



Shri Balasaheb Mane Shikshan Prasarak Mandal, Ambap's

ASHOKRAO MANE GROUP OF INSTITUTIONS

NH - 4, Vathar Tarf Vadgaon, Tal: - Hatkanangale, Dist: - Kolhapur - 41611

Phone: (0230) 2407740, 2407750, 2407760 Fax: (0230) 2407750

NBA accredited Programs* | Accredited by NAAC with 'A' Grade CGPA 3.08



DEPARTMENT OF ELECTRICAL ENGINEERING

Program Outcomes:

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



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8. **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
9. **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
10. **Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. **Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
12. **Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

Program Specific Outcomes:

1. **PSO1: Contemporary Engineering Knowledge-**Understand contemporary issues in electrical Engineering like power trading and Programmable Logic Control.
2. **PSO2: Future Energy Era-** Understand the importance and implementation of Nonconventional Energy Sources

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Electrical Engineering
AMIGO, Faculty of Engineering
Vathar Tarf Vadgaon
Tal. Hatkanangale, Dist. Kolhapur



Loth
Director
DIRECTOR

SHRI BALASAHEB MANE SHIKSHAN PRASARAK MANDAL'S
ASHOKRAO MANE GROUP OF INSTITUTIONS
Vathar Tarf Vadgaon, Tal. Hatkanangale, Dist. Kolhapur, M.S. 416112



ASHOKRAO MANE GROUP OF INSTITUTIONS, VATHAR

FACULTY OF ENGINEERING

Department of Electrical Engineering

CO with PO Mapping of Program

Second Year Odd Semester: (Semester III)

1) BTBS301- Engineering Mathematics-III(CO's)

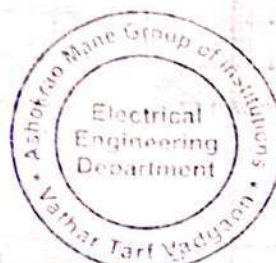
Sr. No.	Course Outcomes
CO301.1	Understand the properties of Laplace transform and evaluate transform of integral & derivative functions.
CO301.2	Solve inverse Laplace transform using partial fraction & convolution theorem.
CO301.3	Determine Fourier Sine & Fourier Cosine integrals.
CO301.4	Study partial differential equations along with applications.
CO301.5	Study analytic functions, Cauchy Riemann equations, Cauchy integral Formula & Cauchy's residue theorem.

BTBS301- Engineering Mathematics-III(Mapping of PO's and PSOs with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	3	1												
CO3	3	2	1											
CO4	3	3	3											
CO5	3	2	3											

2) BTEEC302- Electrical Machine I (CO's)

Sr. No.	Course Outcomes
C302.1	Understand and classify different parts of a transformer & understand its operation.
C302.2	Analyze 1-Ph and 3-Ph transformers circuits.
C302.3	Identify different parts of a DC machine & understand its operation.
C302.4	Interpret different testing methods to predetermine the efficiency of DC machines.
C302.5	Analyze the starting and speed control methods of a DC machines.





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FACULTY OF ENGINEERING

Department of Electrical Engineering

BTEEC302-Electrical Machine I (Mapping of PO's and PSOs with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3												
CO2	2	1												
CO3	3	2							2					
CO4	2	1							2					
CO5	3	2							2					

3) BTEEC303-Electrical and Electronics Measurement (CO's)

Sr. No.	Course Outcomes
C303.1	Classify various types of errors in the system and types of electrical measuring instruments
C303.2	Explain different types of meters required for electrical quantities.
C303.3	Determine unknown variables in the bridge configuration with the help of other known variables.
C303.4	Recognize basic measuring instruments used for digital measurements and to explain them.
C303.5	Define the term transducers and to classify and explain various types of transducers

BTEEC303-Electrical and Electronics Measurement (Mapping of PO's and PSOs with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	2			2		1	2					1		
CO3	2	3	2	2										
CO4			2											
CO5	2		1											





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FACULTY OF ENGINEERING

Department of Electrical Engineering

4) BTHM 304- Basic Human Rights (CO's)

Sr. No.	Course Outcomes
C304.1	Understand importance of human life & Realize the Human rights and Duties.
C304.2	Understand about the society, religion, culture of human life
C304.3	Evaluate the social structure and problems.
C304.4	Recognize about the freedom, liberty, democracy of human being..
C304.5	Identify about the Human rights law , constitution of India.

BTHM 304-Basic Human Rights(Mapping of PO's andPSOs with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1					2		3						
CO2	1					2		3						
CO3	2					2		3						
CO4	1					2		3	3					
CO5	2					2		3						

5) BTES305- Engineering Material Science (CO's)

Sr. No.	Course Outcomes
C305.1	To study about Crystal structures.
C305.2	To understand magnetic material structure.
C305.3	To study about conducting and superconducting materials.
C305.4	To study about semiconducting materials
C305.5	To study dielectric and nano materials.





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BTES305- Engineering Material Science (Mapping of PO's andPSOs with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3				2									
CO2		2			2									
CO3	2		3		2									
CO4	2				2									
CO5	3				2									

6) BTEEL306- Electrical Machine I Lab (CO's)

Sr. No.	Course Outcomes
C306.1	Verify VI characteristics and Phasor diagram of 3 phase transformer.
C307.2	study of construction and working of single phase transformer.
C308.3	study of construction and working of DC machine.

BTEEL306- Electrical Machine I Lab (Mapping of PO's and PSOs with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3							3			2		
CO2	1	3							3			2		
CO3	1	3							3			2		

7) BTEEL307-Electrical and Electronics Measurement Lab (CO's)

Sr. No.	Course Outcomes
C307.1	Study of AC bridges
C307.2	Construction and working of different meters.
C307.3	Study LVDT and transducers.





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BTES305- Engineering Material Science (Mapping of PO's andPSOs with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3				2									
CO2		2			2									
CO3	2		3		2									
CO4	2				2									
CO5	3				2									

6) BTEEL306- Electrical Machine I Lab (CO's)

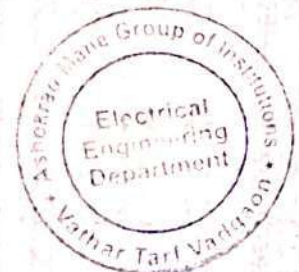
Sr. No.	Course Outcomes
C306.1	Verify VI characteristics and Phasor diagram of 3 phase transformer.
C307.2	study of construction and working of single phase transformer.
C308.3	study of construction and working of DC machine.

BTEEL306- Electrical Machine I Lab (Mapping of PO's and PSOs with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3							3			2		
CO2	1	3							3			2		
CO3	1	3							3			2		

7) BTEEL307-Electrical and Electronics Measurement Lab (CO's)

Sr. No.	Course Outcomes
C307.1	Study of AC bridges
C307.2	Construction and working of different meters.
C307.3	Study LVDT and transducers.





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BTEEL307-Electrical & Electronics Measurement Lab (Mapping of PO's and PSOs with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2		1										
CO2	2	2		1										
CO3	2	2		1										

Second Year Even Semester: (Semester IV)

1) BTEEC401- Network Theory (CO's)

Sr. No.	Course Outcomes
C401.1	Review basic components of electric network.
C401.2	Design and develop network equations and their solutions.
C401.3	Apply Laplace theorem for Electric Network Analysis.
C401.4	Analyze Two port networks.
C401.5	Analyze AC circuits.

BTEEC401- Network Theory (Mapping of PO's and PSOs with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	1		3									
CO2	2	2	3		2									
CO3	3	2	1		3									
CO4	2	3	1	2	2									
CO5	3	2		2	3									





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Department of Electrical Engineering

2) BTEEC402 Power System-I(CO's)

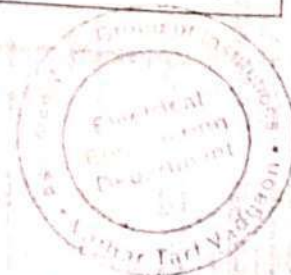
Sr. No.	Course Outcomes
C402.1	Explain the generation of Electric Energy by different sources
C402.2	Discuss the Electrical design aspects of overhead transmission line
C402.3	Discuss the Mechanical design aspects of overhead transmission line
C402.4	Analyze Performance of transmission line
C402.5	Describe the basic structure of power system distribution and its components

BTEEC402 Power System- I (Mapping of PO's and PSOs with CO.)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3				1									
CO2	3	2			1									
CO3	3	2			2									
CO4	3	2			2									
CO5	3	2			2									

3) BTEEC403- Electrical Machine-II (CO's)

Sr. No.	Course Outcomes
C403.1	Explain the construction, working principle, performance and applications of Poly-phase induction motor
C403.2	Evaluate the basic operation and performance of single phase Induction motor, special machines and Synchronous machine
C403.3	Perform experiments and on above machines
C403.4	Analyze & apply the concept of operations of Machines for solving social problem.
C403.5	Identify, formulate and solve the numerical problems related to above machines





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BTEEC403-Electrical Machine-II (Mapping of PO's and PSOs with CO)

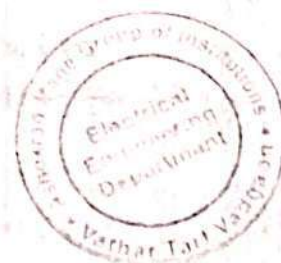
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1			1							1		
CO2	3	1			1							1		
CO3	3	2			1				1	1		2		
CO4	1		1			1	1					1		
CO5	2	2										1		

4) BTBS404-Analog and Digital electronics (CO's)

Sr. No.	Course Outcomes
C404.1	Study transistor and op-amp.
C404.2	Review basic number system.
C404.3	Understand design and characteristics of digital logic gates.
C404.4	Compare different techniques in use of digital circuits.
C404.5	Study combinational and sequential circuits.

BTBS404-Analog and Digital electronics(Mapping of PO's and PSO with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3												
CO2	2	2			3									
CO3	2	3												
CO4	2	2	1											
CO5	2	2	1	1	2									





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5) BTEEPE405 Electrical Devices and Circuits (CO's)

Sr. No.	Course Outcomes
C405.1	Model electrical circuits using circuit elements such as resistors, capacitors, and inductors
C405.2	Study and analyze the characteristics and applications of common electronic devices such as diodes and transistors.
C405.3	Understand the properties and applications of operational amplifiers.
C405.4	Understand the concept of frequency response in electrical circuits.
C405.5	Solve practical problems related to electrical circuits.

BTEEPE405 Electrical Devices and Circuits Mapping of PO's and PSOs. With CO)

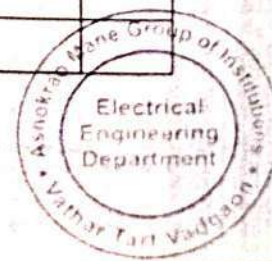
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		3	2									
CO2	3	3	3											
CO3	3	2		3	2									

6) BTEEL406- Network Theory Lab (CO's)

Sr. No.	Course Outcomes
C406.1	Apply basic laws,theorems,methods for DC electric network
C466.2	Acquire skills of MATLAB for transient response of RC,RL networks
C406.3	Analyze resonance in series R,L and C

BTEEL406-Network Theory Lab(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3		3	3					2		2		
CO2	3	3		3	3					2		3		
CO3	3	2		3	3					2		2		





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7) BTEEL-407 Power System lab-I (CO's)

Sr. No.	Course Outcomes
C407.1	Verify VI characteristics and Phasor diagram of 3 phase transformer.
C407.2	Study of construction and working of single phase transformer.
C407.3	Study of construction and working of DC machine.

BTEEL407 Power System lab-I(Mapping of PO's and PSOs with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	3							3			2		
CO2	1	3							3			2		
CO3	1	3							3			2		

8) BTEEL408 Electrical Machine-II Lab (CO's)

Sr. No.	Course Outcomes
C408.1	Conduct and understand various performance characteristics of AC machines
C408.2	Analyze and understand the behavior of induction machines.
C408.3	Calculate and optimize the efficiency of electrical machines.

BTEEL408 Electrical Machine-II Lab(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3					2	2			2		
CO2	2	3						2	2			2		
CO3	2	3	3					2	2			2		





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9) BTEEL409- Analog and Digital Electronics Lab (CO's)

Sr. No.	Course Outcomes
C409.1	Analyze basic amplifier circuits.
C409.2	Review basic and universal gates.
C409.3	Understand design & characteristics of digital ICs.

BTEEL409-Analog and Digital ElectronicsLab(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2							2					
CO2	3	2							2					
CO3	3	2							2					

Third Year Odd Semester: (Semester V)

1) BTEEC501-Power System Analysis (CO's)

Sr. No.	Course Outcomes
C501.1	Explain power system components and SLD
C501.2	Analyze large fault analysis using Y bus and Z bus calculations
C501.3	Explain the importance of sequence diagram of power system network
C501.4	Explain and Analyze of unsymmetrical fault
C501.5	Acquire the knowledge of power flow calculation





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BTEEC501-Power System Analysis (Mapping of PO's and PSO with CO)

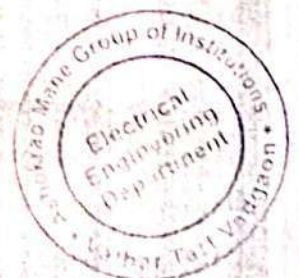
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	2	2			1									
CO3	3	1			1									
CO4	2	2			1									
CO5	3		2											

2) BTEEC502-Microprocessor and Microcontroller (CO's)

Sr. No.	Course Outcomes
C502.1	Study the architecture of 8085 .
C502.2	Understand interfacing of 8085 and 8051.
C502.3	Understand interrupt features of 8085 and 8051.
C502.4	To develop program for basic applications.
C502.5	Understand typical applications of 8085 & 8051

BTEEC502-Microprocessor and Microcontroller(Mapping of PO's and PSO with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2	2											
CO2	3	2		1										
CO3	2	3		1										
CO4	2	2	1											
CO5	3	2												





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3) BTEEC503- Power Electronics(CO's)

Sr. No.	Course Outcomes
C503.1	Review the principle of construction, operation & characteristics of semiconductor devices.
C503.2	Understand & analyze the performance of controlled & uncontrolled converters.
C503.3	Explain & understand the DC to DC converters and AC to AC converters.
C503.4	Explain & understand AC voltage controllers.
C503.5	Understand AC to AC Power conversion using choppers and cyclo converters.

BTEEC503- Power Electronics(Mapping of PO's and PSO with CO)

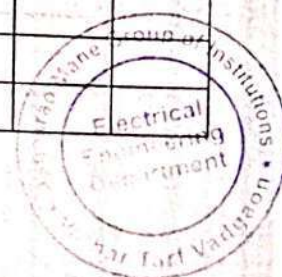
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3													
CO2	2			2										
CO3	2			2										
CO4	3			2										
CO5	2			2										

4) BTEEPE504A- HVDC (CO's)

Sr.no	Course Outcomes
C504.1	Understand importance, configuration & types of HVDC transmission
C504.2	Understand benefits, roles & realities of types of FACTS controllers.
C504.3	Analyze the reactive power control and VAR sources.
C504.4	Analyze the operation of variable impedance type series compensator
C504.5	Understand types of STATCOM and working of UPFC.

BTEEPE504A- HVDC (Mapping of PO's and PSO with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1			3							1		
CO2	2	2			3							1		
CO3	2	3			2							1		
CO4	2	3			3							2		
CO5	2	3			3							2		





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5) BTEEOE505- Embedded Systems (CO's)

Sr. No.	Course Outcomes
C505.1	Understand the Embedded Systems Architecture and working.
C505.2	Understand working and applications of Sensor and Actuator
C505.3	Understand Real time operating systems
C505.4	Understand different Embedded Networks
C505.5	Understand the Embedded System Design

BTEEOE505- Embedded Systems (Mapping of PO's and PSO with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1												
CO2	2				2									
CO3	3		2											
CO4					2									
CO5			3											

6) BTEEL508 -Microprocessor and Microcontroller Lab (CO's)

Sr. No.	Course Outcomes
C508.1	To study assembly language programming.
C508.2	To analyze different flags in 8085 after execution of program.
C508.3	To study interfacing with 8085.

BTEEL508 -Microprocessor and Microcontroller Lab(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	2			1				2					
CO2	2	2							1					
CO3	3	2							1					





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7) BTEEL509–Power Electronics Lab (CO's)

Sr. No.	Course Outcomes
C509.1	Use the power electronics simulation packages to develop the power converters.
C509.2	Analyze the different converters output waveforms for R and RL loads
C509.3	Understand operating principle of various power electronics circuits /converter.

BTEEL509-Power Electronics Lab(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2			2	3									
CO2	2			2	3									
CO3	2			2	3									

Third Year Even Semester: (Semester VI)

1) BTEEC601 Switchgear and Protection (CO's)

Sr. No.	Course Outcomes
C601.1	Understand the concept of protective relay
C601.2	Understand the concept of static and Numerical Relay
C601.3	Understand the concept of Circuit breaker and Fuses
C601.4	Understand the concept of protection of Transmission Line
C601.5	Understand the concept of protection of Transformer and Alternator Protection

BTEEC601- Switchgear and Protection(Mapping of PO's and PSO with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	1												
CO2	1	1												
CO3	1	2												
CO4	1									2				
CO5	2				3	2								





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2) BTEEC602-Electrical Machine Design (CO's)

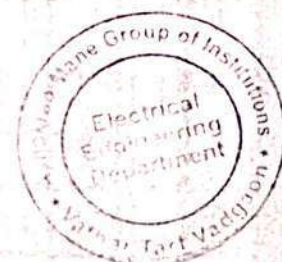
Sr. No.	Course Outcomes
C602.1	Explain principles of electric machine design.
C602.2	Explain different types of electrical apparatus
C602.3	Describe types and parameters of AC and DC windings
C602.4	Explain Heating, Cooling and Ventilation for electrical machine
C602.5	Design Transformer for different ratings

BTEEC602-Electrical Machine Design (Mapping of PO's and PSO with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2		2										
CO2	3				2						2			
CO3	3				2						2			
CO4	2		2											
CO5	3	2	3		2						2			

3) BTEEC603-Control System (CO's)

Sr. No.	Course Outcomes
C603.1	To know different basic concepts and components of a control system.
C603.2	To derive transfer functions of basic control system components.
C603.3	To perform stability analysis using time domain response on a given system.
C603.4	To design and analyze PID controller.
C603.5	To understand and analyze state variable technique.





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BTEEC603-Control System (Mapping of PO's and PSO with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1							1					
CO2	3	2			2				2			2		
CO3	2	2	2	2	2				1			2		
CO4	2	2	2	2	2				1			2		
CO5	3	2	1		2				1			2		

4) BTEEPE604-FACTS CO's)

Sr. No.	Course Outcomes
C604.1	Understand importance, configuration & types of HVDC transmission.
C604.2	Understand benefits, roles & realities of types of FACTs controllers.
C604.3	Analyze the reactive power control and VAR sources.
C604.4	Analyze the operation of variable impedance type series compensator.
C604.5	Understand types of STATCOM and working of UPFC.

BTEEPE604-FACTS (Mapping of PO's and PSO with CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1			3							1		
CO2	2	2			3							1		
CO3	2	3			2							1		
CO4	2	3			3							2		
CO5	2	3			3							2		





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5) BTEEOE605-Power Plant Engineering CO's)

Sr. No.	Course Outcomes
C605.1	To understand the principles of operation of thermal power plant.
C605.2	To understand the principles of operation of nuclear and gas power plant.
C605.3	To understand the principles of operation of hydro power plant.
C605.4	To understand the principles of operation of Renewable energy sources.
C605.5	To understand economics of Power generation.

BTEEOE605-Power Plant Engineering (Mapping of PO's and PSO with CO)

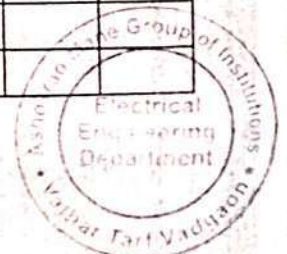
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1											1	2
CO2	2	1											1	2
CO3	2	1											1	2
CO4	2	1											1	2
CO5	3	2											1	3

6) BTEEL606-Switchgear and Protection lab (CO's)

Sr. No.	Course Outcomes
1	Identify and understand the functions of various components of switchgear.
2	Analyze and interpret the test results to evaluate the condition of circuit breakers.
3	Analyze fault currents and voltages during system faults.
4	Analyze the working principles of circuit breakers and relays.
5	Calibrate protective relays to ensure accurate and reliable operation.

BTEEL606- Switchgear and Protection lab (Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1												
CO2	2								1					
CO3	2	1		1			2							
CO4	2	1												
CO5	3	2							2					





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7) BTEEL607-Electrical Machine Design Lab (CO's)

Sr. No.	Course Outcomes
C607.1	Illustrate electrical symbol & electrical installation procedure.
C607.2	Design of DC shunt motor starter & Start Delta Starter.
C607.3	Design of AC DC winding
C607.4	Design of transformer

BTEEL607–Electrical Machine Design Lab(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	3		2									
CO2	2		2		2									
CO3	2		3	2	2									
CO4	2		3	2	2									

8) BTEEL608–Control System Lab (CO's)

Sr. No.	Course Outcomes
C608.1	To understand and use various components of Analog Computer System.
C608.2	To understand concepts of MATLAB programing and simulation tools.
C608.3	To analyze Control System using MATLAB programming commands.
C608.4	To simulate nonlinear control systems using MATLAB simulation tool.
C608.5	To obtain solutions of state space equations using MATLAB





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BTEEL608–Control System Lab(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3			2										
CO2	2			2										
CO3	3	3		2										
CO4			3		3					2				
CO5			3		3					2				

9) BTEEM609-Seminar (CO's)

Sr. No.	Course Outcomes
C609.1	Updates the student with the latest progress and issues in a particular field.
C609.2	Facilitates to search new ideas and innovations.
C609.3	Develops the oral communication skills as well as confidence for self-education.
C609.4	Ability for lifelong learning.

BTEEM609-Seminar(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1										3		3		
CO2										3		3		
CO3										3		3		
CO4										3		3		





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Final Year Odd Semester: (Semester VII)

1) BTEEC701 Power System Operation & Control :

Sr. No.	Course Outcomes
CO701.1	Describe the fundamental concept of reactive power in power system.
CO701.2	Analyze the transient stability of power system using swing equation and equal area criteria
CO701.3	Explain need of Excitation system in power system.
CO701.4	Design of load frequency control .
CO701.5	Analyze the economic operation of power system.

BTEEC701 Power System Operation & Control (Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3												
CO2	3	2	3											
CO3	2	2			3									
CO4	2	2												
CO5	3	2	2		3									

2) BTEEC702 High Voltage Engineering (CO's)

Sr. No.	Course Outcomes
CO702.1	Illustrate the concept of electric field stresses, applications of insulating materials
CO702.2	Explain the breakdown process in solid, liquid, and gaseous materials
CO702.3	Analyze methods for generation and measurement of High Voltages and Currents
CO702.4	Describe the phenomenon of overvoltage and choose appropriate insulation coordination levels based on IS & IEC Standards.
CO702.5	Understand the methods for Nondestructive testing of equipment like transformers, insulators, isolators, bushings, lightning arrestors, cables, circuit breakers and surge diverters





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BTEEC702 High Voltage Engineering(Mapping of PO's and PSOs. With CO)

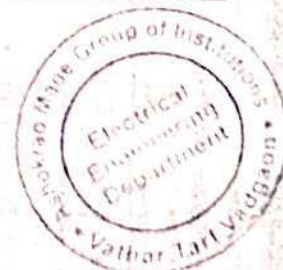
CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	3										3		
CO2	3	2	3									2		
CO3	2	2			3							3		
CO4	2	2										2		
CO5	3	2	2		3							3		

3) BTEEC703 Electric Drives (CO's)

Sr.no	Course Outcome
C703.1	Examine various applications in industrial and domestic areas where use of electric drives are essential.
C703.2	Classify types of electric drives systems based on nature of loads, control objectives, performance and reliability.
C703.3	Combine concepts of previously learnt courses such as, electrical machines, Control and power electronics to cater to the need of automations in industries.
C703.4	Select most suitable type and specification of motor drive combination for efficient conversion and control of electric power.
C703.5	Identify the critical areas in application levels, and derive typical solutions.

BTEEPE703 Electric Drives (Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	3												
CO2	2	3												
CO3	2	3												
CO4	2	3	2											
CO5	2	3												





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4) BTEEE704 Electric Traction and Utilization(CO's)

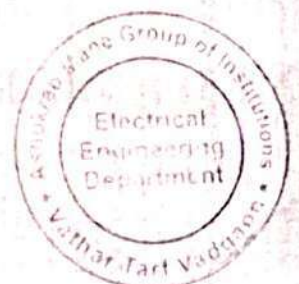
Sr. No.	Course Outcomes
CO704.1	Identify types of Traction system.
CO704.2	Interpret various power supply in electric traction.
CO704.3	Analyze various traction motors & Traction motor control.
CO704.4	Elaborate train movement & breaking in traction system.
CO704.5	Classify the indoor and outdoor Illumination system.

BTEEE704 Electric Traction and Utilization(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3	1	1									1		
CO2	3	2										2		
CO3	2	2										1		
CO4	2	2										1		
CO5	2	2												

5) BTEEE705 (B) Energy Audit and Conservation(CO's)

Sr.no	Course Outcome
C705.1	To understand the basic process involved in the energy audit and the terminologies associated in the process.
C705.2	To be able to develop audit reports of any firm including large and small scale industries, residential and commercial establishments.
C705.3	To select and comment on the appropriate method for the planning and monitoring of any energy conservation project.
C705.4	To analyze various energy conservation in generation, transmission, distribution
C705.5	to get knowledge about Planning, Implementation & monitoring of energy conservation project





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BTEEOE705 Energy Audit and Conservation- (Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		2				2							
CO2	2	1	3	2								1		
CO3	2	1	2			2								
CO4	2	1									2			
CO5	2	1	2					2			2			

6) BTEEL706Power System Operation and Control Lab (CO's)

Sr.no	Course Outcome
CO706.1	Understand program to compute the voltage and power factor using MATLAB.
CO706.2	Understand simulation of AVR single load frequency control using MATLAB.
CO706.3	Understand program for economic dispatch in power systems using MATLAB
CO706.4	Understand for synchronous machine operation using MATLAB
CO706.5	Understand program to solve the given Equal Area Criteria problem using MATLAB

BTEEL706Power System Operation and Control Lab(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	2	2		3							3		
CO2	2	2	3		3							3		
CO3	2	2	2		3									
CO4	2	2	2		3							3		
CO5	2	2	2		3							3		





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7) BTEEL707 High Voltage Engineering Lab (CO's)

Sr.no	Course Outcome
CO707.1	Measure high voltages accurately using appropriate instruments.
CO707.2	Perform dielectric strength tests on insulating materials and equipment
CO707.3	Study and implement insulation coordination principles in high voltage systems
CO707.4	Understand the calibration and limitations of measurement equipment.
CO707.5	Learn basic maintenance practices for high voltage equipment.

BTEEL707 High Voltage Engineering Lab(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2		2	2										
CO2						2								
CO3	2		3	2	3									
CO4			2			3								
CO5							3							

8) BTEEL708 Electric Drives Lab (CO's)

Sr.no	Course Outcome
CO708.1	Simulate single phase half/ full controlled converter DC Drive.
CO708.2	Simulate Speed control of DC motor using chopper.
CO708.3	Simulate of AC Drive .
CO708.4	Simulate V/f control of AC drive

BTEEL708 Electric Drives Lab(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1	2	2	3								1		
CO2	1	1	1	2								1		
CO3	2	2	2	2								1		
CO4	1	2	2	3								1		





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9) BTEEP710 Project Part-I

Sr.no	Course Outcome
CO710.1	Demonstrate an understanding of the fundamental principles of Electrical Engineering and apply them to the design and development of a complex electrical system
CO710.2	Conduct research and analyze existing literature in the field of Electrical Engineering to identify the latest trends and technologies
CO710.3	Use advanced software tools and techniques to design , simulate and test electrical system
CO710.4	Work effectively in a in a team to plan manage and execute the project and communicate progress and outcomes
CO710.5	Document and report on project with outcomes

BTEEP710 Project Part-I(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		2	2					2		2	2	2	
CO2		3					2							
CO3	2		2	2	3								2	2
CO4						3				1		2		
CO5							3					2		

10) BTEEF711 Internship (CO's)

Sr.no	Course Outcome
C609.1	Develop practical skills, critical thinking, problem solving skills by working on projects.
C609.2	Apply theoretical knowledge to real world problem.
C609.3	Build communication and teamwork skills.
C609.4	Develop a professional network and gain exposure.
C609.5	Reflect on personal strengths and areas for professional development and career advancement.





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BTEEF711 Internship (Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	2	1	2	1										
CO2	3	1	1											
CO3						3	3							
CO4						3	2	2						
CO5						2	3	2	3					

Final Year Even Semester (Semester VII)

1) Entrepreneurship Essentials (CO's)

Sr.no	Course Outcome
CO801.1	Analyze the data, information and knowledge.
CO801.2	Define the concept of marketing.
CO801.3	Identify project and work for community development.
CO801.4	Analyze the business model.

Entrepreneurship Essentials (Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1				3	1									3
CO2	1	2												3
CO3		3					2	1		3				3
CO4				3	1	1								3





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2) Introduction to Industry 4.0 & Industrial Internet of Things (CO's)

Sr.no	Course Outcome
CO802.1	Understand sensors, actuators, communication and Networking.
CO802.2	Understand Cyber Physical Systems and Cyber security in Industry 4.0.
CO802.3	Knowledge of theory related to Industrial IoT Systems
CO802.4	Ability to implement real case studies by gained knowledge of Industrial applications with IoT capability

Introduction to Industry 4.0 & Industrial Internet of Things (Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	1													
CO2	2	3												
CO3	3		1											
CO4	2		2	2										

3) BTEEP803Project – II (CO's)

Sr.no	Course Outcome
CO803.1	Demonstrate an understanding of the fundamental principles of electrical Engineering and apply them to the design and development of a complex electrical system
CO803.2	Conduct research and analyze existing literature in the field of Electrical Engineering to identify the latest trends and technologies
CO803.3	Use advanced software tools and techniques to design , simulate and test electrical system
CO803.4	Work effectively in a in a team to plan manage and execute the project and communicate progress and outcomes
CO803.5	Developed skills in project management, time management and organization



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BTEEP803Project – II(Mapping of PO's and PSOs. With CO)

CO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	3		2	2					2		2	2	2	
CO2		3						2					1	2
CO3	2		2	2	3								1	
CO4						3				1		2	1	
CO5							3					2	1	2

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HOD

Electrical Engineering
AMGOI, Faculty of Engineering
Vathar Tarf Vadgaon,
Tal. Hatkanangale, Dist. Kolhapur

