Electrical Engineering

UNIT-I:POWER SYSTEM

Transmissionlineparameters;Representation ofshort,medium,andlongtransmission lines – ABCDparameters;CircleDiagram;PerUnitrepresentation;3-Φsystem;Short CircuitStudies;SequenceNetworks;Load-flow Studies – Gauss Seidelmethod, Newton- Raphson Method; Automatic Generation Control; Load-Frequency Control; Automatic Voltage Regulator; Power System Stability – Equal area criteria; Swing Equation; Optimal Load dispatch in Power System. Protection Schemes for Transformer,Generators and Transmission Lines.

UNIT -II:POWER ELECTRONICS AND DRIVES

Characteristicsandratingsofdifferentthyristorfamilydevices,theirturnonandturnoff methodswiththeirprotection,seriesandparallelconnectionofSCRsandtheirderating, controlledsinglephaseandthreephaserectifiersfordifferenttypesofloadviz.R,R-L, R-L-E, single phase and three phase voltage source and current source inverter, cycloconverter,choppers,PWMtechniques,CharacteristicsandprincipleofACandDC machines, Methods of conventional controls and application of static controls and microprocessor based controls for AC and DC machines.

UNIT -III:COMPUTER TECHNOLOGY

Soft Computing (Basics of neural network, fuzzy logic, genetic algorithm, wavelets). Digital Electronics: Adder/Subtractor, Multiplexer/Demultiplexer, Serial and parallel operations; Computer and its Applications: Fundamentals of Computer Architecture (representation of information, control unit, bus organisation, memory, I/O devices), IntroductiontodataStructures(arrays,linkedlist,graphs,queue,stacks),ObjectOriented programming(classes and objects, inheritance, polymorphism), Fundamentals of Operating Systems (Operating System Structure, management of resources**)**,

Fundamentals of Data Communication and Networks.

UNIT:-IV:CONTROLAND INSTRUMENTATION

MathematicalMoldingofphysicalsystems,Transferfunctionoflinearsystems,Steady stateerrorsanderrorconstants,staticerrorcoefficientsTimedomainanalysis,Stabilityof controlsystem,Routh-Hurwitz'sstabilitycriterion.Rootlocusplots,analysisofcontrol system byroot loci. Relationship between time and frequency response, Polar plot, Bode'sPlot,NyquistplotandNyquiststabilitycriterion,RelativeStability,Phaseand GainMargins,ConstantMandNcircle.DesignofFeedbackControllers:DesignofProportional, Integral, Derivative, PI, PID controllers of first, second order systems. Controlloopwithauxiliaryfeedback,Feed forwardcontrol,PracticalControllertuning tips,Ziegler-Nichol'stuningmethods.CompensationdesignusingBodeDiagramand Root Locus technique, Reshaping the Root Locus,CascadeLag,LeadandLag-Lead compensators.SateVariableconcepts,Statemodel,Statetransition matrix,conversionof state-variable modes to transfer functions, conversion of transfer function to canonical state-variablemodels, solutionof state equation, concepts of controllabilityand observability. StabilityImprovementby statefeedback,Necessaryandsufficient conditionsforarbitrarypoleplacement,State regulatortheory,designofstateobserver, Servodesign:Introductionofreferenceinputby feedforwardcontrol.Recentadvancesin control system design technologies.

Classification of Instruments, Moving iron, Moving Coil, Permanent magnet, and Dynamometer types. Thermal, Electrostatic Rectifier Instruments,transforms,CT,PT, Powermeasuringinstruments,powerfactor,frequencymetersand synchroscope. Measurementoflow,mediumandhighresistancesAC andDCmeasuringbridges, Magnetic measurement. General Transducers voltage, currant, phase angle, optical, Hall effect and Industrial transducers Electronic voltmeters, Vacuum Tube Voltmeter (VTVM),dataacquisitionsystem,spectrumanalyses,sensors Measuringorsensing devising in different application, Generalized performance characteristics of the measuringinstruments.Physicalandchemical sensors,Principleofworkingofphysical andchemicalsensors, interfaceelectronicscircuitsforinstruments/sensorfordata manipulation,

transmission and recording Computer aided measurement of voltage current power energy frequency phase angle. High voltage measurement.

UNIT -V:ELECTRONICS ANDCOMMUNICATION

Biasingandbiasstabilityof transistorandFETamplifiers.Amplifiers:single-andmulti- stage, differentialand operational, feedback, and power. Frequency responseof amplifiers. Simple op-amp circuits. Filters.Function generatorsand wave-shaping circuits,555Timers.Powersupplies.Logicgates;digitalICfamilies(DTL,TTL,ECL, MOS, CMOS). Combinatorial circuits: arithmetic circuits, code converters, multiplexers, decoders,PROMsandPLAs.Sequentialcircuits:latchesandflip-flops,countersand shift-registers. Sample and hold circuits, ADCs, DACs. Operational Amplifiers and other analog ICs., Semiconductor memories. Microprocessor(8085):architecture,programming and I/O interfacing.

Amplitude and angle modulation and demodulation systems, spectral analysis of these operations, superheterodyne receivers.Signal-to-noiseratio (SNR) calculationsfor amplitude modulation (AM) and frequency modulation(FM)forlownoiseconditions.Fundamentals of information theory and channel capacity theorem. Digital communicationsystems:pulsecodemodulation (PCM), differentialpulsecode modulation(DPCM),digitalmodulation schemes:amplitude,phaseandfrequency shift keyingschemes(ASK,PSK,FSK),matchedfilterreceivers, bandwidthconsiderationand probability oferrorcalculationsfortheseschemes.BasicsofTDMA,FDMAandCDMA and GSM.