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 Group-A									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EE141	BTPH103-18	Physics	3	1	0	40	60	100	4
EE142	BTPH113-18	Physics (Lab)	0	0	3	30	20	50	1.5
EE143	BTAM101-18	Maths-I	3	1	0	40	60	100	4
EE144	BTEE101-18	Basic Electrical Engineering	3	1	0	40	60	100	4
EE145	BTEE102-18	Basic Electrical Engineering (Lab)	0	0	2	30	20	50	1
EE146	BTME101-18	Engineering Graphics & Design	1	0	4	60	40	100	3
EE147	BMPD101-18	Mentoring and Professional Development	0	0	2	Satisfactory/ Un-Satisfactory			Non-Credit

First Semester Group-B									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EE148	BTCH101-18	Chemistry-I	3	1	0	40	60	100	4
EE149	BTCH102-18	Chemistry-I (Lab)	0	0	3	30	20	50	1.5
EE150	BTAM101-18	Maths-I	3	1	0	40	60	100	4
EE151	BTPS101-18	Programming for Problem Solving	3	0	0	40	60	100	3
EE152	BTPS102-18	Programming for Problem Solving (Lab)	0	0	4	30	20	50	2
EE153	BTMP101-18	Workshop / Manufacturing Practices	1	0	4	60	40	100	3
EE154	BTHU101-18	English	2	0	0	40	60	100	2
EE155	BTHU102-18	English (Lab)	0	0	2	30	20	50	1
EE156	BMPD101-18	Mentoring and Professional Development	0	0	2	Satisfactory/ Un-Satisfactory			Non-Credit

Second Semester (Group-B)									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EE157	BTPH103-18	Physics	3	1	0	40	60	100	4
EE158	BTPH113-18	Physics (Lab)	0	0	3	30	20	50	1.5
EE159	BTAM203-18	Maths-II	3	1	0	40	60	100	4
EE160	BTEE101-18	Basic Electrical Engineering	3	1	0	40	60	100	4
EE161	BTEE102-18	Basic Electrical Engineering (Lab)	0	0	2	30	20	50	1
EE162	BTME101-18	Engineering Graphics & Design	1	0	4	60	40	100	3
EE163	BMPD101-18	Mentoring and Professional Development	0	0	2	Satisfactory/ Un-Satisfactory			Non-Credit

Second Semester (Group-A)									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EE164	BTCH101-18	Chemistry-I	3	1	0	40	60	100	4
EE165	BTCH102-18	Chemistry-I (Lab)	0	0	3	30	20	50	1.5
EE166	BTAM203-18	Maths-II	3	1	0	40	60	100	4
EE167	BTPS101-18	Programming for Problem Solving	3	0	0	40	60	100	3
EE168	BTPS102-18	Programming for Problem Solving (Lab)	0	0	4	30	20	50	2
EE169	BTMP101-18	Workshop / Manufacturing Practices	1	0	4	60	40	100	3
EE170	BTHU101-18	English	2	0	0	40	60	100	2
EE171	BTHU102-18	English (Lab)	0	0	2	30	20	50	1
EE172	BMPD101-18	Mentoring and Professional Development	0	0	2	Satisfactory/ Un-Satisfactory			Non-Credit

Third Semester										
NAAC Code	Course Code	Course Title	Load Allocation			Hours Week	Marks Distribution			Credits
			L	T	P		Internal	External	Total	
EEC241	BTEE-301-18	Electrical Circuit Analysis	3	1	-	4	40	60	100	4
EEC242	BTEE-302-18	Analog Electronics	3	0	-	3	40	60	100	3
EEC243	BTEE-303-18	Electrical Machines – I	3	0	-	3	40	60	100	3
EEC244	BTEE-304-18	Electromagnetic Fields	3	1	-	4	40	60	100	4
EEC245	BTXX- XXX -18	Engineering Mechanics	3	1	-	4	40	60	100	4
EEC246	BTEE-311-18	Analog Electronics Laboratory	-	-	2	2	30	20	50	1
EEC247	BTEE-312-18	Electrical Machines-I Laboratory	-	-	2	2	30	20	50	1
EEC248	BTMC- XXX -18	Mandatory Course (BTMC-101-18 or BTMC102-18)	3	-	-	3	40	60	100	S/US
EEC249	BMPD-301-18	Mentoring and Professional Development of Students	-	1	-	1	50	-	50	Non-Credit
EEC250	BTEE-321-18	Institutional Summer Vacation Training	-	-	-	35	-	-		S/US

Fourth Semester										
NAAC Code	Course Code	Course Title	Load Allocation			Hours Week	Marks Distribution			Credits
			L	T	P		Internal	External	Total	
EEC251	BTEE-401-18	Digital Electronics	3	-	-	3	40	60	100	3
EEC252	BTEE-402-18	Electrical Machines – II	3	-	-	3	40	60	100	3
EEC253	BTEE-403-18	Power Electronics	3	-	-	3	40	60	100	3
EEC254	BTEE-404-18	Signals and Systems	3	-	-	3	40	60	100	3
EEC255	BTAM- 302-18	BTAM- Mathematics-III(Probability & Statistics)	3	1	-	4	40	60	100	4
EEC256	BTEE-411-18	Measurements and Instrumentation Lab.	2	-	2	4	30	20	50	1
EEC257	BTEE-412-18	Digital Electronics Laboratory	-	-	2	2	30	20	50	1
EEC258	BTEE-413-18	Electrical Machines – II Laboratory	-	-	2	2	30	20	50	1
EEC259	BTEE-414-18	Power Electronics Laboratory	-	-	2	2	30	20	50	1
EEC260	BTMC-XXX-18	Mandatory Course (BTMC-101-18 or BTMC 102-18)	3	-	-	3	40	60	100	S/US

Course Outcomes
Semester: 1st/2nd

Course: Chemistry-I; Semester: 1st/2nd	
Course Code:- BTCH101-18	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Analyse microscopic chemistry in terms of atomic and molecular orbitals and intermolecular forces.
II	Rationalise bulk properties and processes using thermodynamics, periodic properties such as ionization potential, electronaffinity etc.
III	Distinguish the ranges of the electromagnetic spectrum used in various spectroscopic techniques.
IV	Understand the stereochemistry of organic compounds and major chemical reactions that are used in the synthesis of molecules.

Course: Chemistry Lab-I ; Semester: 1st/2nd	
Course Code: BTCH102-18	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Learn the techniques like conductometry and chromatography.
II	Learn the methods to determine Partition coefficient, Rate constant and adsorption isotherm.
III	Study the properties of lubricant to compare their quality.
IV	Analyze the different lattice structures and synthesize a polymer molecule.

Course: ENGLISH; Semester: 1st/2nd	
Course Code:- BTHU-101-18	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	Students will acquire basic proficiency in reading & listening, comprehension, writing and speaking skills.
II	Students will demonstrate critical and innovative thinking.
III	They will be able to produce on their own clear and coherent texts.

Course: ENGLISH LAB;Semester: 1st/2nd	
Course Code:- BTHU 102-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	The objective of the course is to help the students become the independent users of English language.
II	Students will be able to display competence in oral, written, and visual Communication.
III	Demonstrate positive group communication exchanges.
IV	They will be able to converse fluently

Course: Programming for Problem Solving; Semester: 1st/2nd	
Course Code:- BTPS101-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Describe algorithm, pseudo codes and programming structures.
II	Use syntax, semantics and different constructs to solve mathematical and logical problems in 'C' language.
III	Implement programs related to simple numerical method problems, namely root finding of function, differentiation of function and simple integration in 'C' language.
IV	Identify the role of simple data structures, pointers, memory allocation and data handling for various applications through files in 'C'.
V	Decompose a problem into functions and synthesize a complete program using divide and conquer approach.
VI	Describe various file related operations.

Course: Programming for Problem Solving Lab; Semester: 1st/2nd	
Course Code:- BTPS102-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the various hardware and software parts of computer system and define the basic working of Operating System.
II	Describe syntax, semantics and different constructs to solve mathematical and logical problems in 'C' language
III	Implement a simple program by writing the code, testing the code and debugging the program in 'C' Language.
IV	Represent data in arrays, strings and structures and manipulate them through a program.
V	Declare pointers of different types and use them in defining self referential structures.
VI	Implement programs to create, read and write to and from simple text files.

Course: Electromagnetism (Physics) Semester: 1st/2nd	
Course Code:- BTPH 103-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Apply the basic concepts of vector calculus to electric and magnetic fields.
II	Describe static electric and magnetic fields, their behavior in different media, associated laws, boundary conditions and electromagnetic potentials.
III	Understand the concepts related to Faraday's law, induced emf and analyze Maxwell's equations in differential and integral forms.
IV	Understand the phenomena of wave propagation in different media and its interfaces and apply them to diverse engineering problems.

Course: Electromagnetism Lab (Physics Lab) Semester: 1st/2nd	
Course Code:- BTPH113-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	verify some of the theoretical concepts learnt in the theory courses.
II	carry out precise measurements and handling sensitive equipments.
III	understand the methods used for estimating and dealing with experimental uncertainties and systematic errors.
IV	Learn to draw conclusions from data and write a technical report which communicates scientific information in a clear and concise manner.

Course: Mathematics -1 Semester: 1st	
Course Code:- BTAM101-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Determine the rank and inverse of the matrix, solve linear system of equations, determine the Eigen values and Eigen vectors and also apply Cayley Hamilton theorem.
II	determine the convergence and divergence conditions of various types of infinite series.
III	Study the limit, continuity, differentiation and determine the optimal points of single variable and multivariable functions.
IV	integrate wrt multiple variables and also apply the same to determine the areas and volumes using double integration using change of order or change of variables, if needed.

Course:Mathematics-2; Semester: 2nd	
Course Code: BTAM203-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Apply the tools of differential calculus to the functions of complex variables and study the functions and their properties.
II	Apply the tools of integral calculus to the evaluate the singularities and integrals of the functions of complex variables and definite real integrands.
III	Solve the ordinary differential equations of first order.
IV	Solve the ordinary differential equations of higher order as needed in the engineering problems.

Course: Basic Electrical Engineering; Semester: 1st/2nd	
Course Code:- BTEE-101-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	To understand and analyze basic electric and magnetic circuits.
II	To study the working principles, construction, applications of rotating electrical machines.
III	To study the working principle of power converters.
IV	To introduce the components of low voltage electrical installations.

Course: Basics of Electrical Engineering Laboratory ; Semester: 1st/2nd	
Course Code:- BTEE-102-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	The ability to use common electrical measuring instruments and understand the fundamentals of electrical engineering.
II	The ability to make electrical connections and measure power, power factor using appropriate equipments.
III	Have the knowledge of electrical machines, components and their ratings.
IV	Understand the operation of transformers and electrical machines.

Course Outcomes
Semester: 3rd

Course: Electrical Circuit Analysis ; Semester: 3rd	
Course Code: BTEE301-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Apply network theorems for the analysis of electrical circuits.
II	Obtain the transient and steady-state response of electrical circuits.
III	Apply mathematical forms such as Laplace transforms and designing of filters circuits.
IV	Design ,analyse and synthesis the circuits.

Course: Analog Electronics; Semester: 3rd	
Course Code: BTEE302-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the characteristics of transistors.
II	Design and analyze various rectifier and amplifier circuits.
III	Design sinusoidal and non-sinusoidal oscillators.
IV	Understand the functioning of OP-AMP and design OP-AMP based circuits.

Course: Electrical Machines-I ; Semester: 3rd	
Course Code:BTEE-303-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the concepts of magnetic circuits.
II	Understand the operation of DC machines
III	Analyse the differences in operation of different DC machine configurations
IV	Analyse single phase and three phase transformers circuits.

Course: Electromagnetic Fields ; Semester: 3rd	
Course Code:BTEE-304-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the basic laws of electromagnetism and vector analysis.
II	Obtain the electric and magnetic fields for simple configurations under static conditions.
III	Analyze time varying electric and magnetic fields.
IV	Understand Maxwell's equations and the propagation of EM waves.

Course: Engineering Mechanics ; Semester: 3rd	
Course Code: BTXX-XXX-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the concepts of co-ordinate systems.
II	Analyse the three-dimensional motion.
III	Understand the concepts of rigid bodies.
IV	Analyse the free-body diagrams of different arrangements.
V	Analyse torsional motion and bending moment.

Course: Analog Electronics Laboratory ; Semester: 3rd	
Course Code: BTEE-311-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the use and importance of various types of equipments used in the laboratory and to make circuits on bread-board.
II	Analyze, take measurements to understand circuit behavior and performance under different conditions.
III	Troubleshoot, design and create electronic circuits meant for different applications.
IV	Evaluate the performance of electronic circuits and working of small projects employing semiconductor devices.

Course: Electrical Machines – I Laboratory ; Semester: 3rd	
Course Code: BTEE-312-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Analyze three-phase transformer/system connections.
II	Evaluate equivalent circuit parameters, efficiency and voltage regulation by performing various tests on transformer.
III	Analyze parallel operation of transformers.
IV	Analyze performance characteristics of DC generators.

Course: Institutional Summer Vacation Training; Semester: 3rd	
Course Code: BTEE-321-18	
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: Digital Electronics ; Semester: 4th	
Course Code: BTEE-401-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand working of logic families and logic gates.
II	Design and implement Combinational and Sequential logic circuits.
III	Understand the process of Analog to Digital conversion and Digital to Analog conversion.
IV	Understand memories.

Course: Electrical Machines – II ; Semester: 4th	
Course Code:BTEE-402-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the concepts of rotating magnetic fields.
II	Understand the operation of AC machines.
III	Analyses performance characteristics of AC machines.
IV	Understand the difference between the synchronous machines and asynchronous machines.

Course: Power Electronics ; Semester: 4th	
Course Code:BTEE-403-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the differences between signal level and power level devices.
II	Analyses controlled rectifier circuits.
III	Analyses the operation of DC-DC choppers.
IV	Analyses the operation of voltage source inverters

Course: Signals and Systems; Semester: 4th	
Course Code:BTEE-404-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the concepts of continuous time and discrete time systems.
II	Analyses systems in complex frequency domain.
IV	Understand mathematical tools to be able to apply in state variable modeling

Course: Mathematics-III (Probability and Statistics) ; Semester: 4th	
Course Code: BTAM302-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Have basics knowledge about measure of central tendency, skewness, kurtosis and moments and their applications in engineering fields
II	Familiarize the student with expectations of discrete and continuous random variable.
III	Familiarize probability techniques and random variables and detailed knowledge of probability distribution with so as to use it with any date of engineering problem formulation.
IV	Have basic idea about statistics including correlation, regression and then up to advanced level with testing of large samples that is important in solving problems related to engineering.
V	Fit the given data into curves by various methods which forms an important application in engineering.

Course: Measurements and Instrumentation Laboratory ; Semester: 4th	
Course Code: BTEE-411-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Design and validate DC and AC bridges.
II	Analyze the dynamic response and the calibration of few instruments.
III	Learn about various measurement devices, their characteristics, their operation and their limitations.
IV	Understand statistical data analysis.
V	Understand computerized data acquisition.

Course: Digital Electronics Laboratory ; Semester: 4th	
Course Code: BTEE-412-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand basic electronic components and circuits.
II	Verify truth tables of TTL gates.
III	Design,fabrication and realization of all gates and basic circuits.
IV	Design the truth tables and basic circuits.
V	Test basic electronics circuits.

Course: Electrical Machines-II Laboratory ; Semester: 4th	
Course Code: BTEE-413-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Construct equivalent circuits induction motors by routine tests.
II	Comprehend the requirement of starting and speed control methods of induction motors in the various applications of industry.
III	Construct equivalent circuits of synchronous generator and motor.
IV	Apply knowledge to show utility of alternator, synchronous motors and synchronous condenser for various applications in power system.
V	Construct characteristic curves for induction and synchronous machines.
VI	Understand the concept of parallel operation of three phase alternators.

Course: Power Electronics Laboratory ; Semester: 4th	
Course Code: BTEE-414-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the properties and characteristics of thyristors.
II	Understand the different types of waveforms of inverter and chopper circuits.
III	Analyze speed and direction control of single phase and three phase electric motors using ac and dc drive.
IV	Understand the effect of free-wheeling diode on pf with RL load.
V	Check the performance of a choppers, and inverter.