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 Contact Hrs. : 25

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTPH101-23	Basic Science Course	Engineering Physics	3	1	0	40	60	100	4
BTPH102-23	Basic Science Course	Engineering Physics Lab	0	0	2	30	20	50	1
BTAM101-23	Basic Science Course	Engineering Mathematics-I	3*	1	0	40	60	100	4
BTEE101-18	Engineering Science Course	Basic Electrical Engineering	3	1	0	40	60	100	4
BTEE102-18	Engineering Science Course	Basic Electrical Engineering (Lab)	0	0	2	30	20	50	1
BTME101-21	Engineering Science Courses	Engineering Graphics & Design	1	0	4	40	60	100	3
BMPD101-18		Mentoring and Professional Development	0	0	2	Satisfactory / Un-Satisfactory			Non-Credit
TOTAL			**10**	**3**	**10**	**220**	**280**	**500**	**17**

First Semester Group-B Contact Hrs. : 29

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCH101-23	Basic Science Course	Chemistry-I	3	1	0	40	60	100	4
BTCH102-18	Basic Science Course	Chemistry-I Lab	0	0	2	30	20	50	1
BTAM101-23	Basic Science Course	Engineering Mathematics -I	3*	1	0	40	60	100	4
BTPS101-18	Engineering Science Course	Programming for Problem Solving	3	0	0	40	60	100	3
BTPS102-18	Engineering Science Course	Programming for Problem Solving (Lab)	0	0	4	30	20	50	2
BTMP101-18	Engineering Science Courses	Workshop / Manufacturing Practices	1	0	4	60	40	100	3
BTHU101-18	Humanities and Social Sciences including Management courses	English	2	0	0	40	60	100	2
BTHU102-18	Humanities and Social Sciences including Management courses	English (Lab)	0	0	2	30	20	50	1
BMPD101-18		Mentoring and Professional Development	0	0	2	Satisfactory / Un-Satisfactory			Non-Credit
	TOTAL		**12**	**2**	**14**	**290**	**360**	**650**	**20**

Second Semester Group-A Contact Hrs. : 29

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTCH101-23	Basic Science Course	Chemistry-I	3	1	0	40	60	100	4
BTCH102-18	Basic Science Course	Chemistry-I Lab	0	0	2	30	20	50	1
BTAM201-23	Basic Science Course	Engineering Mathematics –II	3*	1	0	40	60	100	4
BTPS101-18	Engineering Science Course	Programming for Problem Solving	3	0	0	40	60	100	3
BTPS102-18	Engineering Science Course	Programming for Problem Solving (Lab)	0	0	4	30	20	50	2
BTMP101-18	Engineering Science Courses	Workshop / Manufacturing Practices	1	0	4	60	40	100	3
BTHU101-18	Humanities and Social Sciences including Management courses	English	2	0	0	40	60	100	2
BTHU102-18	Humanities and Social Sciences including Management courses	English (Lab)	0	0	2	30	20	50	1
BMPD201-18		Mentoring and Professional Development	0	0	2	Satisfactory / Un-Satisfactory			Non-Credit
	TOTAL		**12**	**2**	**14**	**290**	**360**	**650**	**20**

Second Semester Group-B Contact Hrs.: 25

Course Code	Course Type	Course Title	Load Allocations			Marks Distribution		Total Marks	Credits
			L	T	P	Internal	External		
BTPH101-23	Basic Science Course	Engineering Physics	3	1	0	40	60	100	4
BTPH102-23	Basic Science Course	Engineering Physics Lab	0	0	2	30	20	50	1
BTAM201-23	Basic Science Course	Engineering Mathematics -II	3*	1	0	40	60	100	4
BTEE101-18	Engineering Science Course	Basic Electrical Engineering	3	1	0	40	60	100	4
BTEE102-18	Engineering Science Course	Basic Electrical Engineering (Lab)	0	0	2	30	20	50	1
BTME101-21	Engineering Science Courses	Engineering Graphics & Design	1	0	5	40	60	100	3
BMPD201-18		Mentoring and Professional Development	0	0	2	Satisfactory / Un-Satisfactory			Non-Credit
TOTAL			**10**	**3**	**10**	**220**	**280**	**500**	**17**

Semester III [Second year]			Branch: Electrical Engineering							
Sr. No.	**Course code**	**Course Title**	**L**	**T**	**P**	**Hours/ Week**	**Internal Marks**	**External Marks**	**Total Marks**	**Credits**
1	BTEE- 301-18	Electrical Circuit Analysis	3	1	0	4	40	60	100	4
2	BTEE- 302-18	Analog Electronics	3	0	0	3	40	60	100	3
3	BTEE- 303-18	Electrical Machines – I	3	0	0	3	40	60	100	3
4	BTEE- 304-18	Electromagnetic Fields	3	1	0	4	40	60	100	4
5	BTEE- 305-18	Engineering Mechanics	3	1	0	4	40	60	100	4
6	BTEE- 311-18	Analog Electronics Laboratory	0	0	2	2	30	20	50	1
7	BTEE-312-18	Electrical Machines – I Laboratory	0	0	2	2	30	20	50	1
8	BTMC- XXX-18	Mandatory Course (BTMC-101-18 or BTMC 102-18)	3	0	0	3	40	60	100	S/US
9	BMPD- 301-18	Mentoring and Professional Development of Students	0	1	0	1	50	-	50	S/US
10	BTEE- 321-18	Institutional Summer Vacation Training*	-	-	-	35*	-	-		S/US
		Total	**18**	**4**	**4**	**26**	**350**	**400**	**750**	**20**

Semester IV [Second year]			Branch: Electrical Engineering							
Sr. No.	**Course code**	**Course Title**	**L**	**T**	**P**	**Hours/ Week**	**Internal Marks**	**External Marks**	**Total Marks**	**Credits**
1	BTEE-401-18	Digital Electronics	3	0	0	3	40	60	100	3
2	BTEE-402-18	Electrical Machines – II	3	0	0	3	40	60	100	3
3	BTEE-403-18	Power Electronics	3	0	0	3	40	60	100	3
4	BTEE-404-18	Signals and Systems	3	0	0	3	40	60	100	3
5	BTAM-302-18	Mathematics-III (Probability & Statistics)	3	1	0	4	40	60	100	4
6	BTEE-411-18	Measurements and Instrumentation Lab.	2	0	2	4	30	20	50	3
7	BTEE-412-18	Digital Electronics Laboratory	0	0	2	2	30	20	50	1
8	BTEE-413-18	Electrical Machines – II Laboratory	0	0	2	2	30	20	50	1
9	BTEE-414-18	Power Electronics Laboratory	0	0	2	2	30	20	50	1

10	BTMC-XXX-18	Mandatory Course (BTMC-101-18 or BTMC 102-18)	3	0	0	3	40	60	100	S/US
11	BMPD-401-18	Mentoring and Professional Development of Students	0	1	0	1	50	-	50	S/US
Total			**20**	**2**	**8**	**30**	**410**	**440**	**850**	**22**
Students to undertake Six weeks summer industry internship/ field training (during vacation).										

Semester V [Third year]						**Branch: Electrical Engineering**				
Sr. No.	**Course code**	**Course Title**	**L**	**T**	**P**	**Hours/ Week**	**Internal Marks**	**External Marks**	**Total Marks**	**Credits**
1	BTEE-501-18	Power Systems – I (Apparatus & Modelling)	3	1	0	4	40	60	100	4
2	BTEE-502-18	Control Systems	3	1	0	4	40	60	100	4
3	BTEE-503-18	Microprocessors	3	1	0	4	40	60	100	4
4	BTEE-601X-18	Programme Elective-1	3	0	0	3	40	60	100	3
5	EVS-101-18	Environmental Studies	2	0	0	2	50	-	50	S/US
6	BTEE-511-18	Power Systems-I Laboratory	0	0	2	2	30	20	50	1
7	BTEE-512-18	Control Systems Laboratory	0	0	2	2	30	20	50	1
8	BTEE-513-18	Microprocessors Laboratory	0	0	2	2	30	20	50	1
9	BTEE-521-18	Summer Industry Internship	-	-	-	-	40	60	100	S/US
10	BMPD-501-18	Mentoring and Professional Development of Students	0	1	0	1	50	-	50	S/US
Total			**14**	**4**	**6**	**24**	**390**	**360**	**750**	**18**

Semester VI [Third year]						**Branch: Electrical Engineering**				
Sr. No.	**Course code**	**Course Title**	**L**	**T**	**P**	**Hours/ Week**	**Internal Marks**	**External Marks**	**Total Marks**	**Credits**
1	BTEE-601-18	Power System-II (Operation and Control)	3	1	0	4	40	60	100	4
2	BTEE-602-18	Power Generation and Economics	3	1	0	4	40	60	100	4
3	BTEE-603X-18	Programme Elective-2	3	0	0	3	40	60	100	3
4	BTEE-604-18	Programme Elective-3	3	0	0	3	40	60	100	3
5	OXX-XXX-18	Open Elective-1	3	0	0	3	40	60	100	3
6	HSMC-XXX-18	Humanities & Social Sciences including Mgt.	3	0	0	3	40	60	100	3
7	BTEE-611-18	Electronic Design Laboratory	1	0	2	3	30	20	50	2

8	BTEE-612-18	Power Systems-II Laboratory	0	0	2	2	30	20	50	1
9	BTEE-621-18	Project-1	0	0	6	6	60	40	100	3
10	BMPD-601-18	Mentoring and Professional Development of Students	0	1	0	1	50	-	50	S/US
Total			**19**	**3**	**10**	**32**	**410**	**440**	**850**	**26**

Semester VII/VIII [Fourth year]						**Branch: Electrical Engineering**				
Sr. No.	**Course code**	**Course Title**	**L**	**T**	**P**	**Hours/ Week**	**Internal Marks**	**External Marks**	**Total Marks**	**Credits**
1	BTEE-701X-18	Programme Elective-4	3	0	0	3	40	60	100	3
2	BTEE-702X-18	Programme Elective-5	3	0	0	3	40	60	100	3
3	BTOE-703X-18	Programme Elective-6	3	0	0	3	40	60	100	3
4	OXX-XXX-18	Open Elective-2	3	0	0	3	40	60	100	3
5	OXX-XXX-18	Open Elective-3	3	0	0	3	40	60	100	3
6	HSMC-XXX-18	Humanities & Social Sciences including Mgt.	3	0	0	3	40	60	100	3
7	BTEE-721-18	Project-2	0	0	12	12	120	80	200	6
8	BMPD-701-18	Mentoring and Professional Development of Students	-	1	0	1	50	-	50	S/US
Total			**18**	**1**	**12**	**31**	**410**	**440**	**850**	**24**

Semester VII/VIII [Fourth year]					**Branch: Electrical Engineering**	
BTEE-721-18 One Semester Training	**Marks**				**Total Marks**	**Credits**
	Internal			**External**		
	Mid- semester		End-semester			
Evaluation by	***Institute***	***Industry***	***Institute***	***Industry***	***External Examiner***	
Software Training & Project	50	25	50	25	200	500	16
Industrial Training & Project	50	25	50	25			
Total	**300**				**200**	**500**	**16**

Course Outcomes
Semester: 1st/2nd

Course: Engineering Physics; Semester: 1st/2nd	
Course Code:- BTPH 101-23	
CO No.	**COs(Course Outcomes):**On the successful completion of course, students will be able to:
I	Acquire knowledge about the Maxwell equation and Electromagnetic spectrum.
II	Understand the working, properties and characterization techniques of semiconductor materials and devices.
III	Appreciate the need for quantum mechanics, wave particle duality, uncertainty principle etc. and their applications.
IV	Understand the properties and synthesis of nanomaterials.
V	Understand laser system, optical fibre in industries, laboratories and in communication.

Course: Engineering Physics Lab; Semester: 1st/2nd	
Course Code:- BTPH 102-23	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Able to verify some of the theoretical concepts learnt in the theory courses.
II	Trained in carrying out precise measurements and handling sensitive equipment.
III	Introduced to the methods used for estimating and dealing with experimental uncertainties and systematic errors.
IV	Learn to draw conclusions from data and develop skills in experimental design.
V	Write a technical report which communicates scientific information in a clear and concise manner.

Course: Engineering Mathematics-I; Semester: 1st	
Course Code:- BTAM101-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be:
I	able to verify some of the theoretical concepts learnt in the theory courses.
II	trained to visualize and conceptualize the engineering problems.
III	to model the engineering problem mathematically using theory of calculus.
IV	learn to draw conclusions from data and develop skills in industrial problems.
V	to determine the solution of the studied engineering problem from application point of view.

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	Have the knowledge of DC circuits, AC Circuits, basic magnetic circuits, working principles of electrical machines, and components of low voltage electrical installations.
II	Be able to analyze of DC circuits, AC Circuits.
III	Understand the basic magnetic circuits and apply it to the working of electrical machines.
IV	Be introduced to types of wiring, batteries, and LT switchgear.

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: Engineering Graphics & Design; Semester: 1st/2nd	
Course Code: BTME101-21	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Prepare and understand drawings.
II	Use the principles of orthographic projections.
III	By studying about projections of solids, students will be able to visualize three dimensional objects and that will enable them to design new products.
IV	Design and fabricate surfaces of different shapes.
V	Represent the objects in three dimensional appearances.

Course: Chemistry-I; Semester: 1st/2nd	
Course Code:- BTCH101-23	
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	Rationalise periodic properties such as ionization potential, electronegativity, oxidation states and electronegativity.
V	List 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	Estimate rate constants of reactions from concentration of reactants/products as a function of time
II	Measure molecular/system properties such as surface tension, viscosity, conductance of solutions, redox potentials, chloride content of water, etc
III	Synthesize a small drug molecule and analyse a salt sample

Course: Mathematics-II; Semester: 2nd	
Course Code: BTAM201-23	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	able to verify some of the theoretical concepts learnt in the theory courses.
II	trained to visualize and conceptualize the engineering problems.
III	to model the engineering problem mathematically using theory of matrices, ODE and PDE
IV	learn to draw conclusions from data and develop skills in industrial problems.
V	to determine the solution of the studied engineering problem from application point of view.

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: Workshop/Manufacturing Practice; Semester: 1st/2nd	
Course Code:- BTMP101-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Upon completion of this laboratory course, students will be able to fabricate components with their own hands.
II	They will also get practical knowledge of the dimensional accuracies and dimensional tolerances possible with different manufacturing processes.
III	By assembling different components, they will be able to produce small devices of their interest.

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	The objective of the course is to help the students become the independent users of English language.
II	Students will acquire basic proficiency in reading & listening, comprehension, writing and speaking skills.
III	Students will be able to understand spoken and written English language, particularly the language of their chosen technical field.
IV	They will be able to converse fluently.
V	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 acquire basic proficiency in reading & listening, comprehension, writing and speaking skills.
III	Students will be able to understand spoken and written English language, particularly the language of their chosen technical field.
IV	They will be able to converse fluently.
V	They will be able to produce on their own clear and coherent texts.

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: BTEE-305-18	
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.
III	Understanding sampling theorem and its implications
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.

Course Outcomes
Semester: 5th

Course: **Power Systems-I (Apparatus and Modelling)**; **Semester: 5th**	
Course Code: BTEE-501-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the concepts of power systems.
II	Understand the various power system components.
III	Evaluate fault currents for different types of faults.
IV	Understand the generation of over-voltages and insulation coordination.
V	Understand basic protection schemes.
VI	Understand concepts of HVDC power transmission and renewable energy generation.

Course: **Control Systems**; **Semester: 5th**	
Course Code: BTEE-502-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the modelling of linear-time-invariant systems using transfer function and state-space representations
II	Understand the concept of stability and its assessment for linear-time invariant systems. Design simple feedback controllers

Course: **Microprocessors**; **Semester: 5th**	
Course Code:BTEE-503-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Study of 8085 and 8086 Microprocessors.
II	Do assembly language programming
III	Do interfacing design of peripherals like 8255, 8253,8279,8251 etc.
IV	Develop systems using different microprocessors.

Course: **Renewable Energy Sources**; Semester: 5th	
Course Code: BTEE-504D-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	To Understand the Need, importance and scope of non-conventional and alternate energy resources.
II	To understand role significance of solar energy and wind energy
III	To understand the role of ocean energy in the Energy Generation
IV	To get the utilization of Biogas plants and geothermal energy
V	To understand the concept of energy Conservation

Course: **Environmental Studies**; Semester: 5th	
Course Code: EVS-101-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Students will enable to understand environmental problems at local and national level through literature and general awareness.
II	The students will gain practical knowledge by visiting wildlife areas, environmental institutes and various personalities who have done practical work on various environmental Issues.
III	The students will apply interdisciplinary approach to understand key environmental issues and critically analyze them to explore the possibilities to mitigate these problems.
IV	Reflect critically about their roles and identities as citizens, consumers and environmental actors in a complex, interconnected world

Course Outcomes
Semester: 6th

Course: **Power Systems – II (Operation & Control);** Semester: 6th	
Course Code: BTEE-601-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Use numerical methods to analyze a power system in steady state
II	Understand stability constraints in a synchronous grid
III	Understand methods to control the voltage, frequency and power flow.
IV	Understand the monitoring and control of a power system.
V	Understand the basics of power system economics.

Course: **Power Generation and Economics;** Semester: 6th	
Course Code: BTEE-602-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the load curves, load-duration Curve.
II	Understand the power plant economics and tariff
III	Explore the significance of economic operation of steam plants
IV	Understand the hydro-thermal coordination.

Course: **Wind and Solar Energy Systems;** Semester: 6th	
Course Code: BTEE-603D-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the global energy scenario and the consequent growth of the power generation from renewable energy sources.
II	Understand the basic physics of wind and solar power generation
III	Apply the knowledge of electrical machines to generate electrical power from wind

IV	Understand the power electronic interfaces for wind and solar generation
V	Understand the issues related to the grid-integration of solar and wind energy
Course: High Voltage Engineering; Semester: 6th	
Course Code: BTEE-604A-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the basic physics related to various breakdown processes in solid, liquid, and gaseous insulating materials.
II	Knowledge of generation and measurement of D. C., A.C., & Impulse voltages
III	Knowledge of tests on H. V. equipment and on insulating materials, as per the standards.
IV	Knowledge of how over-voltages arise in a power system, and protection against these over-voltages.

Course: Values and Ethics; Semester: 6th	
Course Code: HSMC-113-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand classification of values
II	Understand concept of values
III	Understand the problems associated with values

Course: Electronics Design Laboratory; Semester: 6th	
BTEE-611-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the practical issues related to practical implementation of applications using electronic circuits.
II	Choose appropriate components, software and hardware platforms.
III	Design a Printed Circuit Board, get it made and populate/solder it with components.
IV	Work as a team with other students to implement an application

Course: *Project -1*; Semester: 6th	
BTEE-621-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Apply and verify basic scientific principals and technologies.
II	Identify the scope of interdisciplinary knowledge
III	Make and design a prototype which is preferably a working model

Course Outcomes
Semester: 7th/8th

Course: **Education, Technology and Society**; Semester: 7th	
HSMC-103-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to integrate their technical education for betterment of society as well motivates them to lead a good human life.

Course: **Electrical Energy Conservation and Auditing**; Semester: 7th	
BTEE-701A-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the current energy scenario and importance of energy conservation. Understand the concepts of energy management.
II	Application of interdisciplinary knowledge
III	Understand the concepts of different energy efficient devices.

Course: **Project-2**; Semester: 7th	
BTEE-721-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Apply and verify basic scientific principals and technologies
II	Understand the methods of improving energy efficiency in different electrical systems.
III	To identify possible product that can be made from the project for commercial purpose.

Course: Distributed Generation; Semester: 7th	
BTEE-702D-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	To impart knowledge about distributed generation technologies
II	Their interconnection in grid
III	To understand relevance of power electronics in DG, to understand concept of microgrid

Course: **Energy Storage System; Semester: 7th**	
BTEE-703D-18	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the different possible ways of energy storage.
II	Understand the different strategies related to energy storage systems.
III	Link the real-life examples with various industry related case studies.

Course: Professional Elective-4 (Artificial Intelligence)	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Learn about the basic understanding of Artificial Intelligent system.
II	Explain about various types of Artificial Neural Networks & their models.
III	Describe Artificial Neural networks methods, operation and parameters.
IV	Explore Neural Network MATLAB Toolbox.