

Haldia Institute of Technology, West Bengal

(An Autonomous Institution under Maulana Abul Kalam Azad University
of Technology.)

Curriculum Structure for B. Tech. courses in Electrical Engineering

(Applicable from the academic session 2020-2021)

[ONLY CO OF ALL THE SUBJECTS]



Haldia Institute of Technology, West Bengal
 (An Autonomous Institution under Maulana AbulKalam Azad University of Technology.)
2nd Year Curriculum Structure for B.Tech courses in Engineering & Technology
 (Applicable from the academic session 2020-2021)

Course Code: PC-EE301	Category: Professional Core Courses
Course Title: Electrical Network Analysis	Semester: Third
L-T-P : 3-1-0	Credit: 3+1
Pre-Requisites: Basic Electrical Engineering, Engineering Mathematics	
CO:	
CO 1: Define different elementary signals and identify network theorems to describe network problems by recalling the concept of Laplace Transform, Fourier Series and Graph Theory.	
CO 2: Comprehend different methods of characterizing a Network to describe the network problems.	
CO 3. Apply Network theorems and use mathematical tools to analyze the networks, characterized in different manner.	
CO 4. Analyze the responses of the elementary signals applied to various electrical networks both in time and frequency domain.	
CO 5. Develop generalized network models of different electrical components.	
CO 6. Evaluate the network using different methods to justify the developed model.	

Course Code: PC-EE-302	Category: Engineering Science Courses
Course Title: Analog Electronics Circuit	Semester: Third
L-T-P:3-0-0	Credit: 3+1
Pre-Requisites: Basic Electronics, Semiconductor physics	
COs:	
CO 1: Illustrate working principle of different electronic circuit and their application in real life.	
CO 2. Define semiconductor device and different operating condition and their performance parameter.	
CO 3. Choose proper semiconductor devices depending upon application considering economic and technology up-gradation.	
CO 4. Employ mathematical and graphical analysis considering different practical issues modeling of semiconductor device; analyze the performance parameter of the system.	
CO 5. Employ mathematical and graphical analysis considering different practical issues modeling of semiconductor device; analyze the performance parameter of the system.	
CO 6: Use modeling/simulation parameters with standard equivalent circuit models to predict correctly the expected performance of various general- purpose electronic circuits.	

Course Code: PC-EE-303	Category: Professional Core Courses
Course Title: Electromagnetic Fields	Semester: Third
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Basic Electrical Engineering, Mathematics and Physics	
COs	
CO 1: To understand the basic laws of electromagnetism. Apply different techniques of vector calculus to understand different concepts of electromagnetic field theory.	
CO2: To obtain the electric and magnetic fields for simple configurations under static conditions. Explain fundamental laws governing electromagnetic fields and evaluate the physical quantities of electromagnetic fields (Field intensity, Flux density etc.) in different media using the fundamental laws.	
CO3: Determine the electromagnetic force exerted on charged particles, current elements, working principle of various electric and electromagnetic energy conversion devices are based on this force.	
CO4: To analyze time varying electric and magnetic fields. To understand Maxwell's equation in different forms and different media	
CO5: Deduce and justify the concepts of electromagnetic waves, means of transporting energy or information, in the form of radio waves, TV signals, radar beams and light rays.	
CO6:. Generalize the concepts of guided structures like transmission line, means of transporting energy or information, commonly used in power distribution and communication. To understand the propagation of EM waves.	

Course Code: BS-BI-302	Category: Basic Science Courses
Course Title: BIOLOGY FOR ENGINEERS	Semester: Third
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Nil	
COs :	
CO 1: Understand and explain the biological concepts from an engineering perspective.	
CO2: Understand and explain the concepts of hierarchy of life forms at phenomenological level, biological sensing and its challenges.	
CO3: Understand and explain the concept of genetics as well as how genetic material passes from parent to offspring.	
CO4: Understand, assess and explain the different biomolecules as building blocks of life, macromolecular analysis, information transfer and metabolism as well as the basic concept of microbial system.	
CO5: Explain, assess and integrate biological principles for developing next generation technologies	
CO6:. Understand and explain the development of artificial systems mimicking human action.	

Course Code: ES-ME-301	Category: Engineering Science Courses
Course Title: ENGINEERING MECHANICS	Semester: Third
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Mathematics , Physics	
COs :	
CO 1: To understand the basic mathematical tools to deal with the physical bodies..	
CO2: To learn different mathematical techniques to analyze physical bodies.	
CO3: To learn analysis techniques of rigid bodies.	
CO4: To solve problem of general motion.	

Course Code: MC-EE-301	Category: Mandatory Courses
Course Title: Indian Constitution	Semester: Third
L-T-P : 3-0-0	Credit: 0
Pre-Requisites: Nil	
COs :	
CO 1: Describe different features of Indian constitution.	
CO2: Describe power and functioning of Union, state and local self-government.	
CO3: Describe basics of PIL and guideline for admission of PIL..	
CO4: Describe structure, jurisdiction and function of Indian Judiciary.	
CO5: Describe Functioning of local administration starting from block to Municipal Corporation	
CO6: Identify authority to redress a problem in the profession and in the society.	

Course Code: PC-EE391	Category: Professional Core Courses
Course Title: Electrical Network Analysis Laboratory	Semester: Third
L-T-P : 0-0-2	Credit: 1
Pre-Requisites: Basic Electrical Engineering (Theory and Laboratory)	
COs :	
CO1: Recall the theoretical concepts of laplace Transform and fourier series to define the signals and responses in different software environment	

CO 2: Discuss the principle of Network theorems and explain transient and frequency response of different electrical circuits.
CO 3: Prepare and demonstrate different electrical circuits and components used to perform the simulation in hardware and software.
CO 4: Perform hardware and software simulations and analyze the results.
CO 5: Summarize the experiments
CO 6: Justify the experimental results by theoretical knowledge.

Course Code: PC-EE-392	Category: Engineering Science Courses
Course Title: Analog Electronics Circuit	Semester: Third
L-T-P:0-0-2	Credit: 1
Pre-Requisites: Basic Electronics, Semiconductor physics	
COs:	
CO 1: Develop basic knowledge in semiconductor devices like diode, Mos-FEETs, BJT and Operational Amplifier.	
CO 2: Develop the ability to design analog electronic circuits using discrete components.	
CO 3: Design, construct, and take measurement of various analog circuits to compare experimental results in the laboratory with theoretical analysis.	
CO 4: Apply the knowledge of subject to develop analog circuits based on linear and non-linear applications of Op amp.	
CO 5: Understand the ideas of various analog signals and obtain them via different practical analog circuits.	

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2nd Year Curriculum Structure for B. Tech courses in Engineering & Technology
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Course Code: PC EE 401	Category: Electrical Engineering
Course Title: Electric Machine	Semester: 4 th
L-T-P:3-1-0	Credit: 3+1
Pre-Requisites: Higher Secondary Level Physics and Mathematics	
COs:	
CO 1: Use concepts in trigonometry, complex algebra, phasor operations and principles of electromagnetism to find correct solutions to electrical machine performance questions.	
CO 2. Select proper materials and methods for design and construction of electrical machines within the realm of manufacturing, economic, performance, efficiency and environmental constraints.	
CO 3. Use modeling/simulation parameters with standard equivalent circuit models to predict correctly the expected performance of various general-purpose electrical machines and transformers.	
CO 4. Compare accepted standards and guidelines to select appropriate electrical machines to meet specified performance requirements and choose the scope of applicability of various types of AC and DC machines in real-life multi-disciplinary usages.	
CO 5. Demonstrate an understanding of the fundamental control practices associated with AC and DC rotating machines (starting, reversing, braking, speed control etc.) and transformers.	
CO 6. Set up testing strategies to evaluate performance characteristics of electrical machines.	

Course Code: PC EE 402	Category: Electrical Engineering
Course Title: Digital Electronics	Semester: 4 th
L-T-P:3-1-0	Credit: 3+1
Pre-Requisites: Basic concepts of number system, Basic concept of electronic circuits, Basic knowledge of circuit theory	
COs:	
CO 1: Convert different type of codes and number systems which are used in digital communication and computer systems.	
CO 2. Employ the codes and number systems converting circuits and Compare different types of logic families which are the basic unit of different types of logic gates in the domain of economy, performance and efficiency.	
CO 3. Analyze different types of digital electronic circuit using various mapping and logical tools and know the techniques to prepare the most simplified circuit using various mapping and mathematical methods.	
CO 4. Design different types of with and without memory element digital electronic circuits for particular operation, within the realm of economic, performance, efficiency, user friendly and environmental constraint.	

CO 5. Apply the fundamental knowledge of analog and digital electronics to get different types analog to digitalized signal and vice-versa converters in real world with different changing circumstances. Understand the process of Analog to Digital conversion and Digital to Analog conversion.
CO 6. Assess the nomenclature and technology in the area of memory devices and apply the memory devices in different types of digital circuits for real world application.

Course Code: PC-EE-403	Category: Electrical Engineering
Course Title: Electrical and Electronics Measurement	Semester: 4th
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Basic Electrical Engineering, Electric Circuit Theory, Electromagnetism	
COs :	
CO 1: Develop the knowledge of theoretical and mathematical principles of electrical measuring instruments.	
CO 2: Examine various real life situations in domestic or industrial scenario where measurements of electrical quantities are essential.	
CO 3: Choose the proper type and specification of measuring procedure and measuring instruments for different industrial/commercial/domestic applications.	
CO 4: Assess fault conditions in electrical installations and identify necessary remedial measures.	
CO 5: Design new sensing and measuring schemes for various electrical and electronic applications.	
CO 6: Recognize basic supporting tools for applications in other electrical engineering core fields.	

Course Code: ES ME401	Category: Engineering Science Courses
Course Title: Thermal Power Engineering	Semester: 4 th
L-T-P :3-0-0	Credit: 3
Pre-Requisites: High school Physics,	
COs:	
CO 1: Describe the function of different components of boilers. Engines and turbines.	
CO 2: Explain the principle of operation of different types of boilers, turbines, IC engines and Gas turbines.	
CO 3: Solve numerical problems of boilers, turbines, IC engines and Gas turbines.	
CO 4: Evaluate possible causes of discrepancy in practical experimental observations in comparison to theory.	
CO 5: Analyze the performance of boilers, engines and turbines.	
CO 6: Explain methods to control boiler, engines and turbines parameters..	

Course Code: MC EE 401	Category: Mandatory Courses
Course Title: Environmental Science	Semester: 4 th
L-T-P :3-0-0	Credit: 0

Pre-Requisites: Basic knowledge of science	
COs:	
CO.1. Articulate the interconnected and interdisciplinary nature of environmental studies.	
CO 2 Demonstrate an integrative approach to environmental issues with a focus on sustainability	
CO3. Use critical thinking, problem-solving, and the methodological approaches in environmental problem solving.	
CO 4: Communicate complex environmental information to both technical and non-technical audiences.	
CO 5: Understand and evaluate the global scale of environmental problems.	
CO 6 Reflect critically on their roles, responsibilities, and identities as citizens, consumers and environmental actors in a complex, interconnected world.	

Course Code: PC EE 491	Category: Professional Core Courses
Course Title: Electric Machine Laboratory	Semester: 4 th
L-T-P :0-0-2	Credit: 1
Pre-Requisites: High school Physics (Theory and Laboratory), Circuit Theory, Basic Electrical Engg. (Lab and Theory)	
COs:	
CO 1: Identify relevant information to supplement to the Electric Machine I (EE401) course.	
CO 2: Set up testing strategies and select proper instruments to evaluate performance characteristics of electrical machines and Analyze their operation under different loading conditions.	
CO 3: Practice different types of wiring and devices connections keeping in mind technical, economical, safety issues.	
CO 4: Evaluate possible causes of discrepancy in practical experimental observations in comparison to theory.	
CO 5: Prepare professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software, and word-processing tools.	
CO 6: Primarily via team-based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.	

Course Code: PC EE 492	Category: Professional Core Courses
Course Title: Digital Electronics Lab	Semester: 4 th
L-T-P :0-0-2	Credit: 1
Pre-Requisites: Basic knowledge of Analog Electronics.	
CO 1: Convert numerical data to various number systems.	
CO 2 Can demonstrate truth tables of different logic gates.	
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CO 3: Can design different digital appliances
CO 4: Can design different digital circuit
CO 5: Prepare professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software, and word-processing tools.
CO 6: Primarily via team-based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.

Course Code: PC-EE-493	Category: Professional Core Courses
Course Title: Electrical and Electronics Measurement	Semester: 4th
L-T-P : 2-0-0	Credit: 1
Pre-Requisites: Basic Electrical Engineering, Electric Circuit Theory, Electromagnetism	
COs :	
CO 1: Develop the fundamental knowledge and demonstrate various electrical measuring instruments which operated by different electrical, chemical, mechanical, optical and other physical properties.	
CO 2. Relate the mathematical and theoretical knowledge with the practical electrical measuring system and realize the importance of further improvement of the measuring instrument for more improved performance, efficiency, cost effectiveness, safety and environmental aspects.	
CO 3. Design the measuring circuit and perform the real life experiment to find out various electrical parameters which are important to design the electrical system considering safety, economic and environmental constraints.	
CO 4. Able to standardize various measuring instrument with the help of standard absolute meters.	
CO 5. Capable to analyze the effect on the electrical system with different types of changing electrical loads and supply.	
CO 6. Develop themselves as a good team member and leader to perform the experiments with co-operation and communication with other team members. Also able to invent themselves the capability of decision making which leads a good performance and able to perform the documentation of experimental data.	

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Curriculum Structure for B.Tech courses in Electrical Engineering
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Course Code: PCEE 501	Category: Professional Core Courses
Course Title: ELECTRICAL MACHINES – II	Semester: Fifth
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Physics and Mathematics and Basic Electrical and Electronics Engineering	
Course Outcome :	
CO1. Use concepts in trigonometry, complex algebra, phasor operations and principles of electromagnetism to find correct solutions to electrical machine performance questions. Select proper materials and methods for design and construction of electrical machines within the realm of manufacturing, economic, performance, efficiency and environmental constraints.	
CO2. Use modeling/simulation parameters with standard equivalent circuit models to predict correctly the expected performance of various general-purpose electrical machines.	
CO3. Compare accepted standards and guidelines to select appropriate electrical machines to meet specified performance requirements.	
CO4. Demonstrate an understanding of the fundamental control practices associated with rotating machines (starting, reversing, braking, speed control etc.).	
CO5. Set up testing strategies to evaluate performance characteristics of electrical machines. Design of autonomous systems using special electrical machines. Justify contemporary issues within and outside the electrical engineering profession.	
CO6. Access the techniques, skills, and modern engineering tools necessary for electrical engineering practice. Choose the scope of applicability of various types of electrical machines in real life multi-disciplinary usages.	

Course Code: PC-EE 502	Category: Professional Core Courses
Course Title: Power Systems-I	Semester: 5 th
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Power Electronics, Electrical Machine and Control System	
COs :	
CO 1: Recall the different concepts of previously learned courses which can be applied to power systems.	
CO 2: Identify the concepts applicable to different areas of power system and perform the required modifications to extend them to power system applications.	
CO 3: Apply the modified concepts to calculate the different parameters of transmission line, power system protection, voltage surges and fault analysis.	
CO 4: Analyse the effect of different parameter modifications on the state of the power generation, transmission and distribution system.	
CO 5: Assemble and evaluate the information collected from applying the pre learned concepts to determine procedures which can be applied to areas of power systems.	
CO 6: Compare the different types of power system fault calculation and protection etc. to improve power system stability and reliability.	

Course Code: PC-EE 503	Category: Professional Core Courses
Course Title: CONTROL SYSTEM	Semester: 5th
L-T-P : 3L+1T	Credit: 4
Pre-Requisites: High school Physics,Mathematics and Circuit Theory	
Course Outcomes:	
CO 1: Categorize different types of system and identify a set of algebraic equations to represent and model a complicated system into a more simplified form using transfer function concept.Interpret different physical and mechanical systems in terms of electrical system to construct equivalent electrical models for analysis.	
CO 2: Employ time domain analysis to predict and diagnose transient and steady state performance parameters of the system for standard inputfunctions.	
CO 3: Formulate different types of analysis in frequency domain to explain the nature of stability of the system.	
CO 4: Identify the needs of different types of controllers and compensator to ascertain the required dynamic response from the system.	
CO 5: Employ state variable approach to analyse SISO & MIMO systems.	
CO 6: Understand the characteristics of various types of nonlinearities present in physical systems and carry out the stability analysis of non-linear control systems.	

Course Code: OE-EE-501A	Category: Open Elective Courses
Course Title: Data Structure and Algorithm	Semester: fifth
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Programming for problem solving, Mathematics	
COs	
CO 1: Able to Differentiate how the choices of data structure & algorithm methods enhance the performance of the program.	
CO 2: Able to Solve problems based upon different data structure & also write programs.	
CO 3: Able to Write programs based on different data structureUnderstand the concept of sampling of a signal; obtain the output of a system using z – transform.	
CO 4: Able to Identify appropriate data structure & algorithmic methods in solving problem.	
CO 5: Able to Discuss the computational efficiency of the principal algorithms for sorting, searching,and hashing	
CO 6: Able to Compare the benefits of dynamic and static data structures implementations.	

Course Code: PE-EE-501A	Category: Professional Elective Courses
Course Title: Digital Signal Processing	Semester: Fifth
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Linear algebra, Complex number	
Course Outcomes :	
CO 1: Understand the concept of signals and analyze the spectral content in periodic and aperiodic signals.	
CO 2: Understand the impulse response of a system, convolution of two signals and its application to dynamic systems.	
CO 3: Understand the concept of sampling of a signal; obtain the output of a system using z – transform.	
CO 4: Represent signals mathematically in continuous and discrete-time, and in the frequency domain.	
CO 5: Understand the Discrete-Fourier Transform (DFT) and the FFT algorithms	
CO 6: Apply the knowledge of analog filters to digital filters, design a digital filter and physically realize any digital filter	

Course Code: PCEE 591	Category: Professional Core Courses
Course Title: ELECTRICAL MACHINES -II LABORATORY	Semester: Fifth
L-T-P : 0-0-2	Credit: 1
Pre-Requisites: Physics and Basic Electrical and Electronics Engineering (Theory and Laboratory)	
Course Outcome :	
CO1. Identify relevant information to supplement to the Electric Machine II (EE591) course.	
CO2. Set up testing strategies and select proper instruments to evaluate performance characteristics of electrical machines. Develop testing and experimental procedures on different types of electrical machines and Analyze their operation under different loading conditions.	
CO3. Estimate constraints, uncertainties and risks of the system (social, environmental, business, safety issues etc.). Combine an understanding of the established principles, theories, concepts and terminology relevant to electrical machines with practical laboratory experimentation.	
CO4. Prepare professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software, and word-processing tools.	
CO5. Primarily via team-based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.	
CO6. Originate a professional experience on working in a power plant or any practical field and to be ready for life-long involvement in the further improvement of relevant technology.	

Course Code: PCEE 592	Category: Professional Core Courses
Course Title: POWER SYSTEM-I LABORATORY	Semester: 5 th
L-T-P : 3P	Credit: 2
Pre-Requisites: PSPICE, Basic Electrical Engg.	
COs :	
CO1: Identify relevant information to supplement to the Electric Power system I (EE502) course and Set up testing strategies and select proper instruments to evaluate performance characteristics of transmission lines, insulators and distribution systems.	
CO2: Apply power to hardware models of transmission lines and dc distribution systems to evaluate their performance characteristics and compare them with the results obtained from computer simulations using PSPICE.	
CO 3: Develop testing and experimental procedures on different types of insulating materials and Analyse their operation under different levels of electrical stress.	
CO 4: Practice different types of wiring and devices connections keeping in mind technical, economical, safety issues also evaluate possible causes of discrepancy in practical experimental observations in comparison to theory.	
CO 5: Prepare professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software, and word-processing tools.	
CO 6: Primarily via team-based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.	

Course Code: PC EE 593	Category: Professional Core Courses
Course Title: CONTROL SYSTEM LABORATORY	Semester: 5 th
L-T-P : 0-0-2	Credit: 1
Pre-Requisites: MATLAB, PSPICE	
Course Outcomes :	
CO1: Discuss the need of software tools (MATLAB, PSPICE) to illustrate modeling and simulation of any system.	

CO2: Classify and evaluate the performance parameters of a system and then with simulation prepare an advance tool to modify the values of the parameter of the system in order to meet the desired need.
CO3: Prepare professionals in laboratory to compute or to predict the characteristics of a system by visualizing experimental data and its graphical representation.
CO4: Evaluate possible causes of discrepancy in practical experimental observations in comparison to theory by introducing the concepts of different stability theorems.
CO5: Primarily via team- based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will develop the ability to divide up and share task responsibilities to complete assignments.
CO6: Develop professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software, and word-processing tools.

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3rd Year Curriculum Structure for B. Tech courses in Engineering & Technology
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Course Code: PC-EE601	Category: Professional Core Course
Course Title: Power Systems-II	Semester: 6 th
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Power Systems-I, Electrical Machine and Control System, Mathematics, Numerical Methods.	
COs:	
CO 1: Recall the different concepts of previously learned courses which can be applied to power systems.	
CO 2: Identify the concepts applicable to different areas of power system and perform the required modifications to extend them to power system applications.	
CO 3: Apply the modified concepts to calculate the different parameters of power flow, power system control, stability and economics.	
CO 4: Analyze the effect of different parameter modifications on the state of the power system.	
CO 5: Assemble and evaluate the information collected from applying the pre learned concepts to determine procedures which can be applied to areas of power systems.	
CO 6: Compare the different methods of power flow calculation, control of power system etc. to improve power system economics and stability.	

Course Code: PCEE 602	Category: Professional Core Courses
Course Title: Power Electronics	Semester: Six
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Basic Electrical Engineering and Analog Electronics	
COs :	
CO 1: Relate basic semiconductor physics to properties of power devices, and Analyze characteristics power electronics devices.	
CO 2. Describe basic operation and compare performance of various power semiconductor devices, passive components and switching circuits.	
CO 3. Design and Analyze power converter circuits and learn to select suitable power electronic devices by assessing the requirements of application fields.	
CO 4. Formulate and analyze a power electronic design at the system level and assess the performance.	
CO 5. Identify the critical areas in application levels and derive typical alternative solutions.	
CO 6. Recognize the role power electronics in the improvement of energy usage efficiency.	

Course Code: PCEE603	Category: Professional Core Courses
Course Title: Microprocessor and Micro-Controller	Semester: sixth
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Physics and Mathematics and Basic Electrical and Electronics Engineering	
Course Outcome :	
CO1. Assess and solve basic binary math operations using the microprocessor and explain the microprocessor's and Microcontroller's internal architecture and its operation within the area of manufacturing and performance.	
CO2. Apply knowledge and demonstrate programming proficiency using the various addressing modes and data transfer instructions of the target microprocessor and microcontroller.	
CO3. Compare accepted standards and guidelines to select appropriate Microprocessor (8085 & 8086) and Microcontroller to meet specified performance requirements.	
CO4. Analyze assembly language programs; select appropriate assemble into machine a cross assembler utility of a microprocessor and microcontroller.	
CO5. Design electrical circuitry to the Microprocessor I/O ports in order to interface the processor to external devices.	
CO6. Evaluate assembly language programs and download the machine code that will provide solutions real-world control problems.	

Course Code: PC-EE-691	Category: Professional Core Course
Course Title: Power System-II Laboratory	Semester: 6 th
L-T-P:0-0-2	Credit: 1
Pre-Requisites: Power Systems-I, Electrical Machine and Control System, Mathematics, Numerical Methods	
COs:	
CO 1: Identify relevant information learned from previous courses that can be applied to power systems	
CO 2: Apply the previously gained knowledge to interpret different aspects of power systems and identify the different parameters which can be used to control the operation of power systems.	
CO 3: Develop testing and experimental procedures to simulate and verify the theoretical knowledge.	
CO 4: Practice different types of simulations and study the effect of changing different control parameters on the operation of power systems and identify any discrepancy with theoretical knowledge.	
CO 5: Prepare professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software, and word-processing tools.	
CO 6: Primarily via team-based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.	

Course Code: PCEE 692	Category: Professional Core Courses
Course Title: Power Electronics Laboratory	Semester: Six
L-T-P : 0-0-2	Credit: 1
Pre-Requisites: Basic Electrical Engineering and Analog Electronics	
COs :	
CO 1: Identify relevant information to supplement to the Power Electronics (PCEE603) course.	
CO 2: Set up testing strategies and select proper instruments to evaluate performance characteristics of Power devices and power electronics circuits and analyze their operation under different loading conditions.	
CO 3: Practice different types of wiring and devices connections keeping in mind technical, economical, safety issues.	
CO 4: Realize the limitations of computer simulations for verification of circuit behavior apply these techniques to different power electronic circuits and evaluate possible causes of discrepancy in practical experimental observations in comparison to theory.	
CO 5: Prepare professional quality textual and graphical presentations of laboratory data and computational results, incorporating accepted data analysis and synthesis methods, mathematical software, and word-processing tools.	
CO 6: Primarily via team-based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.	

Course Code: PCEE 693	Category: Professional Core Courses
Course Title: Micro-processor and Microcontroller LABORATORY	Semester: 6th
L-T-P : 0-0-2	Credit: 1
Pre-Requisites: Physics and Basic Electrical and Electronics Engineering (Theory and Laboratory)	
Course Outcome :	
CO1. Identify relevant information to supplement to the Microprocessor and Microcontroller course.	
CO2. Set up programming strategies and select proper mnemonics and run their program on the training boards.	
CO3. Practice different types of programming keeping in mind technical issues and evaluate possible causes of discrepancy in practical experimental observations in comparison.	
CO4. Develop testing and experimental procedures on Microprocessor and Microcontroller analyze their operation under different cases.	
CO5. Prepare professional quality textual and computational results, incorporating accepted data analysis and synthesis methods, simulation software, and word-processing tools.	
CO6. Primarily via team-based laboratory activities, students will demonstrate the ability to interact effectively on a social and interpersonal level with fellow students, and will demonstrate the ability to divide up and share task responsibilities to complete assignments.	

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Curriculum Structure for B.Tech courses in Electrical Engineering
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Course Code: PE-EE701A	Category: Professional Elective Courses
Course Title: Electrical Drives	Semester: 7th
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Power Electronics, Electrical Machine and Control System	
COs :	
CO 1: Examine various applications in industrial and domestic areas where use of electric drives are essential.	
CO 2. Classify types of electric drives systems based on nature of loads, control objectives, performance and reliability.	
CO 3. Combine concepts of previously learnt courses such as, electrical machines, Control and power electronics to cater to the need of automations in industries.	
CO 4. Select most suitable type and specification of motor drive combination for efficient conversion and control of electric power.	
CO 5. Identify the critical areas in application levels, and derive typical solutions.	
CO 6. Design and justify new control and power conversion schemes for implementing alternative solutions considering the critical and contemporary issues.	

Course Code: PEEE 702A	Category: Electrical Engineering
Course Title: High Voltage Engineering	Semester: 4 th
L-T-P:3-1-0	Credit: 3
Pre-Requisites:	
COs:	
CO 1: Understand physical processes involved in operation of high voltage systems.	
CO 2. Evaluate different high voltage generation, measurement and testing of high voltage apparatus schemes using modern simulation tools.	
CO 3: Assess relevant high voltage generation and measurement schemes for use as per customer requirements.	
CO 4 Arrange testing schemes for the apparatus used in high voltage system following national and international standard guidelines.	
CO 5. Diagnose the fault situations in high voltage apparatus due to environmental disturbances.	
CO 6. Provide the suitable solution for protection of the high voltage apparatus against the fault and unwanted disturbances.	

Course Code: PE-EE-791	Category: Professional Elective Courses
Course Title: Electrical Drives Laboratory	Semester: 7th
L-T-P : 0-0-3	Credit: 1
Pre-Requisites: Power Electronics, Electrical Machine and Control System	
COs :	
CO 1: Identify relevant information to supplement to the Electric Drives (PE-EE-701) course	
CO 2: Set up control strategies to synthesize the voltages in dc and ac motor drives.	
CO 3: Develop testing and experimental procedures applying basic knowledge in electronics, electrical circuit analysis, electrical machines, microprocessors, and programmable logic controllers.	
CO 4: Ability to use standard methods to determine accurate modeling/simulation parameters for various general-purpose electrical machines and power electronics devices required for designing a system and solve drives related problems	
CO 5: Estimate constraints, uncertainties and risks of the system (social, environmental, business, safety issues etc.)	
CO 6: Combine the use of computer-based simulation tools relevant to electrical Drives with practical laboratory experimentation	

Haldia Institute of Technology, West Bengal
(An Autonomous Institution under Maulana Abul Kalam Azad University of Technology.)
Curriculum Structure for B.Tech courses in Electrical Engineering
(Applicable from the academic session 2020-2021)

Course Code: EE 801A	Category:
Course Title: HVDC Transmission	Semester: 8 th
L-T-P : 3-1-0	Credit: 3
Pre-Requisites: Power System Fault, Power Electronics Devices, Converters, Inverters, Compensating Devices	
CO 1: To acquire knowledge of HVDC transmission and different converters, applicability and advantage of HVDC transmission over conventional AC transmission.	
CO 2. Formulate and solve mathematical problems related to rectifier and inverter control methods and learn about different control schemes as well as starting and stopping of DC links Able to identify the procedures for calculations of different circuit parameters.	
CO 3. Analyze the different harmonics generated by the converters and their variation with the change in firing angles and overlap angle.	
CO 4. Develop harmonic models and use the knowledge of circuit theory to develop filters and assess the requirement and type of protection for the filters.	
CO 5. Evaluate and judge whether the nature of faults happening on both the AC and DC sides of the converters and formulate protection schemes are correct and matches the required parameters and characteristics.	
CO 6. Review the existing HVDC systems along with MTDC systems and their controls and recognize the need to follow the advancements in both the existing systems and HVDC systems and determine the most economic coexistence of both.	

Course Code: OE-EE801	Category: Open Elective
Course Title: Power Plant Instrumentation and Control	Semester: 8th
L-T-P : 3-0-0	Credit: 3
Pre-Requisites: Measurement and Instrumentation, Control System, Power Plant Engineering	
COs :	
CO 1: To provide an overview of different methods of power generation with a particular stress on thermal power generation..	
CO 2. To bring out the various measurements involved in power generation plants.	
CO 3. To provide knowledge about the different types of devices used for analysis.	

CO 4. To in part knowledge about the different types of controls and control loops.
CO 5. To familiarize the student with the methods of monitoring different parameters like speed, vibration of turbines and their control.
CO 6.

Course Code: PE-EE-881	Category: Professional Elective Courses
Course Title : Electrical systems Design	Semester: Eighth
L-T-P : 0-0-3	Credit: 3
Pre-Requisites: Power System	
Course Outcomes:	
CO 1: Acquire the knowledge to design to design a system.	
CO 2 Understand and apply the various factors which influence the design	
CO 3. Get a General awareness of the National Electric Code and know it's importance in designing a system.	
CO 4. : Understand the principles of system design and carry out a basic design of a heating element, grounding reactor	
CO 5 Learn to use software tools to do complex design/calculations if needed.	
CO 6 Evaluate the require parameter to create an Electrical Layout for residential building	

