, liquids, and solids.		
2	Understand the methods and measurement of high voltage generation and measurement.		
3	Explain the lightning phenomenon and insulation co-ordination.		
4	Understand different non-destructive testing and standards in HV.		
Course no.		Course code	Course name
C403		BTEEC703	Electrical Drives
COs	After the successful completion of this course student will be able to:		
1	Understand the dynamics of drive system.		



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2	Use various methods of speed control of AC andDC Drive.		
3	Analyze the drive system		
4	Select proficiently and the proper drive systemfor application.		
5	Understand basic knowledge of recent advancement in electric drives.		
Course no.		Course code	Course name
C404		BTEEE704(B)	Electrical Traction &Utilization
COs	After the successful completion of this course student will be able to:		
1	Possess knowledge of advanced and emerging topics in traction mechanism and illumination engineering and their applications in the field.		
2	Design a traction system, a component, to meet desired needs of locomotive industry within realistic constraints and confirmsmanufacturability, and sustainability.		
3	Possess in-depth andadvanced knowledgeby course contents alongwith emerging topics.		
Course no.		Course code	Course name
C405		BTEEE705(B))	Energy Audit &Conservation
COs	After the successful completion of this course student will be able to:		
1	Understand the basic process involved in the energy audit and the terminologies associated in the process.		
2	Develop audit reports of any firmincluding large- and small-scale industries, residential and commercial establishments.		
3	Select and comment on the appropriate method for the planning andmonitoring of any energy conservationproject.		
BE-I (DBATU) Laboratory Courses			
Course no.		Course code	Course name
C406		BTEEL706	PSOC Lab
COs	After the successful completion of this course student will be able to:		
1	Understand the fundamental conceptsof power system.		
2	Obtain mathematical model of Synchronous machine, excitation, and speed governing system.		
3	Analyze the transient stability ofpower system.		
4	Understand the economic operation ofpower system.		
Course no.		Course code	Course name
C407		BTEEL707	HVE Lab
COs	After the successful completion of this course student will be able to:		
1	Acquire the knowledge of necessity and methods of testing various apparatus in power system.		



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2	Acquire the Knowledge of various circuits for generating high voltages for testing various apparatus and their measurement method.		
3	Acquire the Knowledge of the various reasons of overvoltage in power system and protection methods against them.		
4	Acquire the Knowledge of insulation coordination and design of insulation levels of various parts of power system		
Course no.		Course code	Course name
C408		BTEEL708	ED Lab
COs	After the successful completion of this course student will be able to:		
1	Understand the concept of different electrical drives by performing simulation and appreciate the result based on analysis. Able to design any kind of electrical drive suitable for different industrial problems.		
2	Conduct different hardware experiments on dc motor drive as well as on ac motor drive.		
3	Implement their own ideas for controlling the speed as well as other relevant parameters of different motors using MATLAB.		
Course no.		Course code	Course name
C409		BTEEL709	Seminar
COs	After the successful completion of this course student will be able to:		
1	Deliver a technical note in stage.		
2	Ensure effective information transfer over a group of students		
3	Demonstrate the model.		
Course no.		Course code	Course name
C410		BTEEL710	Project Part-I
COs	After the successful completion of this course student will be able to:		
1	Understand concepts of project management		
2	Develop a project plan.		
3	Understand the project implementation strategy.		
4	Analyze post project affects.		
BE-II (DBATU) Laboratory Courses			
Course no.		Course code	Course name
C411		BTEEP803	Project-II
COs	After the successful completion of this course student will be able to:		
1	Apply concepts of project management.		
2	Develop a project model.		
3	Understand project modelling and working.		
4	Analyze post project operating stages.		



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BE-II MOOCs Courses	
Course no.	Course name
1	Power Management Integrated Circuits
COs	After the successful completion of this course student will be able to:
1	Understand the principles of power management
2	Learn about different types of power management ICs
3	Learn the coordination of Power ICs
Course no.	Course name
2	DC Power Transmission Systems
COs	After the successful completion of this course student will be able to:
1	Understand the principles of DC power transmission
2	Analyze and design DC power transmission systems
3	Evaluate system performance
Course no.	Course name
3	High Power Multilevel Converters
COs	After the successful completion of this course student will be able to:
1	Understand the principles and operation of multilevel
2	Analyze the advantages and challenges of multilevel converters:
3	Learn about modulation strategies for multilevel converters
4	Understand the control techniques for multilevel converters
5	Explore applications of high-power multilevel converters
Course no.	Course name
4	Fuzzy Sets, Logic, and Systems & Applications
COs	After the successful completion of this course student will be able to:
1	Gain a comprehensive understanding of fuzzy sets and fuzzy logic.
2	Use fuzzy logic systems and their applications.
3	Learn about various applications of fuzzy systems in different domains.
Course no.	Course name
5	The Joy of Computing using Python
COs	After the successful completion of this course student will be able to:
1	Learn the basic principles of programming using Python.
2	Emphasize problem-solving techniques and strategies using Python.
3	Practice coding in Python through hands-on exercises.
4	Understand computational thinking involves problem-solving and analytical skills essential in the digital era
Course no.	Course name
6	Introduction to Industry 4.0 and Industrial Internet of Things



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COs	After the successful completion of this course student will be able to:
1	Gain a comprehensive understanding of the concept of Industry 4.0
2	Understand concept of IIoT and its role in industries.
3	Explore real-world applications of IIoT across various industries.
4	Examine how IIoT is reshaping business models and operations in various industries.
Course no.	Course name
7	Entrepreneurship Essentials
COs	After the successful completion of this course student will be able to:
1	Cultivate an entrepreneurial mindset among students.
2	Gain a understanding of the entrepreneurial process.
3	Develop essential business skills.
4	Identify and evaluate potential business opportunities