Final Year Electrical Engineering (2019 Course)

403141: Power System Operation and Control						
Teaching Scheme			**Credits**		**Examination Scheme**	
Theory	03	Hrs/Week	Theory	03	ISE	30
Practical	02	Hrs/Week/Batch	Practical	01	ESE	70
					Oral	25
					Term work	25

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Course Outcomes:

At the end of this course, students will be able to:
CO1: Summarize angle, voltage and frequency stability in the power system control (UN).
CO2: Illustrate various ways of interchange of power between interconnected utilities (AP).
CO3: Analyze stability and optimal load dispatch using different techniques (AN).
CO4: Select appropriate FACTS devices for stable operation of the system (EV).
CO5: Evaluate the stability of the system and suggest the methods to improve it (EV).

403142: Advanced Control System

Teaching Scheme			Credits		Examination Scheme	
Theory	03	Hrs/Week	Theory	03	ISE	30
Practical	02	Hrs/Week/Batch	Practical	01	ESE	70
					Oral	50

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Prerequisite:

Control System Engineering, Matrix Algebra, Z-transform, and Laplace transform.

Course Outcomes:

At the end of this course, students will be able to:
CO1: Explain compensation networks, common nonlinearities, the concept of state, sampling and reconstruction, and concepts of advanced controls (Understanding)
CO2: Determine transfer function from state model (Applying)
CO3: Test controllability and observability properties of the system (Evaluating)
CO4: Design compensators, state feedback controls, and observers for the system (Creating)

403143A: PLC and SCADA

Teaching Scheme			Credits		Examination Scheme	
Theory	03	Hrs/Week	Theory	03	ISE	30
Practical	02	Hrs/Week/Batch	Practical	01	ESE	70
					Oral	25

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Course Outcomes:

At the end of this course, students will be able to:
CO1:Develop and explain the working of a PLC with the help of a block diagram.
CO2:Classify input and output interfacing devices with PLC.
CO3:Design PLC based application by proper selection criteria, developing GUI and ladder program.
CO4:Execute, debug, and test the programs developed for digital and analog operations.
CO5:Develop the architecture of SCADA and explain the importance of SCADA in critical infrastructure.
CO6:Describe the SCADA protocols and digital control systems, along with their architecture for automation.

403144B: Electric and Hybrid Vehicle

Teaching Scheme			Credits		Examination Scheme	
Theory	03	Hrs/Week	Theory	03	ISE	30
Tutorial	02	Hrs/Week/Batch	Tutorial	01	ESE	70
					Term work	25

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Course Outcomes:

At the end of this course, students will be able to:
CO1: Analyze the Life Cycle Assessment of Li-ion battery.
CO2 : Describe the different types of Li-ion charging methods
CO3 : Comprehend the knowledge of drivetrain hybridization.
CO4 : Evaluate EV motor sizing.
CO5 : Classify Battery Recycling methods.

403145: Project Stage I

Teaching Scheme			Credits		Examination Scheme	
SEM/PW/IN	4	Hrs./Week	SEM/PW/IN	2	ORAL	50
					Term work	50

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Preamble:

Project is an important part of the engineering curriculum covered in the final year. It is divided into ProjectStage I and Project Stage II at Semesters I and II of the Final Year. This project is a substantial piece of work that will require creative activity and original thinking. The project aims to provide students with a transitional experience from the academic world to the professional world. The objectives, outcomes, and guidelines for Project Stage I are given below.

Course Outcomes:

Course outcomes can be different for the different projects undertaken by the student groups.
However, ingeneral, the course outcomes for Project Stage-I can be stated as follows.
At the end of this course, students should be able to:
CO1:Define the project problem statement and identify the scope of the project.
CO2:Search the appropriate research papers, standards and e-resources and write a literature survey.
CO3:Identify tools, techniques, methods, concepts, measuring devices, and instruments required for theproject to define the methodology of the project.
CO4:Justify the selection of electrical, electronic and mechanical components for the project prototypingCO5:Simulate or develop a system for software or hardware verification.
CO6:Write a project report with proper interpretation of results.

403146: MOOCs

Teaching Scheme			Credits		Examination Scheme	
SEM/PW/IN	–	Hrs./Week	SEM/PW/IN	2	ORAL	–
					Termwork	50

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Preamble:

Massive Open Online Courses (MOOCs) is essentially an asynchronous teaching learning platform. To enhance the students learning and to motivate self learning, MOOCs have been added in the BE Electrical 2019 course. It is advised to students that they have to registers MOOCs courses thorough SWAYAM-NPTEL platform.

Course Outcomes:

At the end of this course, students should be able to:
CO1:Enables the students to directly engage and learn from the best faculty in the country in order to strengthen the fundamentals.
CO2:Explore new areas of interest in a relevant field.
CO3:Enable self learning initiative in learners..
CO4:Develop critical thinking to solve complex problems in engineering, science and humanities.
CO5:Improve communication skills by interacting with peers and course teachers.

403148: Switchgear and Protection

Teaching Scheme			Credits		Examination Scheme	
Theory	03	Hrs/Week	Theory	03	ISE	30
Practical	02	Hrs/Week/Batch	Practical	01	ESE	70
					Termwork	25

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Course Outcomes:

At the end of this course, students will be able to:
CO1:Understand the fundamentals of protective relaying.
CO2:Demonstrate the arc interruption and analyze the RRRV in circuit breakers
CO3:Demonstrate the construction and working principle of air brake circuit breakers, SF6 circuit breakers, and a vacuum circuit breaker.
CO4:Explain the characteristics of static and digital relays and their applications in power systems.
CO5:Apply the differential protection scheme to large transformers, alternators, and induction motors.
CO6:Apply distance protection, three stepped protection for transmission line.

403149: Advanced Electrical Drives and Control

Teaching Scheme			Credits		Examination Scheme	
Theory	03	Hrs/Week	Theory	03	ISE	30
Practical	02	Hrs/Week/Batch	Practical	01	ESE	70
					Practical	50

					Termwork	25

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Course Outcomes:

At the end of this course, students will be able to:
CO1: Explain motor load dynamics and multi quadrant operation of drives.
CO2: Analyze operation of converter fed and chopper fed DC drives.
CO3: Apply different braking methods of D.C. and induction motor drive.
CO4: Elaborate vector control for induction motor and BLDC drives.
CO5: Elaborate synchronous motor, reluctance motor drive.
CO6: Differentiate between classes and duty cycles of motors and select suitable drives in various industrial applications.

403150C: Smart Grid						
Teaching Scheme			**Credits**		**Examination Scheme**	
Theory	03	Hrs/Week	Theory	03	ISE	30
					ESE	70
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Course Outcomes:						
At the end of this course, students will be able to: CO1: Apply the knowledge to differentiate between Conventional and Smart Grid CO2: Describe importance of Supercapacitors. CO3: Identify the need of Smart metering. CO4: Apply the communication technology in smart grid. CO5: Comprehend the issues of micro grid.						

403151B: Illumination Engineering						
Teaching Scheme			**Credits**		**Examination Scheme**	
Theory	03	Hrs/Week	Theory	03	ISE	30
					ESE	70
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Course Outcomes:						
At the end of this course, students will be able to: CO1: Define and reproduce various terms in illumination. CO2: Identify various parameters for illumination system design. CO3: Design indoor and outdoor lighting systems. CO4: Enlist state of the art illumination systems.						

403152: Project Stage II

Teaching Scheme			Credits		Examination Scheme	
SEM/PW/IN	12	Hrs./Week	SEM/PW/IN	6	ORAL	50
					Termwork	100

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Preamble:

Project is an important part of the engineering curriculum covered in the final year. It is divided into Project Stage I and Project Stage II in Semesters I and II of the Final Year. This project is a substantial piece of work that will require creative activity and original thinking. The project aims to provide students with a transitional experience from the academic world to the professional world. The objectives, outcomes, and guidelines for Project Stage II are given below.

Course Outcomes:

Course outcomes can be different for the different projects undertaken by the student groups. However, in general, the course outcomes for Project Stage-II can be stated as follows.
At the end of this course, students should be able to:
CO1: Identify tools, techniques, methods, concepts, measuring devices, and instruments required for the project to define the methodology of the project
CO2: Justify the selection of electrical, electronic and mechanical components for the project prototyping
CO3: Select the appropriate testing method for system performance evaluation
CO4: Interpret results obtained by simulation, and hardware implementation and decide on further action or write a conclusion
CO5: Write a project report and research paper on the project work