BOARD OF STUDIES MEETING – 2020-21

K.S.R.M COLLEGE OF ENGINEERING

AUTONOMOUS

Minutes of the Meeting

Date	21.09. 2020	**Day**	**Monday**
Time	**10:00AM**	**Venue**	**Virtual meeting : http://meet.google.com/btj-hbfo-tja**
Dept./SS	**EEE**	**Convener**	**Dr.K. Amaresh**

MembersPresent: 12 **Members Absent: 00**

S.No	Name	Designation	Signature	S.No	Name	Designation
1.	Dr. K. Amaresh	Professor & HoD				
2.	Smt. C.N. Arpitha	Associate Professor				
3.	Sri M. Bhaskar Reddy	Associate Professor				
4.	Sri K. Rama Mohan Reddy	Associate Professor				
5.	Dr. T. Mari Prasath	Associate Professor				
6.	Sri K. Kalyan Kumar	Assistant Professor				
7.	Smt. Saleha Tabassum	Assistant Professor				
8.	Sri P. Durga Prasad	Assistant Professor				
9.	Dr. G. Yesuratnam	Professor (Osmania University)				
10.	Dr. B. Ravikumar	Associate Professor (IIT - Hyderabad)				
11.	Dr. P. Kiranmayi	Professor & HoD (JNTU A)				
12	Sri T. Kishore Kumar	Assistant Professor				

Dr.K.Amaresh, welcomed all the members to the meeting and presented the agenda of the meeting.

There solutions are:

	Todo item	Discussion	Resolution	Coordinator/in-charge
1	Minor Degree Course Structure & Syllabus	The Head of the Department has presented the syllabus designed by the faculty after taking the feedback from all stakeholders and comparing with premier institute syllabus.	The panel members have suggested to make few changes regarding the titles of the subjects in Minor Degree. The changes are as follows: a) Circuits & Networks to Circuit Theory b) Basics of electrical Measurements to Basics of Electrical Measurements & Instrumentation.	Dr.K.Amaresh/ Sri M. Bhaskar Reddy
2	Honour's Degree Course Structure & Syllabus Regulations for Minor & Honour's Degree Course	The Head of the Department has presented the syllabus designed by the faculty after taking the feedback from all stakeholders and comparing with premier institute syllabus.	Regarding the syllabus of Basics of Power electronics few modifications have been suggested by the members. In Honour's degree course structure the members have suggested to replace Fiber Optic Communications with SCADA & its Applications and Embedded Systems with Signals & Systems. Members along with university nominee, subject experts and chairman of BoS has decided that the Mini Project under Minor Degree course should be evaluated for 100 Marks by Internal Committee Members (HoD, Two Senior Faculty Members) and Concerned Guide by conducting Three Reviews and Final Project Viva-voce.	Dr.K.Amaresh/ Sri T. Kishore Kumar
3.	Any other information	The Head of the Department	As per the suggestions given by the members amendments have been done and taken approval for	Sri K.Kalyan Kumar/Sri

for discussion	has presented the syllabus designed by the faculty after taking the feedback from all stakeholders and comparing with premier institute syllabus.	the above courses. BOS members suggested to add certification courses on latest technologies. The committee approved the proposed certification courses.	P.Durga Prasad

The Head of the Department have proposed the Vote of thanks and concluded the meeting.

Convenor

Dr. K. AMARESH,
M.Tech., Ph.D
Professor & HOD
Department of EEE
KSRM College of Engineering
KADAPA - 516 003

V. S. S. Murty

Principal

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Course Title	Power Quality Issues and Harmonic Mitigation Techniques	B. Tech. EEE Certification Course
Course Objectives: The objective of the course is to learnvarious power quality issues, standards, harmonic analysis, and end effects of harmonics, harmonic mitigation techniques, and design of harmonic filters.		

UNIT-I (10 Hours)

Power quality issues, IEEE standards and recommended practices, Power system quantities under non sinusoidal conditions, Harmonic Analysis, Effects of Power System harmonics on Power System equipment and loads, Harmonic mitigation techniques.

UNIT – II (20 Hours)

MATLAB simulation of power quality issues, Modeling of Nonlinear loads, Design of passive harmonic filters, Active harmonic Filters, Hybrid Active Filters

Text books:

1. Roger. C. Dugan, Mark. F. McGranagham, Surya Santoso, H.WayneBeaty, Electrical Power Systems Quality, McGraw Hill,2003
2. Bhim Singh, Ambrish Chandra, Kamal Al-Haddad, Power Quality Problems and Mitigation Techniques Wiley, 2015.

Reference Books:

1. G.T. Heydt, Electric Power Quality, 2nd Edition. (West Lafayette, IN, Stars in Circle Publications, 1994.
2. M.H.J Bollen, Understanding Power Quality Problems: Voltage Sags and Interruptions, (New York: IEEE Press), 2000.

Basics of MATLAB-Simulink

(Certification course)

Module-1:

Elementary features: Introduction to Simulink –Creating new Simulink file – Commonly used blocks – Continues & Discrete signals – Logic & Bit operations – Math operations – Ports & Subsystems – Sinks – Sources – User defined functions.

Module-2:

Sim Power Systems: Fundamental Blocks: Electrical sources – Elements – Interface elements – Machines – Power Electronics – Control & Measurement- Facts – Renewables.

Module-3:

Electrical Engineering Applications – Modeling& Simulation ofsimple Electrical Block diagrams: Power electronics, Electrical Machines, Power & Control Systems.

Text books:

1. Beginning MATLAB and Simulink from Novice to Professional by SulaymonEshkabilov, Apress.
2. Modeling & Simulation Using MATLAB – Simulink by Dr. Shailendra Jain, Wiley.
3. MATLAB – Simulink For Engineers by Agam Kumar Tyagi, OXFORD university press.

K. S. R. M. College of Engineering

(AUTONOMOUS)

Kadapa, Andhra Pradesh, India – 516003.

Approved by AICTE & New Delhi, Affiliated to JNTUA, Ananthapuramu.

Department of Electrical and Electronics Engineering

Date: 02.07.2021

	Computational Intelligence (Common for EEE, CSE & ECE)	
Pre. Req.:	Data structures, Algorithms	
Objective:	• The purpose of this course is to teach the students about the basic techniques, theory and computational models of fuzzy and soft computing. • This course focuses on how to apply several neural network algorithms, genetic algorithms and PSO over real-time problems to get optimized outcome.	
Outcomes:	1. Understand the basic concepts of artificial intelligence. 2. Apply neural networks to design classification problems. 3. Apply fuzzy principles and thinking to deal with vulnerability and tackle real-time issues. 4. Apply genetic algorithms to generate optimized results for a particular problem. 5. Apply PSO and Hybrid optimization techniques to generate optimized result for a particular problem.	
Module	**Contents**	**Hrs.**
1	Artificial Intelligence – a brief review – Pitfalls of traditional AI – Why Computational Intelligence? – Computational intelligence concept - Importance of tolerance of imprecision and uncertainty - Constituent techniques – Overview of Artificial Neural Networks, Fuzzy Logic, Evolutionary Computation.	8
2	Neural Network: Biological and artificial neuron, neural networks, supervised and unsupervised learning. Single layer Perceptron, Multilayer Perceptron – Rule-based systems. Neural networks as associative memories - Hopfield networks, Bidirectional Associative Memory. Topologically organized neural networks – competitive learning, kohonent network.	8
3	Fuzzy Logic: Introduction to crisp sets and Fuzzy sets, properties, membership functions, fuzzy operations. Fuzzy logic and fuzzy inference and applications, basic Fuzzy set operations and approximate reasoning-Fuzzy relations-Fuzzification-interference and defuzzification.	9

4	Genetic algorithms- Genetic Algorithm versus Conventional Optimization Techniques - Genetic representations and selection mechanisms; Genetic operators- different types of crossover and mutation operators, Application to SINX maximization problem.	10
5	Nature Inspired optimization techniques - Particle Swarm Optimization - Bird flocking and Fish Schooling – anatomy of a particle- equations based on velocity and positions -PSO topologies - control parameters, Hybrid approaches (neural networks, fuzzy logic, genetic algorithms etc.)	10
	Total Lecture Hours	45

Text Books:

1. Jack M. Zurada, "Introduction to Artificial Neural Systems", Jaico Publishing House, 2003.
2. Timothy J. Ross, "Fuzzy Logic with Engineering Application", McGrw Hill International Editions, 2004.
3. Konar A., "Computational Intelligence: Principles, Techniques and Applications", Springer Verlag, 2005
4. Xin-She Yang, "Recent Advances in Swarm Intelligence and Evolutionary Computation", Springer International Publishing, Switzerland, 2015.
5. James Kennedy and Russel E Eberheart, "Swarm Intelligence", the Morgan Kaufmann Series in Evolutionary Computation, 2001.

Reference Books:

1. Engelbrecht, A.P, "Fundamentals of Computational Swarm Intelligence", John Wiley & Sons, 2006.
2. Eiben A E and Smith J E, "Introduction to Evolutionary Computing", Second Edition, Springer, Natural Computing Series, 2007.
3. Jang J S R and Sun C T, Mizutani E, "Neuro - Fuzzy and Soft Computing", PHI, 2002.
4. Rajashekaran S and Vijayalakshmi Pai G A, "Neural Networks, Fuzzy Logic and Genetic Algorithms", PHI, 2003.
5. Laurence Fausett, "Fundamentals of Neural Networks- Architectures Algorithms and Applications", Pearson Education, 2004.
6. D.E.Goldberg, "Genetic Algorithms: Search Optimization and Machine Learning", Addison Wesley, 1989.

Power Electronics Converters for Smart grids	
Pre. Req	**Basic Electrical & Electronics Engineering, Machines-I, Basics of Control Systems**
Objective:	• To make the students to understand the importance and applications of DC-DC Converters • Importance power converters for standalone and grid connected systems. • To make the students understand the design of wireless power transmission converters.
	• Design of Non-Isolated converters for grid interfacing. • Getting knowledge on various types of DC-DC Converters.

Outcomes:	• Importance of standalone and smart grid systems for real time applications.	
Module	**Contents**	**Hrs.**
1	Introduction to converters for DGs in Smart Grid, DC-DC converters: Buck, boost, buck-boost, Forward, fly-back and push-pull converter circuits, half bridge, full bridge converters.	7
2	Resonant DC-DC converters: operating principle, waveforms. Cascaded DC-DC and DC-AC converters (DC-link) and cascaded DC-AC and AC-AC converters (high-frequency link).	8
3	Z-source converter, bi directional DC-DC converter, Converter control: PWM, closed loop control, feed forward and current mode control.	10
4	Driver circuits: unipolar, bipolar and isolated drives. Simulation of DC-DC converters with close loop control. Inverters: Overview, three phase converters, rectifier and inverter modes of operation for RL load.	10
Total Lecture Hours Mode: Online Class, Simulation models and Hardware models		**35hrs**

Text Books:

1. Ned Mohan, Tore M. Undeland and William P. Robbins, "Power Electronics: Converters, Applications and Design", Third Edition, John Wiley & Sons,2007
2. L. Umanand, "Power Electronics: Essentials and Applications", Wiley India, 2009.
3. Erickson, Maksimovic, and Dragan "Fundamentals of Power Electronics", Kluwer academic publishers, 2001.
4. B K Bose, "Modern Power Electronics and AC Drives"Pearson publications,1st edition
5. R. Erickson, D. Maksimovic, Fundamentals of Power Electronics, Springer 2001.
6. Ehab H E Bayoumi,"Power electronics in smart grid distribution power systems:

Solar Photovoltaic Systems		
Pre. Req	**Analysis of Power Conversion**	
Objective:	• To make the students understand the importance and applications of Solar Energy and techniques to improve the efficiency of Solar PV systems. • To make them acquainted with power electronic interface circuits for Solar Energy.	
Outcomes:	• Design a photovoltaic system and its interfacing circuits. • Getting knowledge on various techniques available to extract maximum power and to increase the efficiency of solar PV systems. • Importance of standalone and grid connected PV systems and applications of Solar PV in real time scenario. • Design power electronic interfacing circuits for real time PV applications.	
Module	**Contents**	**Hrs.**

1	**Solar PV cell fundamentals:** Principle of direct solar energy conversion into electricity in a solar cell - Properties - Solar cell and its types - P-N junction and structure.	5
2	**Solar cell characteristics:** Solar I-V & P-V characteristics of a PV module - Solar PV modelling and equations - Modelling techniques - Cell efficiency - Fill factor - Applications.	8
3	**Maximum power point tracking:** Necessity of maximum power tracking- - Effect of irradiation and temperature on Photovoltaic I-V & P-V characteristics – Conventional and soft computing power point tracking techniques.	7
4	**Stand Alone PV Systems:** Schematic of Solar Photovoltaic standalone systems, with battery and without battery, charge conditioners - Balance of system components for DC and AC Applications - Typical applications for lighting, water pumping etc.	9
5	**Grid Connected PV Systems:** Schematics – Directly connected to utility systems without storage and with storage, Charge conditioners - Interface Components - Balance of system - PV System in Buildings.	9
6	**Energy Storage:** Necessity of storage for solar energy- Rechargeable batteries. Solar Energy Storage Concepts - Materials for Energy Storage- Materials for Low and High Temperature Storage Applications.	7
Total Lecture Hours Mode: Online Class, Simulation models and Hardware models		**45hrs**

Text Books:

1. Roger Messenger, Amir Abtahi, "Photovoltaic Systems Engineering", 4rd edition, CRC Press, 2017.
2. D. Yogi Goswami, "Principles of Solar Engineering" 3rd Edition, CRC Press, 2015.

Projects:

1. Identification of suitable PV cell model for solar array design.
2. Extraction of I-V and P-V curves of PV panel using resistive load at different atmospheric conditions.
3. Design a model of any solar PV application.
4. Study on identification of suitable location of establishing solar PV plants.
5. Design control algorithm for Maximum power tracking.
6. Simulation of various conventional MPP techniques.
7. Implementation bio inspired algorithms for maximum power tracking.
8. Design of standalone solar PV system using simulation.
9. A survey on major standalone solar PV systems and applications.

Applications of MATLAB

Objectives:

- To understand basic of MATLAB/Simulink
- To improve the students programming skill in MATLAB
- To develop an electrical and electronics model using Simulink block sets
- To Develop MATLAB model for power system analysis
- To Design and Modeling Renewable Energy Systems

Module 1 – Basic MATLAB Programming (6hrs)

ArrayBasedComputing; Arrays and Vectors - Appending - Deleting - Concatenation - Data Type - Built-In Functions - Matrix Algebra - Logical Operations - Random Matrix - Flipping a Matrix - Indexing - Slicing - Colon Operators - Structure Arrays - celldisp–cellplot

Polynomials: Roots - Addition, Subtraction and division- Differentiation - Polynomial Integration - polynomial Curve Fitting

Module 2 – Plotting and Loops (6hrs)

Plotting: 2D& 3D Plotting - Multiple Plots – Bar charts - Polar graphs - Logarithmic Plots

Loops and Function: Loops - The while Loop - The do-until Loop - The for Loop - The if-elseif-else Loop - Functions - inline Function - Anonymous Functions

Module 3 –Application of MATLAB Simulink Tool box (6hrs)

Introduction on simulation - Sim power system –Simcape – Control System-P,PI and PID-STATCOM-Voltage and Current Transformation Techniques- Power system fault detection and classification by using ANN-Demand Side Management by ANN- Speed Control of three phase induction motor and DC motor using Fuzzy Logic

Module 4 –Renewable Energy System Modeling and Analysis (6hrs)

Solar PV cell modeling and Analysis –Effect of Environmental factor on Solar PV- Single stage and Double stage Grid connected Inverter design-Wind Power Plant Modeling and Analysis

Module5- Maximum Power Point Tracking (6hrs)

Perturb and Observation (P&O), Incremental and Conductance, Hill Climbing, ANN, Fuzzy Logic, ANFIS, Biological Inspired and Physical Inspired Algorithm.

Course outcomes

On successful completion of the course, student will be able to

1. Coding technique usingthe MATLAB editor
2. Modeling and analyses performances of electrical as well as an electronics model by Simulink blocks
3. Power system fault classification and location technique as well as Demand side management
4. Real time problem optimizing method by artificial intelligence tool box
5. Executing various MPPT Techniquefor enhancing renewable energy resources Efficiency

References:

1. Sandeep Nagar, "Introduction to MATLAB for Engineers and Scientists: Solutions for Numerical Computation and Modeling",Springer 2017
2. The Mathworks"MATLAB/SIMULINK",2015
3. Howard Demuth, Mark Beale "Neural Network Toolbox" MathWorks, 2004.

Course Title	Electrical Measurements					B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1802403	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	--	--	3	30	70	100
Mid Exam Duration : 2Hrs						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn about the measuring instruments, ac and dc bridges, instrument transformer, potentiometer and CRO.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Classify the types of instruments and bridges.
CO 2	Choose a suitable instrument to measure Voltage, Current, Power, Energy and lissajous patterns.
CO 3	Determine circuit parameters using Bridges.
CO 4	Measure Phase angle errors from CT's and PT's, magnitude and frequency from the CRO.

UNIT - I

Measuring Instruments: Classification, deflecting, control and damping torques, ammeters and voltmeters, PMMC, moving iron, dynamometer type instruments, expression for the deflecting torque and control torque, errors and compensations, extension of range using shunt and multipliers, numeric problems.

UNIT - II

Measurement of Power: Single phase dynamometer wattmeter, expression for deflecting and control torques, types of p.f. meters – dynamometer and moving iron type, 1Φ& 3Φ meters

Measurement of Energy: Single phase induction type energy meter, driving and braking torques, errors and compensations. Three phase energy meter.

UNIT - III

D.C. Bridges: Method of measuring low, medium and high resistance – sensitivity of Wheatstone's Bridge – Kelvin's Double Bridge for measuring low resistance, measurement of high resistance – loss of charge method.

A.C Bridges: Measurement of inductance - Maxwell's Bridge, Anderson's Bridge, measurement of capacitance and loss angle, Desauty's Bridge, Schering Bridge- frequency measurement- Wien's Bridge.

UNIT - IV

Instrument Transformers: CT and PT – ratio and phase angle errors–design considerations.

Potentiometers: Principle and operation of d.c. crompton's potentiometer, standardization, measurement of unknown resistance, current and voltage. a.c. potentiometers: polar and coordinate types, standardization – applications.

UNIT - V

Electronic Measurements: Cathode ray oscilloscope – cathode ray tube – time base generator – horizontal and vertical amplifiers – application of cro – measurement of phase, frequency, current & voltage – lissajous pattern.

Digital meters: Digital voltmeter – successive approximation, ramp and integrating type.

Text Books

1. Electrical measurements and measuring Instruments – by E.W. Golding and F.C. Widdis, 5th Edition, Reem Publications.
2. Electrical & Electronic Measurement & Instruments by A. K. Sawhney, Dhanpat Rai & Co. Publications.
3. Electronic Instrumentation and measurement techniques by William D Cooper- Prentice Hall Publishers.
4. Electrical Measurements-Martin U. Reisland,New Age International Publishers.

Reference Books

1. Electrical Measurements – by Buckungham and Price, Prentice – Hall
2. Electrical Measurements: Fundamentals, Concepts, Appliations – by Ressland, M.U, New Age International (P) Limited, Publish.
3. Electronic Instrumentation by H. S. Kalsi, Tata Grawhill Mc, 3rd Edition.
4. Principles of Electrical Measurements, Authur Whitemore Smith,classic reprint series.

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Course Title	Electrical Measurements Lab				B. Tech. EEE IV Sem		
Course Code	Category	Hours/Week		Credits	Maximum Marks		
1802407	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		--	--	2	1	50	50	100
						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to calibrate instruments and measure various circuit parameters.

Course Outcomes: On successful completion of this course, the students will be able to,

CO 1	Compare and calibrate various measuring Instruments
CO 2	Identify balanced conditions among bridges
CO 3	Measure the percentage errors among measuring instruments

List of Experiments (Any Eight Experiments)

1. Calibration and testing of single phase energy meter
2. Calibration of dynamometer power factor meter.
3. Crompton d.c. potentiometer – calibration of pmmc ammeter and pmmc voltmeter.
4. Kelvin's double bridge – measurement of resistance – determination of tolerance.
5. Measurement of % ratio error and phase angle of given C. T. by comparison.
6. Schering bridge & Anderson bridge.
7. Measurement of 3 phase reactive power with single phase wattmeter.
8. Measurement of parameters of a choke using 3 voltmeter and 3 ammeter methods.
9. Calibration lpf wattmeter – by phantom testing.
10. Measurement of 3 phase power with two wattmeter method (balanced & unbalanced).
11. Dielectric oil testing using H. T. testing kit
12. AC potentiometer – calibration of ac voltmeter, parameters of choke.

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Course Title	Power Electronics					B. Tech. V Sem		
Course Code	Category	Hours/Week			Credits	Maximum Marks		
1802503	Professional Core (PCC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	30	70	100
Mid Exam Duration : 2Hrs						End Exam Duration : 3Hrs		

Course Objectives: The objective of the course is to learn the basic concepts of power semiconductor devices, converters, choppers and inverters and their analysis.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Understand the basic operation of power semiconductor devices and passive components.
CO 2	Analyze the performance of different power converters subjected to various loads.
CO 3	Design static and dynamic equalizing circuits, Snubber circuits.
CO 4	Evaluate the number of SCRs required for desired series /parallel operation, Electrical parameters and different variables of various power electronic circuits.

UNIT - I

Silicon Controlled Rectifier: SCR – static characteristics –turn on and off mechanism – gate characteristics – dynamic characteristics – series and parallel operation of scr's – static and dynamic equalization circuits – design of snubber circuit – line commutation and forced commutation circuits, MOSFET, IGBT, GTO Characteristics.

UNIT - II

Phase controlled Rectifiers: Phase controlled rectifiers – single phase half and fully controlled converters – midpoint and bridge connections with R and RL loads – effect of source inductance- single phase and three phase half and fully controlled converters with R load - single phase and three phase dual converters with R and RL loads-numerical problems.

UNIT - III

AC Voltage Controllers: AC voltage controllers- single phase ac voltage controllers with SCR and triac for R and RL load –cyclo converters – single phase cyclo converters (mid-point and bridge configuration) with R and RL loads.

UNIT - IV

Choppers: Choppers – principle of operation – control strategies- types of chopper circuits – type A, type B, type C, type D and type E chopper circuits - multiphase chopper circuits – buck converter, boost converter, buck -boost converter, problems.

UNIT - V

Inverters: Inverters – single phase inverter – basic series inverter – basic parallel capacitor inverter – bridge inverter– current source inverter - forced commutation circuits for bridge inverters – output voltage control techniques- PWM techniques- space vector modulation - harmonic reduction techniques.

Text Books

1. Power Electronics – By M.D Singh & K.B. Kanchandhani, Tata McGrawHill Publishing Company, 1998.
2. Power Electronics - Circuits, Devices and Applications – by M.H. Rashid, Prentice Hall of India, 2nd Edition 1998.
3. Power Electronics- by PS Bimbhra, Khanna Publications.
4. Power Electronics-Branco L.Dokic,Branco Blanusa,3rd Edition, Kindle Edition.

Reference Books

1. Power Electronics – By Vedam Subramanyam, New Age Information Limited, 3rd Edition.
2. Power Electronics – By V.R. Murthy, Oxford University Press, 1st Edition – 2005
3. Power Electronics – By P.C Sen, Tata Mc Graw Hill Publishing.
4. Thyristorised Power Controllers – By G.K. Dubey, S. R. Doradla, A. Joshi and R. M. K. Sinha, New Age Informational(p) Limited Publishing 1996.

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Course Title	SCADA & Its Applications (PE – IV)				B. Tech. VIII Semester		
Course Code	Category	Hours/ Week		Credits	Maximum Marks		
1802804	Professional Elective (PEC)	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		3	0	0	3	30	70	100
Mid Exam Duration: 2 Hrs					End Exam Duration : 3Hrs		

Course Objectives: The student is able to learn

On successful completion of this course, the students will be able to

CO 1	Describe the basic tasks of Supervisory Control Systems (SCADA) as well as their typical applications.
CO 2	Acquire knowledge about SCADA architecture, various advantages and disadvantages of each system
CO 3	Acquire knowledge about single unified standard architecture IEC 61850
CO 4	Acquire knowledge about SCADA system components: remote terminal units, PLCs, intelligent electronic devices, HMI systems, SCADA server
CO 5	Acquire knowledge about SCADA communication, various industrial communication technologies, open standard communication protocols
CO 6	Learn and understand about SCADA applications in transmission and distribution sector, industries etc
CO 7	Gain knowledge and understanding for the design and implementation of a SCADA system

UNIT - I

Introduction to SCADA: Data acquisition systems, Evolution of SCADA, Communication technologies, Monitoring and supervisory functions, SCADA applications in Utility Automation, Industries

UNIT - II

SCADA System Components: Schemes- Remote Terminal Unit (RTU), Intelligent Electronic Devices (IED), Programmable Logic Controller (PLC), Communication Network, SCADA Server, SCADA/HMI Systems

UNIT - III

SCADA Architecture: Various SCADA architectures, advantages and disadvantages of each system - single unified standard architecture -IEC 61850

UNIT - IV

SCADA Communication: various industrial communication technologies -wired and wireless methods and fiber optics. Open standard communication protocols

UNIT - V

SCADA Applications: Utility applications- Transmission and Distribution sector - operations, monitoring, analysis and improvement. Industries - oil, gas and water.

Text Books

1. Stuart A. Boyer: SCADA-Supervisory Control and Data Acquisition, Instrument Society of America Publications, USA,2004.
2. Gordon Clarke, Deon Reynders: Practical Modern SCADA Protocols: DNP3, 60870.5 and Related Systems, Newnes Publications, Oxford, UK,2004.

Reference Books

1. William T. Shaw, Cyber security for SCADA systems, PennWell Books, 2006.
2. David Bailey, Edwin Wright, Practical SCADA for industry, Newnes, 2003.
3. Michael Wiebe, A guide to utility automation: AMR, SCADA, and IT systems for electric power, Penn Well 1999

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Course Title	Project Stage - I				B. Tech. VII Semester		
Course Code	Category	Hours / Week			Credits	Maximum Marks	
1802711	PROJ	L	T	P	C	Continuous Internal Assessment	End Exam	Total
		--	--	6	3	100	--	100

Course Objectives: The objective of the course is to

- develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions.
- Acquire and apply new knowledge as needed, using appropriate learning strategies.
- Apply knowledge of probability and statistics to applications in electrical engineering.

Course Outcomes: On successful completion of this course, the students will be able to

CO 1	Demonstrate a sound technical knowledge of their selected project topic.
CO 2	Understand problem identification, formulation and solution
CO 3	Design engineering solutions to complex problems utilising a systems approach.
CO 4	Communicate with engineers and the community at large in written an oral form
CO 5	Demonstrate the knowledge, skills and attitudes of a professional engineer

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Department of Electrical and Electronics Engineering

The following are the list of the Certificate Courses/Short Term Courses for the academic year 2020-21.

S. No.	B.Tech, Sem	Certificate Courses / Short Term Courses
1	B.Tech III Sem	Design of Electrical Circuits using MULTISIM
2	B.Tech III Sem	Introduction to Solar PV Systems
3	B.Tech V Sem	Circuit Design using MULTISIM
4	B.Tech V Sem	MATLAB Programming
5	B.Tech VII Sem	PLC and Its Applications
6	B.Tech VII Sem	LAB VIEW Programming
7	B.Tech IV sem	Industrial Safety
8	B.Tech VI Sem	Internet of Things - Its Applications
9	B.Tech VI Sem	Introduction to ETAP
10	B.Tech VIII Sem	PCB Design

Convener/HOD

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Design of Electrical Circuits Using MULTISIM

Syllahus of Course

Sl. No.	Topic	Hours
		Theory
Module 1	Introduction to MUTISIM software ,Design procedur and Steps, Evalaution of voltage/ Currents using kvl, Evalaution of voltage/ Currents using kvl	07
Module 2	Evalaution of voltage/ Currents using kcl ,Design of dependent Source Circuits for dc excitation,	08
Module 3	, Design of dependent Source Circuits for ac excitation Design of dependent Source Circuits for dc excitation, Design of dependent Source Circuits for ac excitation	08
Module 4	Response of half wav e and full wave rectifier circuits, Voltage divider circuit designing, Design of Bridge rectifier circuit	07

Text Books

1.Fundamentals of Electronic Circuit Design: Getting Started: MultiSim- John Wiley & Sons;

2.NI MULTISIM user manual-file:///C:/Users/Admin/Desktop/CC/NI%20MULTISIM.pdf

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Syllabus

PCB Design

Sl. No.	Topic	Hours
		Theory
Module 1	Introduction to Printed circuit board:fundamental of electronic components: B asic electronic circuits, Basics of printed circuit board designing	07
Module 2	Layout planning, general rules and parameters, ground conductor considerations, thermal issues, check and inspection of artwork	07
Module 3	Design rules for PCB: Design rules for Digital circuit PCBs, Analog circuit PCBs	08
Module 4	High frequency and fast pulse applications, Power electronic applications, Microwave applications	08

Text Books:

1. Printed circuit Board Design and technology, Walter C. Bosshart

2. Printed Circuits Handbook, Sixth Edition,by Clyde F. Coombs, Jr, Happy T. Holden,Publisher: McGraw-Hill Education Year: 2016

3. Complete PCB Design Using OrCAD Capture and PCB Editor,Kraig Mitzner Bob Doe Alexander Akulin Anton Suponin Dirk Müller, 2nd Edition 2009.

4. Introduction to System-on-Package, Rao R Tummala&MadhavanSwaminathan, McGraw Hill, 2008.

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Syllabus

Introduction to Solar PV Systems

Sl. No.	Topic	Hours
		Theory
Module 1	Basics of Electricity Voltage, Current, DC Power, AC Power, Energy, Harmonics, Solar Radiation.	08
Module 2	Solar Photovoltaic Solar Cell and its function, Solar Technologies, Solar Cell Parameters, Efficiency of Solar Cell, Solar PV Module, Rating of Solar PV Module	08
Module 3	Solar Photovoltaic Connection of PV Module in Series and Parallel, Estimation andMeasurement of PV Module Power, Selection of PV Module.	08
Module 4	Batteries Battery function, Types of Batteries, Battery parameters, Selection of Battery, Series Parallel combination of Batteries, Batteries for Photo voltaic System, Application of Batteries in Solar PV system, Battery Maintenance and Measurements.	08

Text Book

Honsberg, C., and S. Bowden. *Photovoltaics: Devices, Systems and Applications CD-ROM*. [A free online resource.]

References Books

Wenham, S., M. Green, et al., eds. *Applied Photovoltaics*. 2nd ed. Routledge, 2006. ISBN: 9781844074013. [Preview with Google Books]

Luque, A., and S. Hegedus, eds. *Handbook of Photovoltaic Science and Engineering*. John Wiley & Sons, Ltd, 2003. ISBN: 9780471491965.

Yu, P., and M. Cardona. *Fundamentals of Semiconductors: Physics and Materials Properties*. 3rd ed. Springer, 2004. ISBN: 9783540413233. [Preview with Google Books]

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Design of Electrical Circuits Using MULTISIM

Syllabus of Course

Sl. No.	Topic	Hours
		Theory
Module 1	Introduction to MUTISIM software ,Design procedur and Steps, Evalaution of voltage/ Currents using kvl, Evalaution of voltage/ Currents using kvl	07
Module 2	Evalaution of voltage/ Currents using kcl ,Design of dependent Source Circuits for dc excitation,	08
Module 3	, Design of dependent Source Circuits for ac excitation Design of dependent Source Circuits for dc excitation, Design of dependent Source Circuits for ac excitation	08
Module 4	Response of half wav e and full wave rectifier circuits, Voltage divider circuit designing, Design of Bridge rectifier circuit	07

Text Books

1.Fundamentals of Electronic Circuit Design: Getting Started: MultiSim- John Wiley & Sons;

2.NI MULTISIM user manual-file:///C:/Users/Admin/Desktop/CC/NI%20MULTISIM.pdf

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MATALB PROGRAMMING

Syllabus

Module 1 – Basic MATLAB Programming (6hrs)

Array Based Computing; Arrays and Vectors - Appending - Deleting - Concatenation - Data Type - Built-In Functions - Matrix Algebra - Logical Operations - Random Matrix - Flipping a Matrix -Indexing - Slicing - Colon Operators - Structure Arrays - celldisp–cellplot

Polynomials: Roots - Addition, Subtraction and division- Differentiation - Polynomial Integration - polynomial Curve Fitting

Module 2 – Plotting and Loops (6hrs)

Plotting: 2D& 3D Plotting - Multiple Plots – Bar charts - Polar graphs - Logarithmic Plots

Loops and Function: Loops - The while Loop - The do-until Loop - The for Loop - The if-elseif-else Loop - Functions - inline Function - Anonymous Functions

Module 3 –Application of MATLAB Simulink Tool box (6hrs)

Introduction on simulation - Sim power system –Simcape – Control System-P,PI and PID-STATCOM-Voltage and Current Transformation Techniques- Power system fault detection and classification by using ANN-Demand Side Management by ANN- Speed Control of three phase induction motor and DC motor using Fuzzy Logic

Module 4 –Renewable Energy System Modeling and Analysis (6hrs)

Solar PV cell modeling and Analysis –Effect of Environmental factor on Solar PV- Single stage and Double stage Grid connected Inverter design-Wind Power Plant Modeling and Analysis

Module5- Maximum Power Point Tracking (6hrs)

Perturb and Observation (P&O), Incremental and Conductance, Hill Climbing, ANN, Fuzzy Logic, ANFIS, Biological Inspired and Physical Inspired Algorithm.

Text Books

1. Sandeep Nagar, "Introduction to MATLAB for Engineers and Scientists: Solutions for Numerical Computation and Modeling",Springer 2017
2. The Mathworks"MATLAB/SIMULINK",2015
3. Howard Demuth, Mark Beale "Neural Network Toolbox" MathWorks, 2004.

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Syllabus

Sl. No.	Topic	Hours
		Theory
Module 1	Definition & History of PLC, Basic structure & Components of PLC, Principle of Operation, Selection of PLC, Why Use PLC, PLC I/O Modules, Memory & How it is used, PLC advantages & Disadvantages, PLC vs Computers, , Overview of Micro PLCs.	08
Module 2	Conventional ladders vs PLC Ladder logic, What is Logic? Overview of Logic functions, Number systems & Codes, Hardwired Logic vs Programmed logic,	08
Module 3	Processor memory organization, PLC Programming languages, Ladder diagrams, Relays, contactors, switches, sensors, output control devices, latching relays, ladder diagram elements.	08
Module 4	Basic Functions : PLC Timer & Counter functions, Timer & Counter Industrial applications, Arithmetic functions, Comparison functions, Jump functions, Data handling functions, Digital Bit functions, PLC matrix Functions, Advanced PLC Functions: Analog PLC operation, PID control of Continuous processes.	10

TEXT BOOKS

1.Introduction to PLCs, Second EditionJay F. Hooper

2.PLC Programming Using RSLogix 5000: Understanding Ladder Logic and the Studio 5000 PlatformClark, Nathan

3.Programmable Logic Controller (PLC) Tutorial, Siemens Simatic S7-1200**Tubbs, Stephen Philip (Author)**

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LABVIEW PROGRAMMING

Syllabus

Sl. No.	Topic	Hours
		Theory
Module 1	Basics of LabVIEW: NumericalsBooleans and comparatorsLoopsFinal Module test	06
Module 2	LOOPS: For loops,while loops,Flat sequence	06
Module 3	Structures:Case structure,Event structure,Formula node,Local and global variable.	08
Module 4	Data handling instruction:Strings,MatrixFile ,IOClusters,Waveform and wavechart.	06
Module 5	LabVIEW with DAQ-USB-6009, Unit A: Theory of DAQ card,Unit B: Hardware Interface Process 1: – Acquiring and generation of Digital signals Process 2: – Acquiring analog values in DE and RSE method Process 3: – Generating analog output	08

TEXT BOOKS

1.A Software Engineering Approach to LabVIEW by Jon Conway and Steve Watts

2.The LabVIEW Style Book (LSB) by Peter Blume.

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Syllabus

INDUSTRIAL SAFETY

Sl. No.	Topic	Hours
		Theory
Module 1	Definition, Importance Of Industrial- Safety Objectives Of Industrial Safety Consequences Of Accidents -Causes Of Accidents- Unsafe Acts	08
Module 2	Personal Factors: Unsafe Conditions Natural Calamitie-s Accident Assessment - Interrelation Activities With Staff	08
Module 3	To Prevent The Accidents -Hazard Identification - Occupational Health Hazards -Commandments For Safety- Supervisor's Role In Safety	06
Module 4	Engineering: I.E Safety At The Design, Equipment Installation Stage Case Studies-I- Case Studies-I	08

TEXT BOOKS

1.Introduction to Health and Safety By Phil Hughes MBE

2.Health and Safety at Work- Ed Ferrett

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Syllabus

Internet of Things - Its Applications

Sl. No.	Topic	Hours
		Theory
Module 1	*Introduction to Internet of Things, Characteristics of IoT Physical design of IoT,*	08
Module 2	*Functional blocks of IoT, Sensing, Actuation, Basics of Networking*	08
Module 3	Applications of rasberri pi	08
Module 4	Applications of Aurdino ,SDN for IoT, Data Handling and Analytics, **Iot for audino -programming**	08

Text Books:

1. "The Internet 'of Things: Enabling Technologies, Platforms, and Use Cases", by Pethuru Raj and Anupama C. Raman (CRC Press)
2. Make sensors: Terokarvinen, kemo, karvinen and villey valtokari, 1st edition, maker media, 2014.
3. "Internet of Things: A Hands-on Approach", by Arshdeep Bahga and Vijay Madisetti

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Introduction to ETAP

Sl. No.	Topic	Hours
		Theory
Module 1	Introduction to ETAP, ETAP Toolbars ,Mode Toolbar ,Analysis Toolbar	08
Module 2	Protective device coordination, **D**iscrimination or selectivity,Harmonic or power quality analysis	08
Module 3	Reliability , Optimal power flow, Power system stabilizer tuning	08
Module 4	Case Study-Load flow or power flow study and Short circuit or fault analysis	08

Text Books:

1. "Electrical Network's Modeling & Simulation Tools: The State of the Art".
2. ^ Hase, Yoshihide (December 2019). Power system dynamics with computer based modeling and analysis. p. 1112. ISBN 978-1-119-48745-6.
3. ^ "Electrical Transient Analyzer Program (ETAP)". United States Department of Veterans Affairs. United States: United States Department of Veterans Affairs.
4. ^ "The Leading Electrical Power System Analysis & Operation Software ETAP - Operation Technology, Inc". The Silicon Review. Retrieved 2019-09-28.

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Skill Course Syllabus

ETAP

UNIT-I

Introduction to ETAP, ETAP Toolbars ,Mode Toolbar, Analysis Toolbar, emerging trends of Power systems basics of ETAP, Project modeling and input data collection.

UNIT-II

Protective device coordination, discrimination or selectivity, Harmonic or power quality analysis, Load flow analysis, different types of fault currents-symmetrical and unsymmetrical analysis.

UNIT-III

Reliability , Optimal power flow, Power system stabilizer tuning Motor starting analysis, static analysis, dynamic analysis.

UNIT-IV

Reliability , Optimal power flow, Power system stabilizer tuning Motor starting analysis, static analysis, dynamic analysis.

UNIT-V

Case Study-Load flow or power flow study and Short circuit or fault analysis, Grid integration through wind and solar, solar form and inverter modeling.

Text Books:

1. "Electrical Network's Modeling & Simulation Tools: The State of the Art". Hase, Yoshihide (December 2019).
2. Power system dynamics with computer based modeling and analysis. p. 1112. ISBN 978-1-119-48745-6
3. "Electrical Transient Analyzer Program (ETAP)". United States Department of Veterans Affairs. United States: United States Department of Veterans Affairs.

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Department of Electrical & Electronics Engineering

Time Table for Academic Year 2020 – 2021

Class : B.Tech – VII Sem - A/S

Room No. SJ 107

Time / Day	09.00 AM – 10.00 AM	10.00 AM – 11.00 AM	11.00 AM – 12.00 Noon	12.00 Noon – 01.00 PM	01.00 PM – 02.00 PM	02.00 PM – 03.00 PM	03.00 PM – 04.00 PM
	1	2	3		4	5	6
Mon	SGP	ACS	EDS	LUNCH	PQ	MS	ACS
Tue	PS&S LAB/ MPMC LAB				EDS	HVDCT	PQ
Wed	PQ	HVDCT	SGP		ETAP-Skill Course		
Thu	ACS	SGP	MS		PS&S LAB/ MPMC LAB		
Fri	HVDCT	EDS	PQ		MS	SGP	TUT
Sat	EDS	ACS	HVDCT		STUDENT ACTIVITY		

S. No	Name of the Subject		Name of the staff
01	Management Science-1525701	MS	Sri S.Khasimpeera
02	Advanced Control Systems-1525702	ACS	Sri K.RamaMohana Reddy
03	HVDC Transmission-1525703	HVDCT	Sri M.Bhaskar Reddy
04	Switch Gear & Protection-1525704	SGP	Sri T. Kishore Kumar
05	Electrical Distribution Systems-1525705	EDS	Dr. T. Mariprasath
06	Power Quality(CBCC-III)- 1502707	PQ	Sri P.Durga Prasad
07	ETAP-Skill Course	ETAP	Dr.K.Amaresh
08	Micro Processors & Micro Controllers Lab-1514709	MPMC LAB	Sri S.Munawar Ali
09	Power Systems Simulation Lab-1502710	PS&S LAB	Sri T. Kishore Kumar
10	Tutorial	TUT	

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Department of Electrical & Electronics Engineering
Time Table for Academic Year 2020 – 2021

Class : B.Tech – VII Sem - B/S

Room No. SJ 206

Time / Day	09.00 AM – 10.00 AM	10.00 AM – 11.00 AM	11.00 AM – 12.00 Noon	12.00 Noon – 01.00 PM	01.00 PM – 02.00 PM	02.00 PM – 03.00 PM	03.00 PM – 04.00 PM
	1	2	3		4	5	6
Mon	PQ	MS	HVDCT	LUNCH	EDS	ACS	HVDCT
Tue	SGP	ACS	EDS		PS&S LAB/ MPMC LAB		
Wed	EDS	ACS	HVDCT		MS	PQ	TUT
Thu	PQ	EDS	SGP		ACS	SGP	MS
Fri	PS&S LAB/ MPMC LAB				ETAP-Skill Course		
Sat	HVDCT	PQ	SGP		STUDENT ACTIVITY		

S. No	Name of the Subject		Name of the staff
01	Management Science-1525701	MS	Dr.M.Sugunadha Reddy
02	Advanced Control Systems-1525702	ACS	Sri K.RamaMohana Reddy
03	HVDC Transmission-1525703	HVDCT	Sri M.Bhaskar Reddy
04	Switch Gear & Protection-1525704	SGP	Sri T. Kishore Kumar
05	Electrical Distribution Systems-1525705	EDS	Dr. T. Mariprasath
06	Power Quality(CBCC-III)- 1502707	PQ	Sri P.Durga Prasad
07	ETAP-Skill Course	ETAP	Dr.K.Amaresh
08	Micro Processors & Micro Controllers Lab-1514709	MPMC LAB	Sri S.Munawar Ali
09	Power Systems Simulation Lab-1502710	PS&S LAB	Sri T. Kishore Kumar
10	Tutorial	TUT	

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Skill Course Syllabus

MATLAB

UNIT-I

Basics of MATLAB: Basic features, script M-files, code cells, arrays creation, addressing and array operations; multi dimensional arrays.

UNIT-II

Control Flow: Arithmetic & Logical operators, control flow - if, if-else, for, while, switch case constructions and functions.

UNIT-III

Mathematical Operations: Matrix algebra and solutions to systems of linear equations, polynomials, Numerical integration, numerical differentiation

UNIT-IV

MATLAB Graphics & Numerical techniques: Two dimensional graphics, basics of three dimensional graphics, interpolation, curve fitting.

UNIT-V

Symbolic Mathematics: Symbolic aigebra, equation solving, differentiation and integration.

Text Books

1. Hanselman and Littlefield, "Masterig MATLAB 7", Pearson Education Etter,
2. Kuncickly,Hull, "Introduction to MATLAB 6", Pearson Education.

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Time Table for Academic Year 2020 – 2021

Class : B.Tech – V Sem

Room No. SJ 106

Time / Day	09.00 AM – 10.00 AM	10.00 AM – 11.00 AM	11.00 AM – 12.00 Noon	12.00 Noon – 01.00 PM	01.00 PM – 02.00 PM	02.00 PM – 03.00 PM	03.00 PM – 04.00 PM
	1	2	3		4	5	6
Mon	EM-II LAB / CS&S LAB			LUNCH	MPMC	ACS	PSOC
Tue	PE	MPMC	LDICA		LDICA	PSOC	TUT
Wed	AECS LAB				PSOC	ACS	PE
Thu	PSOC	PE	ACS		EM-II LAB / CS&S LAB		
Fri	LDICA	ACS	MPMC		Skill Course		
Sat	MPMC	LDICA	PE		STUDENT ACTIVITY		

S.No	Name of the Subject		Name of the staff
01	Microprocessors & Microcontrollers-1804501	MPMC	Miss.P.Lavanya
02	Linear Digital IC Applications-1814502	LDICA	Sri S.Munawar Ali
03	Power Electronics-1802503	PE	Sri M.Bhaskar Reddy
04	Power System Operation & Control-1802504	PSOC	Smt.Saleha Tabassum
05	Advanced Control Systems-1802507(PE-I)	ACS	Sri K.RamaMohan Reddy
06	Skill Course - MATLAB	PSC	Sri T.Kishore Kumar
07	Electrical Machines – II Lab -1802510	EM-II LAB	Sri K.Kalyan Kumar
08	Control Systems & Simulation Lab-1802511	CS&S LAB	Sri S.Khader Vali
09	Advanced English Communication Lab-1824512	AECS LAB	Sri K.Eswar Reddy/Sri K.Vijaya Bhaskar Reddy

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