PLANNED THEORY SYLLABUS COVERAGE

GP Hamirpur	Department: Electrical Engg.	Subject: ELECTRICAL AND ELECTRONICS MEASUREMENT
	Sem. & Branch: 3rd & Elect. Engg	Duration : 3years
SYLLABUS COVERAGE	Total Periods: Theory:56 Practical:28	

Sr No	Period Nos	Topic	Details	Instruction Reference	Additional Study Recommended	Remarks
1	12(1-12)	**Fundamentals of Measurements**	Measurement: Significance, units, fundamental quantities and standards Classification of Instrument Systems: Null and deflection type instruments Absolute and secondary instruments Analog and digital instruments Static and dynamic characteristics, types of errors, Calibration: need and procedure Classification of measuring instruments: indicating, recording and integrating instruments. Essential requirements of an indicating instruments.			
2	12(13-24)	**Measurement of voltage and current**	DC Ammeter: Basic, Multi range, Universal shunt, DC Voltmeter: Basic, Multi-range, concept of loading effect and sensitivity AC voltmeter: Rectifier type (half wave and full wave) ,CT and PT: construction, working and applications. Clamp-on meter.			
3	10(25-34)	**Measurement of Electric Power**	Analog meters: Permanent magnet moving coil (PMMC) and Permanent magnet moving iron (PMMI) meter, their construction, working, salient features, merits and demerits. Dynamometer type wattmeter: Construction and working Range: Multiplying factor and extension of range using CT and PT Errors and compensations. Active and reactive power measurement: One, two and three wattmeter method. Effect of Power factor on wattmeter reading in two wattmeter method. Maximum Demand indicator			

Sr	Period Nos	Topic	Details	Instruction	Additional	Remarks

No				Reference	Study Recommended	
4	8(35-42)	**Measurement of Electric Energy**	Single and three phase electronic energy meter: Constructional features and working principle, Errors and their compensations. Calibration of single phase electronic energy meter using direct loading.			
5	14(43-56)	**Circuit Parameter Measurement, CRO and Other Meters**	Measurement of resistance: Low resistance: Kelvin's double bridge, Medium Resistance: Voltmeter and ammeter method, High resistance: Megger and Ohm meter: Series and shunt Measurement of inductance using Anderson Bridge (no derivation and phasor diagram) ,Measurement of capacitance using Schering bridge (no derivation and phasor diagram) Single beam/single trace CRO, Digital storage Oscilloscope: Basic block diagram, working, Cathode ray tube, electrostatic deflection, vertical amplifier, time base generator, horizontal amplifier, measurement of voltage/ amplitude/ time period/ frequency/ phase angle delay line, specifications. Other meters: Earth tester, Digital Multi-meter; L-C-R meter, Frequency meter (ferromagnetic and Weston type), Phase sequence indicator, power factor meter (single phase and three phase dynamometer type), Synchroscope, Tri-vector meter, Signal generator need, working and basic block diagram. Function generator: need, working and basic block diagram, function of symmetry.			

Priyanka Kapoor

APPROVED	SIGN HOD/OIC
DATE ----------	

Government Polytechnic Hamirpur
Lecture Planning (Theory)

Branch : **Electrical Engg.** Semester: **3rd**

Subject : **INTRODUCTION TO ELECTRICAL GENERATION SYSTEM** Session: **Aug 24 - Dec 24**

Teacher : **Ms. Parveen Dogra** Cass Room :

Sr. No.	No. of Lectures	Chapter/ Unit Description	Detail of Contents	Reference Resources	Rem
1.	1-12	Thermal Power Plants	Coal, Gas/ Diesel and Nuclear-based Layout and working of a typical thermal power plant with steam turbines and electric generators. Properties of conventional fuels used in the energy conversion equipment used in thermal power plants: Coal, Gas/diesel, nuclear fuels–fusion and fission action. Safe Practices and working of various thermal power plants: coal-based, gas-based, diesel-based, and nuclear based. Functions of the following types of thermal power plants and their major auxiliaries: Coal fired boilers, fire tube and water tube. Gas/diesel based combustion engines. Types of nuclear reactors: Disposal of nuclear waste and nuclear shielding. Thermal power plants in India..	R1,R2,R3	
2.	13-22	Large and Micro-Hydro Power Plants	Energy conversion process of hydro power plant. Classification of hydro power plant: High, medium and low head. Construction and working of hydro turbines used in different types of hydro power plant: a. High head – Pelton turbine b. Medium head – Francis turbine c. Low head – Kaplan turbine. Safe Practices for hydro power plants. Different types of micro- hydro turbines for different heads: Pelton, Francis and Kaplan turbines, .. Locations of these different types of large and micro-hydro power plants in Himachal. Potential locations of micro-hydro power plants in Himachal	-do-	
3.	23-34	Solar and Biomass based Power Plants	Solar Map of India: Global solar power radiation. Solar Power Technology a. Concentrated Solar Power (CSP) plants, construction and working of: Power Tower, Parabolic Trough, Parabolic Dish, Fresnel Reflectors b. Solar Photovoltaic (PV) power plant: layout, construction, working. Biomass-based Power Plants c. Layout of a Bio-chemical based (e.g. biogas) power plant: d. Layout of a Thermo-chemical based (e.g. Municipal waste) power plant e. Layout of an Agro-chemical based (e.g. bio-diesel) power plant, Features of the solid, liquid and gas biomasses as fuel for biomass power plant.	-do-	
4.	35-42	Wind Power Plants Wind Map of India	Wind power density in watts per square meter Layout of Horizontal axis large wind power plant: Geared wind power plant. Direct-drive wind power plant. Salient Features of electric generators used in large wind power plants: Constant Speed Electric Generators: Squirrel Cage Induction Generators (SCIG), Wound Rotor Induction Generator (WRIG) Variable Speed Electric Generators: Doubly-fed induction generator (DFIG), wound rotor synchronous generator (WRSG), permanent magnet synchronous generator (PMSG)	-do-	
5.	43-56	Economics of Power Generation and Interconnected Power System	Related terms: connected load, firm power, cold reserve, hot reserve, spinning reserve. Base load and peak load plants; Load curve, load duration curve, integrated duration curve Cost of generation: Average demand, maximum demand, demand factor, plant capacity factor, plant use factor, diversity factor, load factor and plant load factor. Choice of size and number of generator units, combined operation of power station. Causes, Impact and reasons of Grid system fault: State grid, national grid, brown-out and black-out; sample blackouts at national and international level.	-do-	

Parveen 1/8/24
Signature of Teacher with Date

Signature of HOD (EE)

Reference Resource:

R1:Nag. P. K.Power Plant Engineering, McGraw Hill, New Delhi,
R2. Gupta, B.R., Generation of Electrical Energy, S. Chand& Co. New Delhi,
R3. Gupta, J.B. A Course in Electrical Power– S. K Kataria and Sons, New Delhi. 2014

Govt. Polytechnic Hamirpur (H.P.)
Lesson Planning (Theory)

Branch : ELECTRICAL ENGG
Subject : ELECTRICAL CIRCUITS
Teacher: ARCHIT BHARTI

Semester: 3rd
Session: AUG-2024
Class Room: L1

S.No.	No. of Lectures	Chapter/ Unit Description	Detail of Contents	Reference Resources	Remarks
1	12	**Single Phase A.C Series Circuits**	Generation of alternating voltage, Phasor representation of sinusoidal quantities R, L, C circuit elements its voltage and current response R-L, R-C, R-L-C combination of A.C series circuit, impedance, reactance, impedance triangle, Power factor, active power, reactive power, apparent power, power triangle and vector diagram, Resonance, Bandwidth, Quality factor and voltage magnification in series R-L, R-C, RL-C circuit	**R1,R2**	
2	13	**Single Phase A.C Parallel Circuits**	R-L, R-C and R-L-C parallel combination of A.C. circuits. Impedance, reactance, phasor diagram, impedance triangle R-L, R-C, R-L-C parallel A.C. circuits power factor, active power, apparent power, reactive power, power triangle Resonance in parallel R-L, R-C, R-L-C circuit, Bandwidth, Quality factor and voltage magnification	**R1,R2**	
3	16	**Three Phase Circuits**	Phasor and complex representation of three phase supply, Phase sequence and polarity Types of three-phase connections, Phase and line quantities in three phase star and delta system, Balanced and unbalanced load, neutral shift in unbalanced load. Three phase power, active, reactive and apparent power in star and delta system	**R1,R2**	
4	13	**Network Reduction and Principles of Circuit Analysis**	Source transformation, Star/delta and delta/star transformation Mesh Analysis, Node Analysis	**R1,R2**	
5	16	**Network Theorems**	Superposition theorem. Thevenin's theorem. Norton's theorem Maximum power transfer theorem Reciprocity theorem Duality in electric circuits.	**R1,R2**	

REFERENCE RESOURCES

R1- Ashfaq Husain, Networks & Systems, Khanna Book Publishing, New Delhi
R2- Gupta, B.R; Singhal, Vandana;, Fundamentals of Electrical Network, S.Chand and Co

1/7/24
Signature of Teacher

2/8
Signature of H.O.D

Govt. Polytechnic Hamirpur (H.P.)
Lesson Planning (Theory)

Branch : ELECTRICAL ENGG
Semester: 3rd
Subject : ELECTRONICS DEVICES AND CIRCUITS
Session: AUG-2024
Teacher: ANIL KUMAR JAGOTA
Class Room: L1

S.No.	No. of Lectures	Chapter/ Unit Description	Detail of Contents	Reference Resources	Remarks
1	8	**Semiconductor and Diodes**	Definition, Extrinsic/Intrinsic, N-type & p-type PN Junction Diode – Forward and Reverse Bias Characteristics Zener Diode – Principle, characteristics, construction, working Diode Rectifiers – Half Wave and Full Wave Filters – C, LC and PI Filters	R1,R2	
2	10	**Bipolar Junction Transistor**	NPN and PNP Transistor – Operation and characteristics Common Base Configuration – characteristics and working Common Emitter Configuration – characteristics and working Common Base Configuration – characteristics and working High frequency model of BJT Classification of amplifiers, negative feedback	R1,R2	
3	13	**Field Effect Transistors**	Working Principle, Classification MOSFET Small Signal model N-Channel/ P-Channel MOSFETs – characteristics, enhancement and depletion mode, MOSFET as a Switch Common Source Amplifiers. Uni-Junction Transistor – equivalent circuit and operation	R1,R2	
4	14	**SCR DIAC & TRIAC**	SCR – Construction, operation, working, characteristics DIAC - Construction, operation, working, characteristics TRIAC - Construction, operation, working, characteristics SCR and MOSFET as a Switch, DIAC as bidirectional switch Comparison of SCR, DIAC, TRIAC, MOSFET	R1,R2	
5	11	**Amplifiers and Oscillators**	Feedback Amplifiers – Properties of negative Feedback, impact of feedback on different parameters Basic Feedback Amplifier Topologies: Voltage Series, Voltage Shunt Current Series, Current Shunt Oscillator – Basic Principles, Crystal Oscillator, Non-linear/ Pulse Oscillator	R1,R2	

REFERENCE RESOURCES

R1- Electronics Devices and Circuits by S. Salivahanan, N Suresh Kumar: Mc Graw Hill Education
R2- Electronics Devices and Circuits by Jacob Millman: Mc Graw Hill Education

31/06/24
Signature of Teacher

21/6/25
Signature of H.O.D.