UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA

LESSON PLAN

SUBJECT- Th3. ELECTRICAL MEASUREMENT & INSTRUMENTATION

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DEPARTMENT OF ELECTICAL ENGINEERING (Session: 2020-21)

Lesson Plan				
Theory			Tutorial	
Week	**Lecture Day**	**Topic**	**Tutorial Day**	**Topic**
Week 1	Day 1	**Unit 1: MEASURING INSTRUMENTS** Purpose of Measurement; Specifications of instruments: Accuracy, precision, Errors, Resolutions Sensitivity and tolerance.	Day 1	Deflecting, controlling and of damping arrangements in indicating type of instruments.
	Day 2	Classification of measuring instruments; Important		
	Day 3	Explanations of Deflecting, controlling arrangements in indicating type of instruments.		
	Day 4	Explanations of damping arrangements in indicating type of instruments; Calibration of instruments.		
Week 2	Day 5	CLASS TEST-1 and Revision ofUnit-1	Day 2	Analog ammeter and voltmeter (PMMC type)
	Day 6	**Unit 2: ANALOG AMMETERS AND VOLTMETERS** Description of Construction, principle of operation of permanent magnet moving coil (PMMC) instruments		
	Day 7	Description of errors, ranges merits and demerits of permanent magnet moving coil (PMMC) instruments and Solving Numerical on PMMC Inst.		
	Day 8	Description of Construction, principle of operation of Moving iron type instruments,		
	Day 9	Description of errors, ranges merits and demerits of Moving iron type instruments, and Solving Numerical on Moving iron type instruments.		

Week 3	Day 10	Description of Construction, principle of operation of, errors, ranges merits and demerits of Rectifier type instruments	Day 3	Analog ammeter and voltmeter (MI type)
	Day 11	Description of Construction, principle of operation of Dynamometer type instruments		
	Day 12	Description of errors, ranges merits and demerits of Dynamometer type instruments, and Solving Numerical on Dynamometer type instruments		
Week 4	Day 13	Description of Construction, principle of operation of Induction type instruments	Day 4	Analog ammeter and voltmeter (Induction type)
	Day 14	Description of errors, ranges merits and demerits of Induction type instruments and Solving Numerical on Induction type instruments		
	Day 15	Revision of Unit 2 and Numerical Solve		
	Day 16	**Unit 3: WATTMETERS AND MEASUREMENT OF POWER** Description of Construction, principle of working of Dynamometer type wattmeter. (LPF and UPF type)		
Week5	Day 17	Description of Construction, principle of working of Dynamometer type wattmeter. (UPF type)	Day 5	Wattmeter
	Day 18	Description of Construction, principle of working of Dynamometer type wattmeter. (LPF type)		
	Day 19	The Errors in Dynamometer type wattmeter and methods of their correction		
	Day 20	The Errors in Dynamometer type wattmeter and methods of their correction		
Week 6	Day 21	Induction type watt meters	Day 6	Wattmeter
	Day 22	CLASS TEST-2		
	Day 23	Revision of Unit 3		
	Day 24	**Unit 4. ENERGYMETERS AND MEASUREMENT OF ENERGY** Introduction		
Week 7	Day 25	Single Phase Induction type Energy meters – construction, working principle and their compensation & adjustments	Day 7	Energymeter
	Day 26	Single Phase Induction type Energy meters – construction, working principle and their compensation & adjustments		
	Day 27	Single Phase Induction type Energy meters – construction, working principle and their compensation & adjustments		
	Day 28	Single Phase Induction type Energy meters – construction, working principle and their compensation & adjustments		
Week 8	Day 29	Testing of Energy Meters.	Day 8	Tachometer
	Day 30	Testing of Energy Meters.		
	Day 31	CLASS TEST-3		
	Day 32	**Unit 5. MEASUREMENT OF SPEED, FREQUENCY AND POWER FACTOR** Tachometers, types and working principles		
Week 9	Day 33	Tachometers, types and working principles	Day 9	Frequency meter and Power Factor meter
	Day 34	Principle of operation and construction of Mechanical resonance Type frequency meters		
	Day 35	Principle of operation and construction of Electrical resonance Type frequency meters		
	Day 36	Principle of operation and working of Dynamometer type single phase power factor meters		

Week 10	Day 37	Principle of operation and working of Dynamometer type three phase power factor meters	Day 10	Measurement of Resistance
	Day 38	CLASS TEST-4		
	Day 39	**Unit 6. MEASUREMENT OF RESISTANCE, INDUCTANCE& CAPACITANCE** Measurement of low resistance by potentiometer method		
	Day 40	Classification of resistance; Measurement of medium resistance by wheat Stone bridge method		
Week 11	Day 41	Measurement of high resistance by loss of charge method.	Day 11	Megger and Multimeter
	Day 42	Construction, principle of operations of Megger for insulation resistance measurement.		
	Day 43	Construction, principle of operations of Earth tester for earth resistance measurement.		
	Day 44	Construction and principles of Multimeter. (Analog and Digital)		
Week 12	Day 45	Measurement of inductance by Maxewell's Bridge method. Measurement of capacitance by Schering Bridge method	Day 12	Earth Tester
	Day 46	CLASS TEST-5		
	Day 47	**Unit 7. SENSORS AND TRANSDUCER** Define Transducer, sensing element or detector element and transduction elements.		
	Day 48	Classify transducer. Give examples of various class of transducer		
Week 13	Day 49	Resistive transducer Linear and angular motion potentiometer	Day 13	Sensors
	Day 50	Thermistor and Resistance thermometers. Wire Resistance Strain Gauges		
	Day 51	Inductive Transducer; Principle of linear variable differential Transformer (LVDT) ;Uses of LVDT		
	Day 52	Capacitive Transducer; General principle of capacitive transducer		
Week 14	Day 53	Variable area capacitive transducer. Change in distance between plate capacitive transducer.	Day 14	Transducer
	Day 54	Piezo electric Transducer and Hall Effect Transducer with their applications.		
	Day 55	CLASS TEST-6		
	Day 56	**Unit 8. OSCILLOSCOPE** Principle of operation of Cathode Ray Tube.		
Week 15	Day 57	Principle of operation of Oscilloscope (with help of block diagram).	Day 15	Oscilloscope
	Day 58	Measurement of DC Voltage & current.		
	Day 59	Measurement of AC Voltage, current, phase & frequency.		
	Day 60	Revision class		