VISION OF THE INSTITUTE

To evolve as an eminent Centre of Learning with total commitment to provide career-focused technical training aimed at excellence in inter-disciplinary education, research and innovation in order to produce socially responsible and synergetic leaders with a global profile.

MISSION OF THE INSTITUTE

The Baba Banda Singh Bahadur Engineering College seeks to enrich the academic experience of students to help them meet the evolving needs of society. We aspire to realise our Vision as follows:

- Conduct UG programs that integrate global awareness, communication skills and team building across the curriculum.
- Run Graduate education programs to prepare students for inter-disciplinary engineering research and advanced problem solving with focus on career advancement.
- Provide an atmosphere to facilitate personal commitment to the educational success of students in an environment that values diversity and community
- Inculcate a high regard for ethical principles and an understanding of human and environmental realities.
- Provide state-of-the-art facilities and effective delivery of high quality content by qualified faculty members to build the notion of lifelong learning.
- Conduct scholarly activities that create and transfer cutting-edge knowledge in the area of engineering and technology
- Create a highly successful alumni base that contributes to the global society.

Vision of The Department

To strive for global standards in the field of Electrical Engineering to make our students life-long learners, technically superior, intuitive in research, ethically strong leaders and responsible human beings.

Mission of The Department

- To impart technical knowledge to its students using state-of-art technology and to create skilled human resources for diverse fields.
- To develop life-long learning and interdisciplinary problem solving skills.
- To produce engineers with environmental awareness toward sustainable development.
- To inculcate ethical and human values in students for the creation of a better society.

PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- To provide technical knowledge, skill and competence to identify and solve problems in industry, research and academics in the field of electrical engineering.
- To make students capable of generating innovative solutions for better society and environment sustainability practicing the knowledge of electrical engineering.
- To inculcate in students of electrical engineering, professional ethics, effective communication skills and capability to succeed in multi-disciplinary fields.
- To encourage students of electrical engineering to work as a team member or a leader with good project management skills through life-long learning.

PROGRAM SPECIFIC OUTCOMES (PSOs)

- Ability to design, implement, test, operate and maintain the electrical systems by applying the knowledge of electrical engineering.
- Ability to function effectively in the allied fields of electrical engineering by applying the knowledge of analog & digital electronics, instrumentation and control systems.
- Ability to work efficiently as a member or leader in multidisciplinary engineering projects by using basic knowledge of electrical engineering, management principles and professional ethics.

PROGRAM OUTCOMES (POs)

Engineering Graduates will be able to:

- **Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- **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.
- **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.
- **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.
- **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.
- **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.
- **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.
- **Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- **Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- **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.
- **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.
- **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.

STUDY SCHEME

First Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC101	BTPH 101	Engineering Physics	3	1	-	40	60	100	4
EEC102	BTAM 101	Engineering Mathematics-I	4	1	-	40	60	100	5
EEC103	BTHU 101	Communicative English	3	-	-	40	60	100	3
EEC104	BTEE 101	Basic Electrical & Electronics Engineering	4	1	-	40	60	100	5
EEC105	HVPE 101	Human Values & Professional Ethics	3	-	-	40	60	100	3
EEC106	BTPH 102	Engineering Physics Laboratory	-	-	2	30	20	50	1
EEC107	BTHU 102	Communicative English Laboratory	-	-	2	30	20	50	1
EEC108	BTEE 102	Basic Electrical & Electronics Engineering Lab	-	-	2	30	20	50	1
EEC109	BTMP 101	Manufacturing Practice	-	-	6	60	40	100	3

Second Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC110	BTCH 101	Engineering Chemistry	3	1	-	40	60	100	4
EEC111	BTAM 101	Engineering Mathematics-II	4	1	-	40	60	100	5
EEC112	BTME 101	Elements of Mechanical Engineering	4	1	-	40	60	100	5
EEC113	BTCS 101	Fundamentals of Computer Programming IT	3	-	-	40	60	100	3
EEC114	EVSC 101	Environmental Science	2	-	-	40	60	100	2
EEC115	BTCH 102	Engineering Chemistry Lab	-	-	2	30	20	50	1
EEC116	BTME 102	Engineering Drawing	1	-	6	40	60	100	4
EEC117	BTCS 102	Fundamentals of Computer Programming IT Lab	-	-	4	30	20	50	2
EEC118	BTME 103	Engineering Computer Graphics Lab	-	-	2	30	20	50	1

Third Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC201	BTAM-301	Engineering Mathematics-III	4	1	-	40	60	100	5
EEC202	BTEE-301	Circuit Theory	4	1	-	40	60	100	5
EEC203	BTEE-302	Transformers & Direct Current Machines	4	1	-	40	60	100	5
EEC204	BTEE-303	Electrical Measurements & Instrumentation	4	1	-	40	60	100	5
EEC205	BTEE-304	Electronic Devices and Circuits	4	1	-	40	60	100	5
EEC206	BTEE-305	Laboratory-I(Semiconductor Devices and Circuit Theory)	-	-	2	30	20	50	1
EEC207	BTEE-306	Laboratory-II(Electrical Machines -I)	-	-	2	30	20	50	1
EEC208	BTEE-307	Laboratory-III(Electrical Measurements)	-	-	2	30	20	50	1
EEC209	BTEE-309	Institutional Training(Undertaken after 2nd semester)	60	40	100	-			

Fourth Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC210	BTEE-401	Asynchronous Machines	3	1	-	40	60	100	4
EEC211	BTEE-402	Linear Control Systems	4	1	-	40	60	100	5
EEC212	BTEE-403	Electromagnetic Fields	3	1	-	40	60	100	4
EEC213	BTEC-404	Digital Electronics	3	1	-	40	60	100	4
EEC214	BTEE-405	Power System-I (Transmission & Distribution)	3	1	-	40	60	100	4
EEC215	BTEE-406	Power Plant Engineering	3	1	-	40	60	100	4
EEC216	BTEE-407	Laboratory-IV (Instrumentation & Measuring Devices)	-	-	2	30	20	50	1
EEC217	BTEE-408	Laboratory-V (Control System)	-	-	2	30	20	50	1
EEC218	BTEC-409	Laboratory-VI (Electronic Circuits)	-	-	2	30	20	50	1
EEC218	General Fitness	-	-	-	100	-	100	-	

Fifth Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC301	BTEE-501	Synchronous Machines	4	1	-	40	60	100	5
EEC302	BTEE-502	Electric Generation & Economics	4	1	-	40	60	100	5
EEC303	BTEE-503	Microprocessors	4	1	-	40	60	100	5
EEC304	BTEC-504	Power Electronics	4	1	-	40	60	100	5
EEC305	BTEE-505	Numerical & Statistical Methods	4	1	-	40	60	100	5
EEC306	BTEE-506	Laboratory-VII(Electrical Machines-II)	-	-	2	30	20	50	1
EEC307	BTEE-507	Laboratory-VIII(Numerical Analysis)	-	-	2	30	20	50	1
EEC308	BTEE-508	Laboratory-IX(Electrical: Estimation & Costing)	-	-	2	30	20	50	1
EEC309	BTEE-509	Industrial Training(Undertaken after 4th semester)	60	40	100	-			

Sixth Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC310	BTEE-601	Electric Power Utilization	3	1	-	40	60	100	4
EEC311	BTEE-602	Power System-II (Switch Gear & Protection)	3	1	-	40	60	100	4
EEC312	BTEE-603	Non-Linear & Digital Control Systems	4	1	-	40	60	100	5
EEC313	BTEC-604	Microcontroller and PLC	3	1	-	40	60	100	4
EEC314	BTEE-605B	Open Elective (Flexible AC Transmission Systems)	3	1	-	40	60	100	4
EEC315	BTHU-6X X/HU-251	Human Resource Management	3	1	-	40	60	100	4
EEC316	BTEE-606	Laboratory-X (Power Electronics & Drives)	-	-	2	30	20	50	1
EEC317	BTEE-607	Laboratory-XI(Power System-II)	-	-	2	30	20	50	1
EEC328	BTEC-608	Laboratory-XII(Micro controller & PLC)	-	-	2	30	20	50	1
EEC329	General Fitness	100	-	100	-				

Seventh/Eighth Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC401	BTEE-801	Power System Analysis	3	1	-	40	60	100	4
EEC402	BTEE-802	High Voltage Engineering	4	1	-	40	60	100	5
EEC403	BTEE-803	Non-conventional Energy Sources	3	1	-	40	60	100	4
EEC404	BTEC-804B	Elective-II(Energy Auditing and Management)	3	1	-	40	60	100	4
EEC405	BTEE-805B	Elective-III(HVDC Transmission)	3	1	-	40	60	100	4
EEC406	BTEE-806	Lab-XIII(Power System Analysis)	-	-	2	30	20	50	1
EEC407	BTEE-807	Project Work	-	-	6	60	40	100	4
EEC408	BTEE-808	Seminar	-	-	2	100	-	100	2

NAAC Code	Course Code	Course Title	Marks Distribution			Credits
			Internal	External	Total	
EE409	BTEE-701	Industrial Oriented Project Training	150	100	250	8
EE410	BTEE-702	Software Training	300	200	500	10

Course Outcomes
Semester: 1st/2nd

Course: Engineering Physics; Semester: 1st/2nd	
Course Code:- BTPH-101	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	CO 1- An ability to identify, formulate and solve physical problems related to engineering.
II	Development of scientific temper and analytical ability through learning of concepts of physics and their applications in engineering and technology.
III	An understanding of basic vector calculus, formation and conduction of wave in different medium with the awareness of importance of dielectrics in electrical phenomenon.
IV	Understand the difference between the process of emission and absorption, Principle of working of laser, pumping of atoms and different types of lasers.
V	Comprehensive knowledge of optical fibres and its types, dispersion mechanism and utilization of optical fibre technology in different fields.
VI	Get acquainted with the applications of nano science and technology and study of drastic changes in the properties of nano sized particles.

Course: Engineering Mathematics-II; Semester: 1st/2nd	
Course Code:- BTAM-102	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Ability to use mathematical concepts and principles while designing and creating innovative technical tools.
II	Ability to communicate effectively and to be able to work in multi-disciplinary teams.
III	Learn critical thinking, modelling/problem solving and effective use of technology
IV	Learn the concept of linear algebra, ordinary Differential equations and their applications, complex numbers and its basic functions and convergence behaviour of infinite series.

Course: Communicative English; Semester: 1st/2nd	
Course Code:-BTHU-101	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	The students will be able to converse fluently without strain using the accent and lexis that is widely understood across the globe.
II	They will be able to compose clear, coherent and persuasive business writings using appropriate format for the expression of their views in a rational manner.
III	They will be able to skillfully employ the communication techniques and strategies to influence others behaviors' and develop more collaborative working relationships.

Course: BEEE; Semester: 1st/2nd	
Course Code:-BTEE-101	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Solve DC and AC circuits using various laws.
II	Understand concepts of magnetic circuits and working of transformers.
III	Understand the construction and working of electrical machines.
IV	Have knowledge of semiconductor devices, transducers and digital circuits.

Course: Human Values & Professional Ethics; Semester: 1st/2nd	
Course Code:-HVPE-101	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Students understanding 'VALUES' and 'SKILLS' as complimentary would mould themselves into engineers, who would enjoy their work and become more efficient.
II	Current problem of students of not to withstand the pressure due to work load would be solved.
III	Student would work with team spirit rather than in competition in professional as well as in personal life.
IV	While designing and applying technology, nurture and protection of nature would become the key parameter of the student.
V	Holistic understanding would lead student to become more sensitive towards societal and environmental issues.

Course: Engineering Physics Lab; Semester: 1st/2nd	
Course Code:-BTPH102	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Ability to acquire measurement skills, observational skills and understand limits of precision in measurements.
II	Ability to verify fundamental laws, theoretical ideas and concepts.
III	Ability to apply practical based knowledge, scientific methods and reasoning in solving daily life problems.
IV	Ability to correlate the knowledge gained with other engineering disciplines.

Course: Communicative English Lab; Semester: 1st/2nd	
Course Code:-BTHU102	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	The students will be able to converse fluently without strain using the accent and lexis that is widely understood across the globe.
II	The students will be able to understand difficult accent and conventional expressions used in different situations.
III	The students will be able to improve upon their language skills, oral communication skills, group discussion, global world culture, personal development and confidence level.

Course: Basic Electrical and Electronics Engineering Lab; Semester: 1st/2nd	
Course Code:-BTEE-102	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Various laws of AC and DC circuits.
II	Verify the characteristics of semiconductor devices and digital circuits.
III	To test and verify the characteristics of various electromagnetic devices.
IV	Understand the uses of various measuring instruments.

Course: Manufacturing Practice; Semester: 1st/2nd	
Course Code:-BTMP-101	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Student will develop skills for welding on arc welding and gas welding.
II	Students will learn about safety precautions while handling tool and machinery.
III	Acquire skill for machining on lathe machines.
IV	Acquire skills for marking, cutting, fitting practices in fitting shops and learn about various materials used for making moulds, cores and casting.
V	Students will acquire skills to fabricate projects involving operations of carpentry shop, welding shop, fitting and foundry shops.

Course: Chemistry; Semester: 1st/2nd	
Course Code:-BTCH101	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	The students will be able to understand the techniques used to make best use of solar energy and also will learn how to protect the instruments from corrosion.
II	The student will be able to design new product by using different polymeric and nano materials.
III	The students will study spectroscopic techniques used to interpret the structure of molecules.
IV	The students will learn the chemical composition, separation techniques and modifications through chemical processes to enhance the quality of petrochemicals and will understand the merits and demerits of different methods applied to purify the water, to make it fit for domestic as well as industrial use.
V	The students will learn to develop the new techniques used for the synthesis of chemical products in an eco- friendly way.

Course: Engineering Mathematics -I; Semester: 1st/2nd	
Course Code:-BTAM-101	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understanding engineering systems in more logical and systematic form.
II	Understanding the multivariable functions.
III	Understanding and implementing the partial differentiation and multiple integration.
IV	Analyzing mathematical proofs of engineering problems.

Course: Element of Mechanical Engineering; Semester: 1st/2nd	
Course Code:-BTME-101	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	The students will be able to identify types of thermodynamic systems and understand the concepts of transient energies.
II	The students will be able to understand the first law of thermodynamics applicable to the closed system and its applications(non-flow thermodynamic processes), open systems and its applications (Flow processes); understanding of the second law of thermodynamics, concepts of entropy, able to identify real and ideal gas power cycles and processes, concepts of irreversibility.
III	The students will be able to solve engineering problems using macroscopic approach related to various systems and processes.
IV	The students will be able to determine centroid, centers of gravity, moments of inertia, polar moment of inertia, radius of gyration, mass moment of inertia of various symmetrical and non-symmetrical shapes and figures; understanding the mechanical properties of materials and ability to select engineering materials for different applications.

Course: Fundamentals of Computer Programming and IT; Semester: 1st/2nd	
Course Code:-BTCS-101	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Familiarize with the structure of computer system and operating system concepts.
II	Understand the problem design tools and MS-Office.
III	Design C++ programs using various concepts like operator control, structures, functions, array and strings.
IV	Understand OOP's concepts and basics of file handling.

Course: Environmental Science; Semester: 1st/2nd	
Course Code:-EVSC-101	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	To measure environmental variables and interpret results.
II	To interpret the results of scientific studies of environmental problems
III	Ability to define threats to global biodiversity, their implications and potential solutions.
IV	Ability to evaluate local, regional and global environmental topics related to resource use and management.

Course: Engineering Chemistry Lab; Semester: 1st/2nd	
Course Code:- BTCH-102	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	The students will learn the methods to determine the hardness, amount of Chlorine and dissolved oxygen in water.
II	The students will be able to study the properties of lubricant to compare their quality.
III	The students will learn advanced instrumental techniques used to determine the chemical composition.
IV	The students will learn the different steps involved in the synthesis of chemical products.

Course: Engineering Drawing; Semester: 1st/2nd	
Course Code:-BTME-102	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	The students will be able to understand various concepts of engineering drawing like dimensioning, conventions and scales.
II	The students will be able to understand orthographic projections in first and third angles.
III	The students will be able to understand interior details and surface layout of various objects.
IV	The students will be able to understand and acquire knowledge of projection of 3D objects.
V	The students will be able to understand the various concepts of interpretation of joints.

Course: Fundamentals of Computer Programming and IT Lab; Semester: 1st/2nd	
Course Code:-BTCS-102	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Familiarize with computer system and control panel.
II	Explore working of Internet and Window Explorer.
III	Know how to use MS-Office.
IV	Implement concepts of C++ language through programs.

Course: Computer Graphics Laboratory; Semester: 1st/2nd	
Course Code:-BTME-103	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	To introduce the visual science in the form of technical graphics.
II	To understand the coordinate system, basic commands to draw basic entities.
III	To understand the different projections i.e. isometric and orthographic.
IV	To upgrade the knowledge and visualization of geometrical objects.

Course Outcomes
Semester: 3rd

Course: Engineering Mathematics-III; Semester: 3rd	
Course Code:-BTAM-301	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Use the fundamental concepts of Fourier series to study different waveforms and find solution of the initial value and Boundary value problems related to various engineering fields using Laplace transforms.
II	Solve the differential equations arising from physical problems in the form of an infinite convergent series.
III	Use the fundamental concepts of partial differential equations to study the vibration of a string, flow of heat in a rod and plate (steady state).
IV	Apply the basic concepts of function of a complex variable to find real integrals using contour integration.

Course: Circuit Theory; Semester: 3rd	
Course Code:-BTEE-301	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the basics of networks.
II	Understand basic concepts of different types of network theorems and their applications.
III	Design, analyse and synthesize the circuits.
IV	Apply mathematical forms such as Laplace transforms and designing of filters circuits.

Course: Transformers and Direct Current Machines; Semester: 3rd	
Course Code: BTEE-302	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the basics of Transformer, different types of transformer connections and their applications.
II	Understand single phase transformer, auto transformer and three phase transformer.
III	Understand the basic concepts of D.C machines, operation and control of DC machines.
IV	Understand different techniques of speed control of DC machines and different types of testing methods.

Course: Electrical Measurements and Instrumentation; Semester: 3rd	
Course Code: BTEE-303	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Acquire knowledge of various units of measuring devices,standards of various electrical quantities and their errors.
II	Understand working principle and construction of various A.C and D.C measuring equipments used in electrical engineering for various parameters such as voltage,current,power,resistance,inductance,capacitance,frequency etc. In industry as well as in power generation,transmission and distribution sectors.
III	Acquire knowledge of magnetic measurements using various methods, separation of losses and also basics of current,potential transformer along with their errors and corrective measures.
IV	Identify,formulate and solve engineering problems related to measurements with the help of different type of measurinf instruments.

Course: Electronics Devices and Circuits; Semester: 3rd	
Course Code: BTEE-304	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand basic electronic components.
II	Understand amplification circuits to amplify the signal.
III	Understand various types of circuits to generate signals.
IV	Understand how electronic components are specified and selected for industrial applications.

Course: Lab-I (Semiconductor Devices and Circuit Theory); Semester: 3rd	
Course Code: BTEE-305	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the characteristics of various semiconductor devices.
II	Understand identification and selection of various electronic components.
III	Understand all types of electronics devices and circuits.
IV	Analyze and interpret data.

Course: Lab-II(Electrical Machines-I); Semester: 3rd	
Course Code: BTEE-306	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the characteristics of DC machines.
II	Understand speed control methods and testing methods of DC machines.
III	Acquire skills to operate all types of DC machines.
IV	Analyze the speed control and efficiency of DC machine.

Course: Lab-III (Electrical Measurements); Semester: 3rd	
Course Code: BTEE-307	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the basics of measurements and instrumentation systems.
II	Understand different instruments for electrical measurements.
III	Understand basic concepts of different types of sensors and transducers.
IV	Gain the skill knowledge of bridges and CRO operations.

Course: Institutional Training; Semester: 3rd	
Course Code: BTEE-309	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Paraphrase different types of wiring, switches, protective devices, cables, insulations and safety measures.
II	Understand the generation of electricity through various conventional and renewable sources.
III	Categorize different types of electrical components and devices.
IV	Identify and discuss various socio-economic/environmental issues.

Course Outcomes
Semester: 4th

Course: Asynchronous Machines; Semester: 4th	
Course Code: BTEE-401	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Acquire the basic concepts and performance of single phase and three phase ac machines for real time applications.
II	Learn and analyze the various starting and speed control techniques for Induction motors.
III	Understand the construction, principle of operation and applications of various special purpose motors.
IV	Analyse and apply principles, and techniques of asynchronous machines in any advanced projects and works as a team.

Course: Linear Control Systems; Semester: 4th	
Course Code: BTEE-402	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Obtain transfer functions for electrical circuits, translational/rotational mechanical systems and electromechanical systems.
II	Learn basic goals of control systems in terms of transient/steady state time response behaviour.
III	Analyze the stability of designed systems.
IV	Have skills to model the control systems.

Course: Electromagnetic Fields; Semester: 4th	
Course Code: BTEE-403	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Learn the concepts of electromagnetic field theory and fundamental field equations.
II	Acquire knowledge about the time varying fields and Maxwell's equations.
III	Understand the propagation of electromagnetic wave along different mediums.
IV	Identify, formulates and solves engineering problems related to electromagnetic fields.

Course: Digital Electronics; Semester: 4th	
Course Code: BTEE-404	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Acquire knowledge and understanding of the basics of digital electronics.
II	Acquire an analytical thinking for the analysis of combinational and sequential digital circuits.
III	Able to formulate and design digital applications and propose a cost effective solution.
IV	Acquire knowledge of the technology in the area of memory devices, logic families, A/D & D/A converters.

Course: Power System-I(Transmission and Distribution); Semester: 4th	
Course Code: BTEE-405	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Acquire knowledge about basic requirements of transmission and distribution system design and installation. They can calculate economic Size of conductors and will know which transmission voltage is best suitable for a particular distance and area for economic consideration.
II	Understand constructive details of overhead and underground transmission lines such as different types of conductors, supporting structures for transmission line considering geographical conditions and weather. They will also understand about problems in the overhead lines and can calculate the errors.
III	Analyze and calculate different parameters of single phase and three phase lines and will know how to improve the efficiency of transmission lines by parameters. Students will be able to describe different transmission lines in the form of circuits and can evaluate their respective equations and constants.
IV	Understand how different type of equipment are deployed to improve the quality of power and to compare different type of transmission systems and their requirement according to locality and efficiency.

Course: Power Plant Engineering; Semester: 4th	
Course Code: BTEE-406	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the classification of steam and hydro-electric power plants and familiarization with the main equipment and machinery used in them.
II	Understand the basic concepts of nuclear, gas and diesel power plants.
III	Acquire knowledge about pollution control of different plants.
IV	Understand the combined operation of different plants.

Course: Lab-IV (Instrumentation and Measuring Devices); Semester: 4th	
Course Code: BTEE-407	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the working principal and construction of the measuring instruments and recorders
II	Measure various electrical parameters using meters and transducers
III	Calibrate the measuring devices such as meters and transducers.
IV	Use the techniques and skills to operate CRO.

Course: Lab-V(Control System); Semester:4th	
Course Code: BTEE-408	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Examine and compare the Speed-Torque characteristics of various motors.
II	Acquire skills to understand all types of control components and controller to achieve the desired performance.
III	Examine characteristics of transducers and develop skills for their applications.
IV	Demonstrate knowledge to manage control based projects for solving real world problems using software techniques.

Course: Lab-VI(Electronic Circuits); Semester:4th	
Course Code: BTEE-409	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Acquire practical knowledge about all types of digital circuits.
II	Acquire working knowledge to connect digital circuits and verify their truth tables.
III	Test and verify working and truth tables of combinational and sequential circuits.
IV	Acquire knowledge of various logic families.

Course Outcomes
Semester: 5th

Course: Synchronous Machines; Semester:5th	
Course Code: BTEE-501	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the concept of synchronous machine as an alternator, synchronous motor and condenser and their constructive features, working principle, various characteristics, winding terminology, types and their transient stability.
II	Analyze performance of synchronous machines on various power factors, draw various associated phasor diagrams and calculation of voltage regulation with different methods.
III	Gain knowledge of various starting methods ,types of motors , parallel operation of alternators along with conditions and effect of various changing parameters on efficiency of alternators while parallel operation.
IV	Comprehend industrial problems associated with synchronous machines and suggest possible solutions.

Course: Electric Generation and Economics; Semester: 5th	
Course Code: BTEE-502	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand different types of loads, load curves and factors, their impact on generation planning and operation.
II	Understand the different types of costs involved in power plant and tariffs design imposed on the consumers
III	Acquire knowledge about selection of plants and analysis of technique to solve economic operation of steam plant.
IV	Understand the management of technical co-ordination operation of Hydro and Steam power plants and principle of cogeneration.
V	Basics of electrical energy sources,organization and their impact on environment.

Course: Microprocessors; Semester: 5th	
Course Code: BTEE-503	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand architecture of 8 bit and 16 bit Microprocessor.
II	Understand basics of assembly language programming.
III	Integrate the interfacing of Microprocessor with the peripheral devices.
IV	Paraphrase the application areas of Microprocessor.

Course: Power Electronics; Semester: 5th	
Course Code: BTEE-504	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the power electronic devices and construction, operation and characteristics of most popular member of thyristor family i.e. SCR.
II	Analyse operation of diffferent types of converter circuits such as; AC-DC, DC-DC, AC-AC and DC-AC.
III	Understand the operation of cycloconverters and their applications.
IV	Understand the application of converters for control of motor drives.

Course: Numerical and Statistical Methods; Semester: 5th	
Course Code: BTEE-505	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Apply the fundamentals of numerical methods and associated error estimates to solve algebraic and transcendental equations and linear system of equations using direct and iterative methods.
II	Interpolate the value with evenly and unevenly spaced points using the Lagrange's and Newton's distinct techniques and Fit the different types of curves using least square method
III	Differentiate and integrate problems using numerical Differentiation and Integration techniques.
IV	Apply the fundamentals of sampling distribution and testing of significance of small and large samples.

Course: Lab-VII (Electrical Machines-II); Semester: 5th	
Course Code: BTEE-506	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Obtain equivalent circuit parameters of single-phase and three- phase Induction motors.
II	Control speed of Induction motors by different methods.
III	Draw open and short circuit characteristics of three-phase alternator and V and inverted V curves of synchronous motor.
IV	Find out voltage regulation of an alternator by different tests.
V	Synchronize two or more 3-phase alternators.

Course: Lab-VIII(Numerical Analysis); Semester: 5th	
Course Code: BTEE-507	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Develop programs of numerical methods and associated error estimates to solve algebraic and transcendental equations in modern scientific computing.
II	Develop the programs to solve the linear system of equations
III	Use C++ to interpolate the value with evenly and unevenly spaced points using the Lagrange's and Newton's distinct techniques.
IV	Create a programs for the solutions of ordinary differential equations using Numerical Methods.

Course: Electrical: Lab-IX(Electrical: Estimation and Costing); Semester: 5th	
Course Code: BTEE-508	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Acquire knowledge of Indian electricity rules.
II	Study and carry out wiring, estimating and costing of various types of electrical installations and develop skills for their application.
III	Formulate detail estimate and costing of a transmission line/Overhead and underground distribution system.
IV	Understand energy audit of a small utility including future expansion.

Course: Electrical: Industrial Training; Semester: 5th	
Course Code: BTEE-509	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand various software platforms and their applications.
II	Understand the impact of engineering solutions and industrial safety in a global and social context.
III	Enhance self-education and clearly understand the value of achieving Perfection in the respective Project work.
IV	Communicate in Multi-disciplinary teams and familiar with organizational behaviour and management.

Course Outcomes
Semester: 6th

Course: Electric Power Utilization; Semester: 6th	
Course Code:BTEE-601	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Impart knowledge of electric traction, electric heating, electric welding and illumination.
II	Analyze and solve the varieties of problems and issues in electrical power utilization.
III	Impart the knowledge of air conditioning and refrigeration.
IV	Acquire knowledge of different methods of production of light, lighting systems, illumination levels for various purposes light fittings- industrial lighting- flood lighting-street lighting.

Course: Power System-II (Switchgear and protection); Semester: 6th	
Course Code: BTEE-602	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand about basic components of power system protection system.
II	Understand about basics of Substation, Isolator and Fuses.
III	Understand about Principle, Operation and types of Relays and Circuit Breakers.
IV	Understand about Protection of Feeder, Bus bar, Generator and Transformer.

Course: Non-Linear and digital control systems; Semester: 6th	
Course Code: BTEE-603	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Acquire an analytical thinking for the analysis and design of non-linear & digital control systems using state space models having cognition of stability, Controllability and Observability.
II	Identify and investigate various non linearities in control system for second & higher order systems.
III	Formulate & analyze stability of non-linear systems with appropriate problem solving techniques.
IV	Recognition of and ability to engage in Lifelong learning with understanding the concepts of basic and modern control system for the real time analysis and design of control systems.

Course: Microcontroller & PLC; Semester: 6th	
Course Code: BTEE-604	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand need of microcontrollers and complete architectural details of 8051 Microcontroller.
II	Understand how to write efficient programs in Assembly level language of the 8051 family.
III	Design an embedded system by interfacing between the microcontroller and peripheral devices.
IV	Design real-time projects using PLC.

Course: Human Resource Management; Semester: 6th	
Course Code: HU-251	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Identify and analyze problems in the field of HRM and to provide innovative solutions.
II	Be able to investigate the significance of ethical issues in HR practices and the management of people in the workplace.
III	Obtain the practical skills required by managers actively engaged in the strategic management of people within organizations.
IV	Gain proficiency in communication skills,make effective presentations and develop an ability to manage projects and apply this knowledge in the context of an independently constructed piece of work as well as team work.

Course: Flexible AC Transmission System; Semester: 6th	
Course Code: BTEE-605X	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Analyze and Design reactive power compensation systems.
II	Solve real and reactive power flow problems.
III	Evaluate the impact of FACTS on modern power systems.
IV	Gain knowledge of a vast field of Research in solving practical power flow control problem.s

Course: Lab-X (Power Electronics & Drives); Semester: 6th	
Course Code: BTEE-606	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Obtain the characteristics of SCR and UJT and to obtain triggering pulses for them.
II	Visualize and analyze the performance of various converter circuits.
III	Verify the performance of various converter circuits by measuring the currents and voltages at different points in the circuit and to display their waveforms.
IV	Control the speed of motors using thyristors.

Course: Lab-XI (Power System-II); Semester: 6th	
Course Code: BTEE-607	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Analyze the performance of transmission lines.
II	Understand operation of fuse,relays and circuit breakers.
III	Analyze various protection schemes in power system.
IV	Plot characteristics of different types of relays.

Course: Lab-XII(Microcontroller & PLC); Semester: 6th	
Course Code: BTEE-608	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the pin configuration of 8051 microcontroller.
II	Design and compile assembly language programs.
III	Understand the concepts of ladder logic programming.
IV	Design and analyze the output of various PLC based programs.

Course Outcomes
Semester: 7th/8th

Course: Software Training; Semester: 7th/8th	
Course Code: BTEE-701	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand various software platforms and their applications.
II	Identify, formulate and model problems based on a systems approach.
III	Understand the impact of engineering solutions in a global and social context.
IV	Enhance capability and enthusiasm for self-improvement through continuous professional development and life-long learning.

Course: Industrial Oriented Project Training; Semester: 7th/8th	
Course Code: BTEE-702	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the impact of engineering solutions and industrial safety in a global and social context.
II	Identify, formulate and model problems based on a systems approach.
III	Enhance self-education and clearly understand the value of achieving Perfection in the respective Project work.
IV	Communicate in Multi-disciplinary teams and familiar with organizational behaviour and management.

Course: Power System Analysis ; Semester: 7th/ 8th	
Course Code: BTEE-801	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Do Modeling of the power system components for steady state analysis.
II	Understand the need of power flow and methods to obtain power flow solution of power system networks.
III	Analyze faulty behavior of power system under balanced and unbalanced conditions.
IV	Study the power transfer capability of transmission lines and analyze steady state and transient stability conditions of power system.

Course: High Voltage Engineering; Semester: 7th/8th	
Course Code: BTEE-802	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Explain that how over-voltages arise in a power system, and protection against these over-voltages.
II	Understand the basic physical phenomenon occurring in various breakdown processes in solid, liquid and gaseous insulating materials.
III	Know about generation and measurement of D. C., A.C., & Impulse voltages.
IV	Know about H. V. testing of equipment and insulating materials, as per the standards.

Course: Non-Conventional Energy Sources; Semester: 7th/8th	
Course Code: BTEE-803	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Explain the use of Non-Conventional sources of energy for the solution of the problem of environment pollution and will also acquire knowledge about current and future energy scenario in the world.
II	Illustrate various renewable energy technologies and systems such as Solar energy, MHD generators, thermoelectric generators.
III	Acquire knowledge about fuel cells, geothermal energy sources, energy from ocean, wind energy.
IV	Apply the knowledge of various possible mechanisms of renewable energy such as biomass and hydroelectric plants.

Course: Energy Auditing and Management; Semester: 7th/8th	
Course Code: BTEE-804Y	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Identify the importance of energy sources & conservation ideas through life-long learning.
II	Define the process of Energy Audit for an industry/ organization.
III	Understand the energy management and saving opportunities for an Electrical system, Compressed Air System and refrigeration system.
IV	Use financial & technical analysis and prepare technical report after the completion of Energy Audit process as an individual or in a group.
V	Contribute towards the environment safety and sustainability.

Course: HVDC Transmission; Semester: 7th/8th	
Course Code: BTEE-805B	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Know the importance of HVDC transmission.
II	Understand HVDC system control strategies.
III	Understand the enhancement of power system stability by HVDC system.
IV	Understand the modelling of DC & AC networks.

Course: Lab-XIII (Power System Analysis); Semester: 7th/8th	
Course Code: BTEE-806	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Acquire the skill of using power system related tools for power system analysis.
II	Analysis of load flow, short circuit, faults using software.
III	Investigation of stability and control of power system.
IV	Designing of transmission system, distribution system and underground cables etc.

Course: Project Work; Semester: 7th/8th	
Course Code: BTEE-807	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Design and construct a hardware and software system, component or process to meet desired needs.
II	Solve multi-disciplinary problems.
III	Understand the concept of various software tools.
IV	Demonstrate the knowledge, skills and attitudes of a professional engineer.

Course: Seminar; Semester: 7th/8th	
Course Code: BTEE-808	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Study research papers for understanding of a new field, in the absence of a textbook, to summarise and review them.
II	Identify promising new directions of various cutting edge technologies.
III	Identify promising new directions of various cutting edge technologies.
IV	Effectively communicate and debate with an appreciationby making an oral presentation before an evaluation committee.