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	
EEC121	BPHY0-101	Applied Physics	3	1	-	40	60	100	4
EEC122	BMAT0-101	Applied Mathematics-I	4	1	-	40	60	100	5
EEC123	BHUMO-101	Communicative English	2	1	-	40	60	100	3
EEC124	BELE0-101	Basics of Electrical Engineering	2	-	-	40	60	100	2
EEC125	BHUMO-103	Human Values & Professional Ethics	2	-	-	40	60	100	2
EEC126	BESE0-101	Environmental Science	2	-	-	40	60	100	2
EEC127	BPHY0-102	Applied Physics Lab	-	-	2	60	40	100	1
EEC128	BHUM0-102	Communicative English Lab	-	-	2	60	40	100	1
EEC129	BELE0-102	Basics of Electrical Engg. Lab	-	-	2	60	40	100	1
EEC130	BMFPO-101	Manufacturing Practice	1	-	6	60	40	100	4

Second Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC131	BCHM0-101	Applied Chemistry	3	1	-	40	60	100	4
EEC132	BMATO-201	Applied Mathematics-II	4	1	-	40	60	100	5
EEC133	BMEE0-101	Elements of Mechanical Engg.	3	1	-	40	60	100	4
EEC134	BECE0-101	Basics of Electronics Engg.	2	-	-	40	60	100	2
EEC135	BCSE0-101	Basics of Computer Programming	3	-	-	40	60	100	3
EEC136	BMEE0-102	Engg. Drawing	1	-	4	40	60	100	3
EEC137	BCHM0-102	Applied Chemistry Lab	-	-	2	60	40	100	1
EEC138	BECE0-102	Basics of Electronics Engg. Lab	-	-	2	60	40	100	1
EEC139	BCSE0-102	Basics of Computer Programming Lab	-	-	4	60	40	100	2

Third Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC221	BMAT0- 301	Mathematics-III	3	1	0	40	60	100	4
EEC222	BELE1-301	Transformers	3	1	0	40	60	100	4
EEC223	BELE1-302	Network Analysis and Synthesis	3	1	0	40	60	100	4
EEC224	BELE1-303	Electronic Devices & Circuits	3	1	0	40	60	100	4
EEC225	BELE1-304	Electrical Measurement & Instrumentation	3	1	0	40	60	100	4
EEC226	BELE1-305	Measurement & Instrumentation Lab.	0	0	2	60	40	100	1
EEC227	BELE1-306	Electronic Devices & Circuit Lab.	0	0	2	60	40	100	1
EEC228	BELE1-307	Training#	0	0	4	60	40	100	2
EEC229	BHUM0-F91	Soft Skills-I	0	0	2	60	40	100	1

Fourth Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC230	BELE1-408	DC Machines	3	1	0	40	60	100	4
EEC231	BELE1-409	Digital Electronics	3	1	0	40	60	100	4
EEC232	BELE1-410	Electrical Engineering Materials	3	1	0	40	60	100	4
EEC233	BELE1-411	Linear Control System	3	1	0	40	60	100	4
EEC234	BELE1-412	Electromagnetic Field Theory	3	1	0	40	60	100	4
EEC235	BELE1-413	Electrical Machine - 1 Lab	0	0	2	60	40	100	1
EEC236	BELE1-414	Control System Lab.	0	0	2	60	40	100	1
EEC237	BELE1-415	Digital Electronics Lab.	0	0	2	60	40	100	1
EEC238	BHUM0-F92	Soft Skills-II	0	0	2	60	40	100	1

Fifth Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC321	BELE1-516	Asynchronous Machines	3	1	0	40	60	100	4
EEC322	BELE1-517	Power Electronics & Drives	3	1	0	40	60	100	4
EEC323	BELE1-518	Generation and Economics of Electric Power	3	1	0	40	60	100	4
EEC324	BELE1519	Power Electronics Lab	0	0	2	60	40	100	4
EEC325	BELE1-520	Electrical: Estimation & Costing Lab	0	0	2	60	40	100	4
EEC326	BELE1-521	Industrial Training #	0	0	4	60	40	100	1
EEC327	BHUM0-F93	Soft Skills-III	0	0	2	60	40	100	1
Department Elective –I (Select any one)			3	0	0	40	60	100	3
EEC328	BELE1-556	Power Plant Engineering							
	BELE1-557	Signals and Systems							
	BELE1-558	Microprocessors and Microcontroller							
	BELE1-559	Instrumentation Engineering							
Open Elective –I			3	0	0	40	60	100	3
EEC329	BCIEO-F91	Environmental Pollution							

Sixth Semester									
NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC330	BELE1-622	Synchronous Machines	3	1	0	40	60	100	4
EEC331	BELE1-623	Power System-I (Transmission and Distribution)	3	1	0	40	60	100	4
EEC332	BELE1-624	Electrical Machines-II Lab.	0	0	2	60	40	100	1
EEC333	BELE1625	Programming in MATLAB	0	0	2	60	40	100	1
EEC334	BHUM0-F94	Soft Skills-IV	0	0	2	60	40	100	1
Department Elective –II			3	0	0	40	60	100	3
EEC335 EEC336	BELE1-660	Electrical Power Utilization							
	BELE1-661	Energy Auditing & Management							
	BELE1-662	Substation Equipment & Design							
	BELE1-663	Digital Control System							

Department Elective –III			3	0	0	40	60	100	3
EEC337 EEC338	BELE1-664	Energy Efficient Machines							
	BELE1-665	Virtual Instrumentation							
	BELE1-666	Flexible AC Transmission System Devices							
	BELE1-667	Non-conventional Energy Sources							
Open Elective –II			3	0	0	40	60	100	3
EEC339	BEEEO-F97	Electrical Machines and Power utilisation							

Seventh Semester

NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC421	BELE1-726	Non-linear and Digital Control System	3	1	0	40	60	100	4
EEC422	BELE1-727	Power System-II (Switchgear and Protection)	3	1	0	40	60	100	4
EEC423	BELE1-728	Minor Project*	0	0	4	60	40	100	2
EEC424	BELE1- 729	Software Lab.	0	0	2	60	40	100	1
EEC425	BELE1-730	Power System-II Lab.	0	0	2	60	40	100	1
EEC426	BELE1-731	Industrial Training #	0	0	0	60	40	100	3
Department Elective –IV			3	0	0	40	60	100	3
EEC427	BELE1-768	Industrial Automation							
	BELE1-769	System Engineering and Reliability							
	BELE1-770	Digital Signal Processing							
	BELE1-771	EHVAC Transmission							
Open Elective –III			3	0	0	40	60	100	3
EEC428	BBADO-F9A	Marketing Management							

Eighth Semester

NAAC Code	Course Code	Course Title	Load Allocation			Marks Distribution			Credits
			L	T	P	Internal	External	Total	
EEC429	BELE1-832	Power System Analysis and Design	3	1	0	40	60	100	4
EEC430	BELE1-833	High Voltage Engineering	3	0	0	40	60	100	3
EEC431	BELE1-834	Major Project	0	0	12	60	40	100	6
EEC432	BELE1-835	Power System Analysis and Design Lab.	0	0	2	60	40	100	1
Department Elective –IV			3	0	0	40	60	100	3
EEC433	BELE1-872	Electrical Machine Design							
	BELE1-873	HVDC Transmission							
	BELE1-874	Fuzzy Logic Systems							
	BELE1-875	Neural Networks							

Course Outcomes
Semester: 1st/2nd

Course: Applied Physics; Semester: 1st/2nd	
Course Code:- BPHY0-101	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand the basics of crystallography, magnetic materials, superconductivity and its applications
II	Comprehend and apply the concepts of quantum and classical problems for different physical problems.
III	Understand basics of vector calculus, formation and conduction of wave in different medium with the awareness of medium with the awareness of importance of dielectrics in electrical phenomenon.
IV	Acquire comprehensive knowledge of lasers and optical fibres and their role in communication system.
V	Gain basic understanding of theory of relativity to apply in relativistic and non relativistic fields.
VI	Acquaint themselves with the applications of nano science and technology and study of drastic changes in the properties of nano sized particles.

Course: Applied Mathematics-I; Semester: 1st	
Course Code:- BMAT0-102	
CO No.	COs (Course Outcomes): On the successful completion of course, students will be able to:
I	Apply the basic concepts of linear algebra including linear transformations.
II	To find the solution of Ordinary differential equations (linear) in most of the dynamical systems of engineering.
III	Apply the theory of elementary functions of complex variables for the summation of trigonometric series.
IV	Investigate the convergence behaviour of power series arising in various engineering applications.

Course: Communicative English; Semester: 1st/2nd	
Course Code:- BHUMO-101	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand and appreciate the need of communication training.
II	Use different strategies of effective communication and select the most appropriate mode of communication for a given situation.
III	Speak effectively and assertively
IV	Correspond effectively through different modes of written communication.
V	Present himself/herself professionally through effective resumes and interviews.

Course: Basics of Electrical Engineering; Semester: 1st/2nd	
Course Code:- BELE0-101	
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 and Professional Ethics; Semester: 1st/2nd	
Course Code:- BHUM0-103	
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: Environmental Science; Semester: 1st/2nd	
Course Code:- BESE0-101	
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: Applied Physics Lab; Semester 1st/2nd	
Course Code:- BPHY0-102	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Acquire measurement skills, observational skills and understand limits of precision in measurements.
II	Verify fundamental laws, theoretical ideas and concepts.
III	Apply practical based knowledge, scientific methods and reasoning in solving daily life problems.
IV	Correlate the knowledge gained with other engineering disciplines.

Course: Communicative English Lab; Semester: 1st/2nd	
Course Code:- BHUMO-102	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Understand and appreciate the need of communication skills in personal and professional life.
II	Use different medias/channels of communication and select the most appropriate for a given situation.
III	Speak and present himself/herself professionally and socially effectively through effective talks, resumes, interviews etc.

Course: Basics of Electrical Engineering Lab; Semester: 1st/2nd	
Course Code:- BELE0-102	
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.
VI	Student will develop skills for welding on arc welding and gas welding.

Course: Applied Chemistry; Semester: 1st/2nd	
Course Code:- BCHM0-101	
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 best use of the techniques to protect the instruments from corrosion.
II	The students will be able to design new product by using different polymeric techniques
III	The students after studying spectroscopic techniques and coordination chemistry will be able 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: Applied Mathematics-II; Semester: 2nd	
Course Code:- BMAT0-201	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Use the fundamentals of differential and integral calculus to analyse existing and developing new mathematical models in engineering.
II	Apply the concept of partial differentiation in different engineering problems.
III	To evaluate the parameters, like area, volume, mass, centre of gravity, moment of inertia etc, of planer and solid structures.
IV	Use vector (calculus) to study the paths, velocities and accelerations of moving bodies and fluids.

Course: Element of Mechanical Engineering-I; Semester: 1st/2nd	
Course Code:- BMEE0-101	
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: Basics of Electronics Engineering-I; Semester: 1st/2nd	
Course Code:- BECE0-101	
CO No.	**COs (Course Outcomes):** On the successful completion of course, students will be able to:
I	To understand behaviour of semiconductor materials that includes diodes, LEDs, rectifiers and power regulators.
II	To learn basic principle of transistor, working of its different configurations and applications in electronic circuits.
III	To impart knowledge of Boolean expressions and their implementation using universal gates.
IV	To learn applications of the transducers in measurements of various physical parameters.

Course: Basics of Computer Programming; Semester: 1st/2nd	
Course Code:- BCSE0-101	
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 develop a program in 'C' language.
III	Implement programs related to mathematical and logical problems in 'C' language.
IV	Use of simple data structures, pointers, memory allocation and data handling for various applications through files in 'C'.
V	Identify the role of functions, arrays, storage classes in programming.
VI	Implementation of various file related operations.

Course:Engineering Drawing; Semester: 1st/2nd	
Course Code: BMEE0-102	
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: Applied Chemistry Lab; Semester: 1st/2nd	
Course Code: BCHM0-102	
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: Basics of Electronics Engineering Lab; Semester: 1st/2nd	
Course Code: BECE0-102	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Become familiar with the functionality of a diode in circuits and their applications in rectifiers and regulators.
II	Basic principle of BJT transistor,working of different configurations and applications of JFET.
III	Tom implement various gates NOT,AND,OR,NAND,NOR using universal gates.
IV	To learn measurements of various physical parameters like temperature ,movement using different transducers.

Course: Basics of Computer Programming Lab; Semester: 1st/2nd	
Course Code:- BCSE0-102	
CO No.	**COs(Course Outcomes):** On the successful completion of course, students will be able to:
I	Identify the various hardware and software parts of computer system and define the basic working of operating system.
II	Describe the working of control panel, Command prompt & Run command.
III	Understand the menance of viruses and antivirus software and recognize the terms related to internet i.e. IP addresses, URL, Protocols and Domains.
IV	Use the package of MS Office for documentation, powerpoint presentations and creating graphs.
V	Understanding the fundamentals of C Programming.
VI	Implement a simple program by writing the code, testing the code and debugging the program in C language.

Course Outcomes
Semester: 3rd

Course: MATHEMATICS -III ; Semester: 3rd	
Course Code: BMAT0-F91	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Represent periodic functions in Fourier series and solve the differential equations using Fourier transforms.
II	Solve the initial value and Boundary value problems related to various engineering fields using Laplace transforms.
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: Transformers ; Semester: 3rd	
Course Code: BELE1-301	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Understand the basics of Transformer
II	Understand basic concepts of different types of transformer connections and their applications.
III	Understand single phase transformer, auto transformer and three phase transformer.
IV	Analyze different transformer connections.

Course: NETWORK ANALYSIS AND SYNTHESIS ; Semester: 3rd	
Course Code: BELE1-302	
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: Electronics Devices and Circuits ; Semester: 3rd	
Course Code: BELE1-303	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Understand basic electronic components.
II	Design and analyze amplification circuits to amplify the signal.
III	Understand various types of oscillator circuits to generate signals.
IV	Paraphrase how electronic components are specified and selected for industrial applications.

Course: Electrical Measurement and Instrumentation ; Semester: 3rd	
Course Code: BELE1-304	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Understand the basic concepts of measurement and different types of measuring instruments.
II	Understand working of different instruments and brides for measurement of electrical quantities.
III	Gain the knowledge about operation of CRO.
IV	Understand the working of various types of transducers.

Course: Measurement and Instrumentation Lab ; Semester: 3rd	
Course Code: BELE1-305	
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: Electronics Devices and Circuits lab ; Semester: 3rd	
Course Code: BELE1-306	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Analyze 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 evaluate data.

Course: Soft Skills-I ; Semester: 3rd	
Course Code: BHUM0-F91	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Identify and understand the aspects of soft skills and importance of effective communication in day to day life.
II	Identify their strengths and weaknesses and perform self-assessment.
III	Importance of Values, Self-Discipline, Personal Values - Cultural Values-Social Values
IV	Understand different aspects of art of listening like Proxemics, Haptics: The Language of Touch, Meta Communication, Listening Skills, Types of Listening, Listening tips.
V	Understands the importance of Etiquette, manners: Professional manners, Mobile manners so that they become fit for corporate environment.

Course: Training; Semester: 3rd	
Course Code: BELE1-307	
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: DC Machines ; Semester: 4th	
Course Code: BELE1-408	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Acquire the basic concepts and performance of D.C machines for real time applications.
II	Understand operation and control of DC machines.
III	Learn and analyze the various techniques of speed control of DC machines.
IV	Analyze the different testing techniques and apply in any advance projects.

Course: Digital Electronics ; Semester: 4th	
Course Code: BELE1-409	
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	Formulate and design digital applications and propose a cost effective solution.
IV	Acquire knowledge of the technology in the area of analog to digital converters and digital to analog converters.

Course: Electrical Engineering Materials ; Semester: 4th	
Course Code: BELE1-410	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Have knowledge about basics of electrical engineering materials.
II	Understand all types of magnetic and conducting properties of materials.
III	Understand the various properties of dielectric and semiconductor materials.
IV	Knowledge of application about materials in engineering design.

Course: Linear Control System ; Semester: 4th	
Course Code: BELE1-411	
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 field Theory ; Semester: 4th	
Course Code: BELE1-412	
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: Electrical Machine-I Lab ; Semester: 4th	
Course Code: BELE1-413	
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: Control System Lab ; Semester:4th	
Course Code: BELE1-414	
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: Digital Electronics Lab ; Semester:4th	
Course Code: BELE1-415	
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: Soft Skills- II ; Semester: 4th	
Course Code: BHUM0-F92	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Understand the importance of attitude and perception so that can use them effectively in organization.
II	Understand the importance of goal setting and myths about choosing career
III	Analyse the benefits of reading and its various stages so that they become effective readers.
IV	Handle stress in their lives and future in a better way.

Course Outcomes
Semester: 5th

Course: Asynchronous Machines; Semester: 5th	
Course Code: BELE1-516	
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: Power Electronics and Drives; Semester: 5th	
Course Code: BELE1-517	
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: Generation and Economics of Electric Power; Semester: 5th	
Course Code: BELE1-518	
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.

Course: Power Electronics Lab; Semester: 5th	
Course Code: BELE1-519	
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: Electrical : Estimation and Costing lab; Semester: 5th	
Course Code: BELE1-520	
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: Soft Skills-III ; Semester: 5th	
Course Code: BHUM0-F93	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Understand the art of writing: Creative writing and Business writing and their importance.
II	Understand the role of body language and non-verbal communication during the interview process
III	Understands the role of effective team work and group dynamics for corporate environment.
IV	Understand the role of time management for effective output.

Course: Power Plant Engineering; Semester: 5th	
Course Code: BELE1-556	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Understand the special engineering challenges techniques of using each of the sources of energy efficiently and environmentally effectively for maximum generation.
II	Consider the various factors of plant design and generation capacity.
III	Understand the theoretical and practical knowledge of different types of power plants and their contributions to the energy and power needs of the nation.
IV	Identify the modern techniques for sustainable development in the field of Power generation.

Course: Environmental Pollution; Semester: 5th	
Course Code: BCIEO-F91	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Understand natural ecosystem and their associated risk.
II	Study various types of environmental pollution and their control.
III	Paraphrase various environmental issues such as Ozone depletion, Acid rain and GHG's.
IV	Integrate latest engineering developments for reducing environmental pollution.

Course: Industrial Training; Semester: 5th	
Course Code: BELE1-521	
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: Synchronous Machines; Semester:6th	
Course Code: BELE1-622	
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 and winding types terminology.
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: Power System-I (Transmission & Distribution); Semester: 6th	
Course Code: BELE1-623	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Acquire knowledge about growth of power system in India and various electricity acts of the country. The subject also inculcates knowledge of basic requirements of transmission and distribution system design and to compare their efficiency.
II	Understand constructive details of overhead and underground transmission lines such as different types of conductors, insulators supporting structures for transmission line considering geographical conditions, weather, environmental and safety measures. They will also understand about various losses, interference 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 equipments 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: Energy Auditing and Management; Semester: 6th	
Course Code: BELE1-661	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Understand the present energy scenario & importance of energy management and audit.
II	Understand the importance of financial management, material and energy balance in energy auditing and managemen and to understand variour types of energy dissipating systems such as electrical,compressed air system,HVAC and referigeration systems.
III	Learn the use of various instruments used in energy audit process.
IV	Perform the energy audit for various equipment used in daily life.

Course: Non-Conventional Energy Sources ; Semester: 6th	
Course Code: BELE1-667	
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	Get knowledge about utilization of renewable energy sources such as solar energy, wind energy conversion and bio-mass energy conversion systems.
III	Become aware about geothermal energy, energy from ocean .
IV	Acquire knowledge about and hydrogen energy sources.

Course: Electrical Machines and Power utilisation ; Semester: 6th	
Course Code:BEEEO-F97	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Understand Different types of circuits and their applications.
II	Analyze Principles and Operation of Transformer, DC machines and motors.
III	Identify methods of power measurement.
IV	Understand the single phase induction motor

Course: Electrical Machines-II Lab ; Semester: 6th	
Course Code: BELE1-624	
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: Programming in MATLAB ; Semester:6th	
Course Code: BELE1-625	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Know about BASIC built in functions of MATLAB and blocks of SIMULINK.
II	Learn to do various programming operations in MATLAB and develop Simulink models in SIMULINK.
III	Draw 2-D and 3-D plots in MATLAB.
IV	Interface multisystem models.

Course: Soft Skills-IV ; Semester: 6th	
Course Code: BHUM0-F94	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Demonstrate soft skills required for business situations.
II	Demonstrate soft skills required for business situations.
III	Apply soft skills to workplace environment.
IV	Confidently participate in GD and interview process.

Course Outcomes
Semester: 7th

Course: Non-Linear and digital control systems ; Semester: 7th	
Course Code: BELE1-726	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Analyze discrete time systems
II	Design and analyze digital controllers.
III	Understand Non Linear control systems and analyze their stability

Course: Power System-II(Switchgear and protection) ; Semester: 7th	
Course Code: BELE1-727	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Understand the requirement of various protective measures in power system, various types of faults and their impact on apparatus along with various zones and types of protection.
II	Analyze basic qualities and working principle of various protection devices such as Fuses, Circuit Breakers and Relays along their associated terminologies and various equipments such as isolators, switches, current transformer, potential transformer and bus bars.
III	Gain knowledge about types and layouts of substations according to operating voltage geographical conditions, weather and requirement .Also the students will gain knowledge of various schemes of protection of transmission lines, bus bars and transformers.
IV	Acquire understanding of installation of different protective devices according to their optimum efficiency at various operating voltage ranges, currents, economic and environmental consideration, severity and frequency of faults.

Course: Software Lab ; Semester: 7th	
Course Code: BELE1-729	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Implementation of iterative techniques for finding real roots of an equation.
II	Development of solutions using a software for solving simultaneous linear algebric equations and interpolation.
III	Development of solutions for numerical integration and differentiation.

Course: Power System-II Lab; Semester: 7th	
Course Code: BELE1-730	
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: EHVAC-Transmission; Semester:7th	
Course Code: BELE1-771	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Understand the advantages of EHVAC Transmission and problems associated with it.
II	Understand the reactive parameters of lines and methods of voltage control.
III	Understand the voltage gradients of conductors.0
IV	Analyze the effects associated with corona.

Course: Marketing Management; Semester: 7th	
Course Code: BBADO-F9A	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Apt with the foundation terms and concepts that are commonly used in marketing.
II	Understand the need and benefits of market segmentation.
III	Understand the concepts related to product decision, promotion techniques used and their significance in marketing management.
IV	Understand the essential elements for effective marketing practice in the industry.

Course Outcomes
Semester: 8th

Course: Power System Analysis and Design ; Semester: 8th	
Course Code: BELE1-832	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Develop per unit system models of synchronous machines, transformers, transmission lines and static loads for power system studies.
II	Perform load flow studies by using bus admittance matrix and to do fault analysis by bus impedance matrix.
III	Compare features of Gauss-Siedel, Newton-Raphson and Fast decoupled methods of load flow analysis.
IV	Analyze the effect of symmetrical and unsymmetrical faults on power system and the effect of small and large disturbances on power system stability

Course: High Voltage Engineering ; Semester: 8th	
Course Code: BELE1-833	
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: Power System Analysis and Design Lab ; Semester: 8th	
Course Code: BELE1-835	
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, such as;
II	Understand load flow studies, short circuit studies,
III	Understand load frequency control, stability analysis etc.
IV	Design transmission system, distribution system and underground cables etc.

Course: HVDC Transmission ; Semester: 8th	
Course Code: BELE1-873	
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 concept of modelling of DC and AC networks.

Course: Industrial Training; Semester: 8th	
Course Code: BELE1-731	
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: Minor Project; Semester: 8th	
Course Code: BELE1-728	
CO No.	COs(Course Outcomes): On the successful completion of course, students will be able to:
I	Undertake problem identification, formulation and solution.
II	Communicate within the group and enhance presentation skills.
III	Understand the concept of various software tools.
IV	Demonstrate the knowledge, skills and attitudes of a professional engineer.

Course: Major Project; Semester: 8th	
Course Code: BELE1-834	
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: Major Project; Semester: 8th	
Course Code: BELE1-834	
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.