ANNEXURE-I

UNIVERSITY OF JAMMU

COURSE SCHEME

B.E 5th Semester Electrical Engineering

For Examination to be held in the Year December 2020,2021,2022,2023

Contact Hours/Week: 26

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
PEE-501	Professional Core Course	Power System-I	2	1	0	50	100	150	3	100%
PEE-502	Professional Core Course	Electrical Measurement and Instruments	2	1	0	50	100	150	3	100%
EEE-502	Professional Elective Course	Elective-I	2	1	0	50	100	150	3	100%
EEC-501	Professional Core Course	Microprocessor (8085) & Peripheral Interfacing	2	1	0	50	100	150	3	100%
BCE-511	Engineering Science Course	Basic Civil Engineering	3	1	0	50	100	150	3	100%
NCC -503	Non Credit Course	Essence of Indian Traditional Knowledge	2	0	0	Satisfactory/unsatisfactory Non Credit				100%
MOC-503	Massive Open Online Course	SWAYAM/ NPTEL	3	0	0	100	-	100	3	100%
PIT -503	Professional Core Course	Industrial Training	0	0	0	50		50	1	100%
PEE-511	Professional Core Course	Power System I Lab	0	0	2	50	-	50	1	100%
PEE-512	Professional Core Course	Electrical Measurement Lab	0	0	2	50	-	50	1	100%
EEC-511	Professional Core Course	Microprocessor Lab	0	0	2	50	-	50	1	100%
TOTAL			**15**	**5**	**6**	**550**	**500**	**1050**	**22**	

**** NOTE:-The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.***

Elective-I	
EEE-502 (A)	Electrical Machine Design
EEE-502 (B)	Power Plant Engineering
EEE-502 (C)	Renewable Energy

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PEE-501

COURSE TITLE: POWER SYSTEM-I

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Understand different types of distribution system and electrical design aspects of transmission lines.
CO2	Analysis the performance of transmission lines and role of insulators.
CO3	Analysis the corona effect and mechanical design aspects of transmission lines.

Detailed Syllabus

Section- A

D.C & A.C. Distribution Systems: Introduction to a Power System (an overall view). Distribution Systems- Feeder, Distribution, service mains. Classification of distribution system. Various types of D.C. & A.C. distributors, Voltage drop calculations. **(08 hours)**

Overhead AC Transmission Lines Parameters: Types and bundling of conductors, Resistance calculations, skin effect, proximity effect. Inductance and Capacitance of single phase and 3- phase, single circuit and double circuit lines. Interference of power Lines with communication lines: Electrostatics & electromagnetic effects. **(10 hours)**

Section- B

Insulators for overhead Lines: Performance of transmission lines, Representation & performance of short, medium and long lines, A, B, C, D constants, surge impedance, Ferranti effect. Materials for insulators, types of insulators, potential distribution over a string of suspension insulators, methods for equalizing the potential. **(08 hours)**

Corona: Visual & critical disruptive voltage conditions effecting corona, power loss due to corona, practical considerations. Mechanical design of transmission line, Calculation of sag and tension, Equivalent span length and sag, effect of ice & wind loading, Conductor vibration& vibration dampers. . **(10 hours)**

BOOKS RECOMMENDED:

1. Elements of Power System Analysis -C.W. Stevenson
2. Transmission & distribution of Electric Energy - H. Cotton & H. Barber
3. Electric Power System - C.L. Wadhwa

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PEE-502

COURSE TITLE: ELECTRICAL MEASUREMENT AND INSTRUMENTS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Measure various electrical parameters like resistance, potential & current.
CO2	Understand the construction & working of AC & DC bridges, Potentiometer & its application.
CO3	Understand the construction , working of different measuring instruments and different energy measuring methods.

Detailed Syllabus

Section- A

Measurement of Resistance:-Measurement of low resistance, Potentiometer method, Kelvin double bridge. Measurement of medium résistance, Ammeter-voltmeter method, Substitution method, Wheatstone bridge, and applications. Measurement of high resistance, Loss of charge method, Meggar Method**,** Galvanometer: D' Arsonval Galvanometer; Construction, working principle, equation of motion, critical résistance **(10 hours)**

A.C. & DC Bridges and Potentiometer: Measurement of Inductance using: Maxwell's Inductance-Capacitance bridge. Anderson's bridge, Measurement of capacitance using De-Sauty's bridge, Schering bridge. Measurement of frequency using Wein's bridge. Crompton's Potentiometer, Vernier Potentiometer, Uses of DC Potentiometers.A.C. Potentiometer: Drysdale polar Potentiometer, Uses of A.C. Potentiometers. **(12 hours)**

Section- B

Measuring Instruments: Classification, effects utilized in measuring instruments. Indicating Instruments: Deflection, controlling & damping forces, various dampings. Ammeters & Voltmeters: Moving coil, moving iron, & electrodynamics type ammeter & voltmeters, electrostatic voltmeter, Errors in Ammeters & Voltmeters Extension of instrument range: Ammeter Shunts, Voltmeter multipliers, C.T. & P. **(12 hours)**

Measurement of Energy: Energy meters for A.C. Circuits, Theory of Induction type meters, Single phase Induction type watt-hour meters, construction, theory & operation. **(06 hours)**

BOOKS RECOMMENDED:

1. Electrical Measurements & Measuring Instruments - Golding Widdis
2. A Course in Electrical & Electronics Measurement & Instrumentation - A.K. Sawhney

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-502 (A)

COURSE TITLE: ELECTRICAL MACHINE DESIGN

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand the various factors which influence the design: electrical, magnetic and thermal loading of electrical machine.
CO2	Understand the design of transformer.
CO3	Understand the principles of A.C. electrical machine design and carry out a basic design of an ac machine by using CAD.

Detailed Syllabus

Section- A

Introduction: Major considerations in electrical machine design, choice of specific electrical and magnetic loadings, thermal considerations, heat flow, temperature rise, rating of machines. **(07 hours)**

Transformers :-Sizing of a transformer, main dimensions, kVA output for single- and three-phase transformers, window space factor, overall dimensions, design for minimum cost, design for minimum loss, temperature rise in transformers, design of cooling tank, methods of cooling transformers. **(10 hours)**

Section- B

Induction Motors:-Sizing of an induction motor, main dimensions, length of air gap, rules for selecting rotor slots of squirrel cage machines, design of rotor bars & slots, design of end rings, design of wound rotor, and turn per phase and stator conductors, stator core and teeth. **(08 hours)**

Synchronous Machines:-Sizing of a synchronous machine, main dimensions, design of salient pole machines, short circuit ratio, shape of pole face, armature design, armature parameters, estimation of air gap length, design of rotor, design of damper winding. **(08 hours)**

Computer aided Design (CAD):-Limitations (assumptions) of traditional designs, need for CAD analysis. **(03 hours)**

BOOKS RECOMMENDED:

1. A Course in Electrical Machine Design - A. K. Sawhney
2. Theory & Performance & Design of A.C. Machines - M.G. Say
3. A Text Book of Electrical Engineering Drawings - K. L. Narang
4. Computer Aided Design of Electrical Machines - K. M. V. Murthy

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-502 (B)

COURSE TITLE: POWER PLANT ENGINEERING

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand layout, construction and working of the components inside a thermal power plant.
CO2	Understand layout, construction and working of the components inside a Diesel, Gas and Combined cycle power plants
CO3	Understand layout, construction and working of the components inside nuclear and hydro power plants.

Detailed Syllabus

Section- A

Coal Based Thermal Power Plants:-Introduction, Layout of modern coal power plant, Super Critical Boilers, FBC Boilers, Turbines, Condensers, Steam & Heat rate, Subsystems of thermal power plants – Fuel and ash handling, Draught system, Feed water treatment. Binary Cycles. **(08 hours)**

Diesel, Gas Turbine and Combined Cycle Power Plants:-Introduction, Layout of Components of Diesel and Gas Turbine power plants. Combined Cycle Power Plants. Integrated Gasifier based Combined Cycle systems **(06 hours)**

Section- B

Nuclear Power Plants:-Introduction, Atomic Nuclei, Atomic Number and Mass Number, Isotopes, Atomic Mass Unit, Radioactivity and Radioactive Change Rate of Radioactive Decay, Mass – Energy Equivalence, Binding Energy, Nuclear Reaction, types of Nuclear Reactions, Initiation of Nuclear Reaction, , Nuclear Fission, The Fission Chain Reaction, moderation. **(09 hours)**

Hydro Power Plant:-Introduction, Potential of hydropower in India. General hydrology-hydrological cycle, precipitation, run-off and its measurement, hydrography, flow duration and mass curve. Site investigations. Classification of hydroelectric power plants. Dams, spillways, Canals, penstocks, surge tanks, draft tubes etc; Power – house structure. **(09 hours)**

BOOKS RECOMMENDED:

1. Power Plant Engineering - Nag. P.K
2. Power Plant Technology - El-Wakil. M.M
3. Power Plant Engineering - Thomas C. Elliott
4. Power Plant Engineering - Black & Veatch

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-502 (C)

COURSE TITLE: RENEWABLE ENERGY

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand the concepts, construction and working of solar energy
CO2	Understand the concepts, construction and working of wind energy
CO3	Understand the concepts, construction and working of Biomass energy and small hydro

Detailed Syllabus

Section- A

Solar Energy: - Primary and Secondary Solar energy and Utilization of Solar Energy. Characteristic advantages and disadvantages. Solar concentrators and tracking; Dish and Parabolic trough concentrating generating systems, Central tower solar thermal power plants; Solar Ponds. **(08 hours)**

Wind Electricity Generation:-Introduction ,Types of turbines, Coefficient of Power, Wind electric generators, Power curve; wind characteristics and site selection; Wind farms for bulk power supply to grid; Potential of wind electricity generation in India and its current growth rate. **(08 hours)**

Section- B

Biomass Energy:-Biomass: Sources and Characteristics; Wet biogas plants; Biomass gasifiers: Classification and Operating characteristics; Updraft and Downdraft gasifiers; Gasifier based electricity generating systems; Maintenance of gasifiers. Types of biogas plants, biogas generation, advantages and disadvantages, applications of gasifiers.

(09 hours)

Hydro Energy:- Overview of micro, mini and small hydro systems; Hydrology; Elements of pumps and turbine; Selection and design criteria of pumps and turbines; Site selection and civil works; Speed and voltage regulation; tariff collection; Potential of small hydro power in India **(07 hours)**

BOOKS RECOMMENDED:

1. Power Plant Engineering - Nag. P.K
2. Power Plant Technology - El-Wakil. M.M
3. Non-conventional energy resources - Shobh Nath Singh
4. Non-conventional energy resources - R.P.Jain

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEC-501

COURSE TITLE: MICROPROCESSOR (8085) & PERIPHERAL INTERFACING

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	To study the architecture and pin diagram of microprocessor 8085.
CO2	To study arithmetic and logic instructions along with advance programming techniques for storing data in momery or register.
CO3	Programming and the interfacing of various I/P and O/P devices along with peripheral IC's with 8085 so as to work in real time mode.

Detailed Syllabus

Section- A

Microprocessor 8085: Microprocessor 8085 pin diagram, Architecture, Addressing modes, Instruction set, Instruction format, Timing diagram, Programming techniques with additional instructions, looping, Counting design of counters & time delays, debugging & memory mapping. **(10 hours)**

Stack & Subroutines, Advanced subroutines concept, Call & Ret instructions, Advanced programming (Code conversions, BCD addition/subtraction, Multiplication etc.), 8085 interrupts & process. **(08 hours)**

Section- B

Interfacing : Interfacing I/O devices, Basic interfacing concept, interfacing with scanned multiplexed displays & LCD's, Interfacing output displays, Interfacing i/p devices, Memory mapped i/o design, Memory wait states & access time. **(06 hours)**

Data communication: Serial I/O data communication, Basic concepts in serial I/O, 8085 serial I/O lines – SID & SOD, Synchronous & asynchronous data communication, Software controlled asynchronous serial I/O. **(06 hours)**

Interfacing to 8085 Microprocessor: PPI – 8155 I/O & timer, PPI – 8255 (mode-0, 1, 2 & BSR), PID 8279 keyboard/display interface, PIC 8259, DMA controller 8257/8237. **(05 hours)**

BOOKS RECOMMENDED:

1. Microprocessor Architecture Programming & App. - Ramesh Gaonkar
2. Introduction to Microprocessor - Aditya P. Mathur
3. The Intel Microprocessor - Brey
4. Fundamental of Microprocessor & Microcomputers - B. Ram
5. Microprocessor and Interfacing - D.V. Hall

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: BCE-511

COURSE TITLE: BASIC CIVIL ENGINEERING

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Explain various traditional and emerging materials in the field of civil engineering construction and the process of manufacture of cement.
CO2	Explain the basic concepts and various type of Foundations.
CO3	Interpret the basic concepts of stress, strain, different types of loading. Draw shear force and bending moment diagrams and analysis of transmission towers

Detailed Syllabus

Section- A

Building stone: - Origin, Classification and Engineering Properties. Essential requirements and selection of good building stones for various works in Civil Engineering. Dressed stones and their role in Export market.

Portland cement:-Methods of manufacture of Portland cement, various types of Cement and their use. Engineering Properties of Cement, Storage and Testing. **(08 hours)**

Foundations: - Purpose, site exploration, Methods of Testing Bearing Capacity of Soils, Types of Foundations, Combined Footing and Raft Foundation. Piers, Machine Foundations, Causes of failure. Excavation of Foundations in water logged sites. Pile Foundation, Concrete Piles, Pile Driving. **(08 hours)**

Section- B

Strength of Material: Simple Stresses and Strains, Hooks law. Strain Energy, Stresses due to different type of loadings, gradually& suddenly applied loads. Shear force and Bending Moment for simply supported, cantilevers, fixed beam, and continuous beams. Stresses in beams, Theory of simple bending, Neutral axis, and Bending stress distribution. **(08 hours)**

Towers: Analysis and design of Transmission line and Towers, Types of Bracing patterns-sag and Tension calculations, Substation structures, Tower foundations- Design of Foundations for towers, Structural Design of Supports for foundation Excavation and design of ground Anchors. **(07 hours)**

BOOKS RECOMMENDED:

1. Building Material - Sushil Kumar
2. Building Material - Prabin Singh
3. Analysis of Structures - O.P.Jain
4. Transmission line structures - Santha Kumar

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 0**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: NCC-503

COURSE TITLE: ESSENCE OF INDIAN TRADITIONAL KNOWLEDGE

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**0**	**0**	**Satisfactory/unsatisfactory**	

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	The students shall be able to know about the Vedic philosophy in detail and its relevance in present scenario.
CO2	The students will be able to strengthen their mind and body through the knowledge of yoga.

Detailed Syllabus

Unit 1

Vedic Philosophy: Concept of Vedas, Ethics & Values, Educational system, Knowledge of science, trade/commerce & medicines as per Vedas, Environmental ethics: Preservation & Purification, Harnessing of natural resources in alienation with nature as per Vedas.

Unit 2

Yoga Philosophy: Parts of Yoga, Importance of Yam and Niyam, Stress management through yoga, Purification of mind and body through yoga .

Note for Teacher: The course should aim at enlightening students with the importance of ancient traditional knowledge.

Evaluation of the course: There will be internal evaluation based on two internal sessional and viva -voce.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: MOC -503

COURSE TITLE: SWAYAM/NPTEL

DURATION OF EXAM: 3 HOURS

L	T	P	Marks Internal
3	0	0	100

The department shall offer the SWAYAM / NPTEL course (12 weeks) out of the list of courses offered by SWAYAM around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the NPTEL course will be under the supervision of the teacher in charge of the department.

The NPTEL/SWAYAM certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per the schedule.

The marks obtained by the student in the NPTEL/SWAYAM certification course will be tabulated by the concerned department.

Note: - In case the student does not pass the certification exam or remains absent in the proctor examination, no certificate will be given to the candidate by the NPTEL and the student will be deemed to have failed in the course. The examination of the said NPTEL course will be taken by the department concerned in the next semester under the supervision of Examination Cell of GCET Jammu. The paper will be of 75 marks and assignment marks will be carried forward from the previous semester.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER **CREDIT: 1**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PIT-503

COURSE TITLE: Industrial Training

			Marks
L	**T**	**P**	**Practical**
0	**0**	**0**	**50**

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	**Interact and study with a range of students and to practice multiple management skills, including communication, independent action and teamwork.**
CO2	**Understand the engineering code of ethics and be able to apply them as necessary.**
CO3	**Demonstrate knowledge of practical application of training.**
CO4	**Submit a training report along with the certificate issued by the concerned department.**

The students are required to take practical training during summer vacations for about 4 to 6 weeks duration in PSUs/Private Industries/DRDO/ISRO/BARC/Power Grid Corporation /Power Stations/Electric sub-stations/ Practical Training Centre etc. After completion of the training, the students should submit a training report along with the certificate issued by the Concerned Department for evaluation purpose.

Guidelines for evaluation of Practical Training:

The evaluation shall be done by the departmental committee by the end of 5th semester. The committee shall have a convener and at least two members.

Distribution of Marks as per the University statues:

1. Report = 32 40%
2. Viva-Voce = 24 30%
3. Miscellaneous Marks = 24 30%

Due weightage will be given, those who have undertaken outside the state &based on the profile of the Industry.

Award of the Marks: Marks (1), (2) & (3) will be awarded by the committee constituted for the purpose.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -511
COURSE TITLE: POWER SYSTEM-I LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Understand the D.C distribution system
CO2	Determine the various parameters of transmission lines.
CO3	Understand types of overhead line conductors, insulators and corona formation

Lab Experiments:

Experiment 1 Various types of d.c distributors can be studied by using DC Network Analyzer.

Experiment 2 To study the radial distribution fed at one end and calculates the various load currents using trainer module.

Experiment 3 To study the ring main d.c distribution fed at one end and calculates the various load currents using trainer module.

Experiment 4 To determine A, B, C, D Parameters of single phase transmission line using single phase transmission line trainer kit.

Experiment 5 To determine voltage distribution and string efficiency of suspension insulator with and without guard ring.

Experiment 6 Study of all types of overhead line conductors.

Experiment 7 Study of all types of Insulators.

Experiment 8 Study of Corona formation of high voltage overhead lines.

NOTE: **Additional Lab experiments/practical will be performed based on the course contents requirements**.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -512
COURSE TITLE: ELECTRICAL MEASUREMENT LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Perform experiments to determine the value of R,L,C and frequency using different bridges.
CO2	Understand various measuring instruments like multimeters, M.C,M.I and dynamometer type instruments.
CO3	To experimentally calibrate energy meter and conversion of galvanometer to voltmeter and ammeter.

Lab Experiments:

Experiment 1 Measurement of resistance using Kelvin's bridge.
Experiment 2 Measurement of resistance using Wheatstone bridge.
Experiment 3 Measurement of inductance using Andersons Bridge.
Experiment 4 Measurement of capacitance using Schering Bridge.
Experiment 5 Measurement of frequency using Weins Bridge.
Experiment 6 Measurement of unknown self-inductance using Maxwell Inductance Bridge.
Experiment 7 To study various types of Multi meters.
Experiment 8 Demonstration of M.C, M.I and Dynamometer type instruments.
Experiment 9 Calibration of single phase energy meter (direct loading).
Experiment 10 Calibration of single phase energy meter (Phantom loading).
Experiment 11 Conversion of galvanometer to voltmeter
Experiment 12 Conversion of galvanometer to ammeter

NOTE: **Additional Lab experiments/practical will be performed based on the course contents requirements**.

Examination to be held in the Year December 2020,2021,2022,2023

CLASS: B.E. 5th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO: EEC -511
COURSE TITLE: Microprocessor LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Write assembly language programs using 8085.
CO2	Perform basic and advanced programming with 8085 instructions.
CO3	Perform programming by interfacing the peripheral ICs with 8085.

Lab Experiments:

Experiment 1 Programs of data transfer group and block transfer of data from Source memory to destination memory.

Experiment 2 Programs on Arithmetic, Logical group of instruction, Multiplication of two unsigned 8 bit number & factorial of a number.

Experiment 3 Programs on time delay & counters.

Experiment 4 Advanced programming such as binary to ASCII, vice versa & BCD addition.
Experiment 5 Study of 8253-Timer & counter interfacing card.

NOTE: **Additional Lab experiments/practical will be performed based on the course contents requirements**.

ANNEXURE II

UNIVERSITY OF JAMMU

COURSE SCHEME

B.E 6th Semester Electrical Engineering

For Examination to be held in the Year May 2021,2022,2023,2024

COURSE CODE	COURSE TYPE	COURSE TITLE	LOAD ALLOCATION			MARKS DISTRIBUTION		TOTAL	Credits	% Change
			L	T	P	Internal	External			
PEE-601	Professional Core Course	Power System-II	2	1	0	50	100	150	3	100%
PEE-602	Professional Core Course	Power Electronics	2	1	0	50	100	150	3	25%
PEE-603	Professional Core Course	Power System Protection	2	1	0	50	100	150	3	100%
EEE-602	Professional Elective Course	Elective-I	2	1	0	50	100	150	3	100%
HMC-601	Humanities and Social Sciences including Management courses	Managerial Economic	3	1	0	50	100	150	4	100%
MOC-603	Massive Open Online Course	Swayam / NPTEL	3	0	0	100	-	100	3	100%
PEE-611	Professional Core Course	Power System-II Lab	0	0	2	50	-	50	1	100%
PEE-612	Professional Core Course	Power Electronics Lab	0	0	2	50	-	50	1	100%
PEE-613	Professional Core Course	Power System Protection Lab	0	0	2	50	-	50	1	100%
PEE-614	Professional Core Course	MATLAB	0	0	2	50	-	80	1	100%
TOTAL			**14**	**5**	**8**	**550**	**500**	**1050**	**23**	

Contact Hours/Week :27

**** NOTE:-The department shall offer the Swayam / NPTEL course out of the list of courses offered by Swayam around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.***

Elective I	
EEE-602 (A)	Power Quality & Facts
EEE-602 (B)	Power System Dynamics & Control
EEE-602(C)	Digital Control System

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PEE-601

COURSE TITLE: POWER SYSTEM-II

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Understand about the construction and working of different types of underground cables
CO2	Apply symmetrical components technique for symmetrical and unsymmetrical fault analysis
CO3	Understand the concept of per unit representation of power system, over voltages and insulation.

Detailed Syllabus

Section- A

Underground Cables: Construction of cable, insulating materials, types of cables- Mass impregnated, oil filled & gas filled Paper cables, Solid dielectric cables, Gas filled cables, Super conducting cables, Electrostatic stresses in a cable, grading of cables, Insulation resistance of cables, capacitance of single core and three core cables, heating of cables, current carrying capacity of cable. **(08 hours)**

Fault analysis: Symmetrical components, sequence impedance's, sequence networks, unsymmetrical faults: single- line to ground, line-to- line, double line ground faults on unload alternator and on power system, 3 phase short circuits, short circuit capacity of a bus, selection of circuit breakers. **(10 hours)**

Section- B

Per Unit Representation of Power System: Single line diagram, impedance & reactance diagram of a power system, per unit system of calculations of a power system. **(06 hours)**

Over voltages and insulation requirements

Generation of over voltages, lightening phenomenon, protection of power system against over voltage, ground wires, lightening arrestors, concept of insulation coordination, basic impulse insulation level, standard impulse test wave, volt-time curve, location and ratings of lightening arrestors. **(10 hours)**

BOOKS RECOMMENDED:

1. Elements of Power System Analysis -W.D. Stevenson
2. Power System Analysis - B.R.Gupta
3. Electric Power System - C.L. Wadhwa
4. Power System Engg -Nagrath & Kothari

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PEE-602

COURSE TITLE: POWER ELECTRONICS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand fundamental concepts of power electronics, characteristics, series parallel operation, protection and firing circuits of SCR and operation of various thyristor devices
CO2	Analyse various single phase and three phase controlled rectifier circuits with different loads and various commutation techniques.
CO3	Understand the concept of choppers, inverters and cycloconverters.

Detailed Syllabus

Section- A

Introduction: Power electronics system and devices, applications, advantages and disadvantages. Solid state devices SCR**:** Basic theory of Operation, Characteristics: Static & Dynamic, ratings, protection of SCR against overcurrent, overvoltage, high dv/dt , di/dt, snubber circuit, series and parallel operation, gate protection, firing circuit of SCR, SCR gate characteristics, two transistor analogy of SCR, Family of SCR: TRIAC, LASCR, DIAC, PUT, SUS, GTO and UJT.

(09 hours)

Phase controlled rectifiers: Single and three phase, half and full wave, fully controlled and half controlled rectifiers with R L E loads with / without freewheeling diode. **(06 hours)**

Commutation and AC Phase control: Methods of forced commutations: (Class A-F), Operation of Single phase, Half and Full wave AC controller with R & R-L Load, Integral cycle control. **(05 hours)**

Section- B

Choppers: Principle and basic chopper circuits, classification, Steady–state Analysis of chopper circuits, control strategies, Commutation in Chopper circuits. **(07 hours)**

Inverters: Single phase voltage source inverters, voltage control of single phase inverter. **(04 hours)**

Cycloconverters: classification, single phase to single phase cyclo converters with resistive inductive load. **(06 hours)**

BOOKS RECOMMENDED:

1. Elements of Power Electronics -P.S.Bimbra
2. Power Electronics - M.Ramamoorty

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: PEE-603

COURSE TITLE: POWER SYSTEM PROTECTION

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Understand the different components of a protection system.
CO2	Understand the protection schemes for different power system equipment.
CO3	Evaluate fault current and understand over current protection system and circuit breakers

Detailed Syllabus

Section- A

Introduction : Introduction and Components of a Protection System ,Principles of Power System Protection, Relays, Instrument transformers, Circuit Breakers . **(08 hours)**

Protection: Equipment protection schemes, Directional, Distance, and Differential protection. Transformer and Generator protection. Bus bar protection, Bus bar arrangement schemes**.** **(12 hours)**

Section- B

Faults: Faults and Over-Current Protection, Review of Fault Analysis, Sequence Networks. Introduction to Overcurrent Protection and overcurrent relay co-ordination. **(08 hours)**

Circuit Breaker: Principle of arc interruption, recovery and restriking voltage, RRRV, current chopping, vacuum interrupter, SF6, rating and testing of CBs. **(08 hours)**

BOOKS RECOMMENDED:

1. Protective Relaying: Principles and Applications -N.G.Hingorani
2. Electric Power Quality - R.C.Dugan
3. FACTS Controllers in Power Transmission and Distribution - K.R.Padiyar

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-602 (B) (Elective I)

COURSE TITLE: POWER SYSTEM DYNAMICS& CONTROL

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand the problem of power system stability and its impact on the system.
CO2	Analyse linear dynamical systems and use of numerical integration methods.
CO3	Analyse different models of power system components and methods of stability analysis .

Detailed Syllabus

Section- A

Introduction to Power System Operations: Introduction to power system stability. Power System Operations and Control. Stability problems in Power System. Impact on Power System Operations and control. **(08 hours)**

Analysis of Linear Dynamical System and Numerical Methods Analysis of dynamical System, Concept of Equilibrium, Small and Large Disturbance Stability. Modal Analysis of Linear System. Analysis using Numerical Integration Technique. **(10 hours)**

Section- B

Modelling of other Power System Components: Modelling of Transmission Lines and Loads. Transmission Line Physical Characteristics. Transmission Line Modelling. Load Models - induction machine model. Frequency and Voltage Dependence of Loads. **(10 hours)**

Stability Analysis: Angular stability analysis in Single Machine Infinite Bus System. Angular Stability in multi machine systems – Intra-plant, Local and Inter-area modes. Frequency Stability: Centre of Inertia Motion. Load Sharing: Governor Droop. Single Machine Load Bus System: Voltage Stability. Introduction to Torsional Oscillations and the SSR phenomenon. **(08 hours)**

BOOKS RECOMMENDED:

1. Elements of Power System Analysis -K.R.Padiyar
2. Power System Analysis - P.Kundur
3. Power System Dynamics - Sauer

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-602 (A) (Elective I)

COURSE TITLE: POWER QUALITY AND FACTS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Understand the characteristics of ac transmission and the effect of shunt and series reactive compensation.
CO2	Understand the working principles of FACTS devices and their operating characteristics.
CO3	Understand the voltage source converters based controller and power quality problems

Detailed Syllabus

Section- A

Transmission Lines : Series/Shunt Reactive Power Compensation Basics of AC Transmission**.** Analysis of uncompensated AC transmission lines. Passive Reactive Power Compensation. Shunt and series compensation at the mid-point of an AC line. Comparison of Series and Shunt Compensation. **(08 hours)**

Thyristor-based (FACTS) Description and Characteristics of Thyristor-based FACTS devices: Static VAR Compensator (SVC), Thyristor Controlled Series Capacitor (TCSC), fault current limiter **(08 hours)**

Section- B

Voltage Source Converter based (FACTS) controllers: Voltage Source Converters (VSC): Six Pulse VSC, STATCOM: Principle of Operation, Reactive Power Control: Type I and Type II controllers, Static Synchronous Series Compensator (SSSC) and Unified Power Flow Controller (UPFC): Principle of Operation and Control. **(08 hours)**

Power Quality Problems in Distribution Systems: Power Quality problems in distribution systems: Transient and Steady state variations in voltage and frequency. Unbalance, Sags, Swells, Interruptions, Wave-form Distortions: harmonics, noise, notching, dc-offsets, fluctuations. Flicker and its measurement. Unified power quality conditioner (UPQC),: Working principle , capabilities and control strategies. **(10 hours)**

BOOKS RECOMMENDED:

1. Elements of Power System Analysis -K.R.Padiyar
2. Electrical Power Systems Quality -R.C.Dugan
3. Electric Power Quality - G.T.Heydt

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year May 2021,2022,2023, 2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: EEE-602 (C) (ELECTIVE-I)

COURSE TITLE: DIGITAL CONTROL SYSTEMS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
2	**1**	**0**	**100**	**50**

COURSE OUTCOMES **At the end of the course the student will be able to: -**	
CO1	Obtain discrete representation of LTI systems, analysis of z – transform and stability of discrete system.
CO2	Analyse state space approach for discrete-time systems
CO3	Understand the design of digital control system and discrete output feedback control.

Detailed Syllabus

Section- A

Discrete Representation of Continuous Systems: Basics of Digital Control Systems. Discrete representation of continuous systems. Sample and hold circuit. Mathematical Modelling of sample and hold circuit. Effects of Sampling and Quantization. Choice of sampling frequency. ZOH equivalent. **(08 hours)**

Discrete System Analysis: Z-Transform and Inverse Z Transform for analysing discrete time systems. Pulse Transfer function. Pulse transfer function of closed loop systems. Mapping from s-plane to z plane. Solution of Discrete time systems. Time response of discrete time system. **(06 hours)**

Stability of Discrete Time System: Stability analysis by Jury test. Stability analysis using bilinear transformation. Design of digital control system with dead beat response. **(04 hours)**

Section- B

State Space Approach for discrete time systems: State space models of discrete systems, State space analysis. Lyapunov Stability. Controllability, reach-ability, Reconstructibility and observability analysis. Effect of pole zero cancellation on the controllability & observability. **(08 hours)**

Design of Digital Control System: Design of Discrete PID Controller, Design of discrete state feedback controller. Design of set point tracker. Design of Discrete Observer for LTI System. Design of Discrete compensator. **(06 hours)**

Discrete output feedback control: Design of discrete output feedback control. Fast output sampling (FOS) and periodic output feedback controller design for discrete time systems. **(04 hours)**

BOOKS RECOMMENDED:

1. Digital Control Engineering - K. Ogata
2. Digital Control Engineering - M. Gopal
3. Digital Control of Dynamic Systems - G. F. Franklin
4. Digital Control System - B.C. Kuo

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 4**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: HMC-601

COURSE TITLE: MANAGERIAL ECONOMICS

DURATION OF EXAM: 3 HOURS

			Marks	
L	**T**	**P**	**Theory**	**Sessional**
3	**1**	**0**	**100**	**50**

COURSE OUTCOMES	
At the end of the course the student will be able to: -	
CO1	Understand about business environment of a country after acquiring good knowledge about micro economic concepts such as demand & utility analysis, consumer behavior, demand forecasting techniques and shall be a good decision maker.
CO2	Suggest producing the product at minimum cost by studying in detail about the cost curves and market structures.
CO3	Have knowledge of macroeconomics concepts such as, index numbers, business cycle, banking, inflation etc. and will be able to apply them in day to day life.

Detailed Syllabus

Section- A

Meaning and Importance of Managerial Economics: Introduction, Meaning, Scope of Managerial Economics, Role and responsibilities of managerial economist, Relationship of managerial economics with other disciplines: Importance of Managerial Economics in decision making, the basic process (steps) of decision making **(05 hours)**

Demand Analysis*:* Introduction, Meaning of demand and Law of Demand, factors affecting demand; exceptions to the law of demand; Elasticity of Demand (Price, income and cross elasticity of demand) **(06 hours)**

Consumer Behaviour: Cardinal utility analysis: Concept: law of diminishing marginal utility: law of equi marginal utility, Ordinal utility analysis: meaning and properties of Indifference curves and utility maximization (consumer equilibrium). **(05 hours)**

Demand Forecasting: Introduction, Meaning and importance of demand Forecasting: Methods or Techniques of Demand Forecasting, Survey Methods, Statistical Methods, Demand Forecasting for New Products. **(04 hours)**

Section- B

Production and cost Analysis: Meaning of Production function, Isoquants (meaning and properties)law of variable proportions, law of returns to scale, Cost Analysis: Concept of Fixed, Variable, Total, Average & Marginal Costs &their relationships in short run. **(06 hours)**

Market structure and pricing decisions - Introduction, Perfect Competition, monopoly (Price-Output Determination under Perfect Competition and monopoly in short run and long run); kinked demand curve analysis of price stability(Sweezy'smodel) . **(05 hours)**

Macro-Economic Environment: Index Numbers-Meaning, construction and difficulties in measurement of Index number and its uses: meaning and phases of Trade /business cycle. **(05 hours)**

Banking and inflation-Functions of central bank and methods of credit control: functions of Commercial bank and methods of credit creation, Inflation(Types, effects and methods to control inflation). **(06 hours)**

BOOKS RECOMMENDED:

1. Modern Economic Theory - K.K.Dewett
2. Advance Economic Theory - H. L. Ahuja
3. Macro-Economic Theory - M.L.Jhinagn
4. Business Economics/Advanced Eco. Theory -P.N.Chopra
5. Managerial Economics -D,N,Dwivedi
6. Modern microeconomics A.Koutsoyianni

NOTE: There will be eight questions of 20 marks each, four from each section. Students are required to attempt five questions selecting at least two questions from each section. Use of Calculator is allowed.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER **CREDITS: 3**

BRANCH: ELECTRICAL ENGINEERING

COURSE NO: MOC-603

COURSE TITLE: SWAYAM/NPTEL

DURATION OF EXAM: 3 HOURS

L	T	P	Marks Internal
3	0	0	150

The department shall offer the SWAYAM / NPTEL course (12 weeks) out of the list of courses offered by SWAYAM around the time of commencement of the semester. However, the selected NPTEL course should not be similar to the regular courses offered as a part of the department curriculum.

The overall monitoring of the NPTEL course will be under the supervision of the teacher in charge of the department.

The NPTEL/SWAYAM certification course comprises of Assignments (25%) and Proctor Examination (Online examination MCQ's based = 75%) conducted at the end of the semester by IIT Madras as per the schedule.

The marks obtained by the student in the NPTEL/SWAYAM certification course will be tabulated by the concerned department.

Note: - In case the student does not pass the certification exam or remains absent in the proctor examination, no certificate will be given to the candidate by the NPTEL and the student will be deemed to have failed in the course. The examination of the said NPTEL course will be taken by the department concerned in the next semester under the supervision of Examination Cell of GCET Jammu. The paper will be of 75 marks and assignment marks will be carried forward from the previous semester.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -611
COURSE TITLE: POWER SYSTEM-II LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Measure the capacitance and charging current in three core underground cable and study of various underground cables.
CO2	Find the fault location using Murray loop bridge and determine the positive, negative and zero sequence impedance of 3 phase transformer.
CO3	Calculate fault currents for transmission lines.

Lab Experiments:

Experiment 1 To study the various types of underground cables.

Experiment 2 To measure the core capacitance, core to earth capacitance and charging current in three core underground cable.

Experiment 3 To find cable fault location using Murray loop bridge.

Experiment 4 To determine the positive, negative and zero sequence impedance of 3 phase transformer using 3 phase transformer.

Experiment 5 To analyse and calculate different fault currents that occurs due to the introduction of faults (L-G, L-L, L-L-G) in short transmission lines using 3 phase fault analysis trainer kit.

Experiment 6 To analyse and calculate different fault currents that occurs due to the introduction of faults(L-G, L-L, L-L-G) in medium transmission lines using 3 phase fault analysis trainer kit.

NOTE: **Additional Lab experiments/practical will be performed based on the course contents requirements**.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -612
COURSE TITLE: POWER ELECTRONICS LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	Study the different characteristics of IGBT.
CO2	Perform the operation of half and fully controlled bridge rectifier with different loads.
CO3	Study the commutation techniques, operation of AC voltage regulator and cycloconverters.

Lab Experiments:

Experiment 1 To study the V-I Characteristics of IGBT(Insulated Gate Bipolar Transistor).

Experiment 2 To study the Transfer Characteristics of IGBT(Insulated Gate Bipolar Transistor).

Experiment 3 To study the operation of fully controlled bridge Rectifier with R Load.

Experiment 4 To study the operation of fully controlled bridge Rectifier with R-L load.

Experiment 5 To study the operation of Half controlled bridge Rectifier with R-load.

Experiment 6 To study the operation of Half controlled bridge Rectifier with R-L load.

Experiment 7 To study various Forced Commutation Techniques in all the four Classes A, B, C & D.

Experiment 8 To study single phase AC Voltage Regulator.

Experiment 9 To study the operation of Cyclo converter.

NOTE: **Additional Lab experiments/practical will be performed based on the course contents requirements**.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -613
COURSE TITLE: POWER SYSTEM PROTECTION LAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	To Study the characteristic , working and testing of different relays.
CO2	To study the characteristic of fuse wires and MCBs of different ratings.
CO3	To measure the PT Ratio and phase error using test set and dielectric strength of transformer oil.

Lab Experiments:

Experiment 1 To study the characteristic of static over current relay.

Experiment 2 To study the characteristics of electromechanical over current relay.

Experiment 3 To study the working of Bucholz relay.

Experiment 4 To study the different types of single phase relay test set

Experiment 5 To study the characteristics of fuse wires of different ratings.

Experiment 6 To study the characteristics of MCBs of different ratings.

Experiment 7 To measure PT Ratio & Phase Error by using the PT Test set.

Experiment 8 To measure the dielectric strength of oil using oil testing set.

NOTE: **Additional Lab experiments/practical's will be performed based on the course contents requirements**.

Examination to be held in the Year May 2021,2022,2023,2024

CLASS: B.E. 6th SEMESTER
BRANCH: ELECTRICAL ENGINEERING
COURSE NO.: PEE -614
COURSE TITLE: MATLAB

CREDIT: 1

L	T	P	Marks Practical
0	0	2	50

LABORATORY OUTCOMES **After Completion of this course the student will be able to: -**	
CO1	To study the MATLAB fundamentals
CO2	To study the characteristic of Plotting Commands
CO3	To study and measure the analysis of Direct Current and transient analysis

Lab Experiments:

Experiment 1 To study the Matrix operations

Experiment 2 To study the Array operations

Experiment 3 To study the Complex numbers

Experiment 4 To study the Graph functions

Experiment 5 To study the X-y plots and annotations

Experiment 6 To study the Logarithmic and polar plots

Experiment 7 To study the Nodal analysis

Experiment 8 To study the Loop analysis

Experiment 9 To study the Maximum power transfer

Experiment 10 To study the RC Network

Experiment 11 To study the RL Network

Experiment 12 To study the RLC Circuit

NOTE: **Additional Lab experiments/practical's will be performed based on the course contents requirement.**