DepartmentofElectricalEngineering

SubjectCode:EE22841SubjectName:ELECTRICALWORKSHOP&DESIGN-IISession:2023-2024

Faculty:

LessonPlan

S.No.	Topic	No.oflab required	COs	POs	PSOs
1	INTRODUCTIONOFTOOLS, ELECTRICAL MATERIALS,SYMBOLSANDABBREVIATIONS.	1	CO1	1,2	1
2	TOMAKET JOINT ANDSTRAIGHT JOINT.	1	CO1	1	1
3	TOSTUDYSTAIRCASEWIRING.	1	CO1	2	1
4	TOSTUDYHOUSEWIRING.	2	CO1	2	1
5	TOSTUDY FLUORESCENT TUBE LIGHT.	2	CO2	3,4	1
6	TOSTUDYHIGHPRESSUREMERCURY VAPOUR LAMP(H.P.M.V.).	2	CO3	4	1
7	TOSTUDYSODIUMVAPOURLAMP.	2	CO3	4	1
8	TO STUDY REPAIRING OF COSTING AND ESTIMATIONOFTHE SYSTEM.	2	CO3	3	2
9	TOSTUDYREPAIRINGOFFAN MOTOR.	3	CO3	3,4	2
10	TOSTUDY THE EARTHING OFTHE HOUSES.	1	CO1	3	2

POMapping

PO Mapped	COs	noofLAB	%ofLAB	Mapping strength
PO1	CO1,CO3,CO4	8	20	1
PO2	CO1,CO2,CO5	9	23	1
PO3	CO2, CO3,CO4,CO5	15	38	2
PO4	CO2, CO3,CO5	13	33	2
PSO1	CO1, CO2,CO3,CO4,CO5	26	65	3
PSO2	CO3,CO4,CO5	11	28	2
PSO3	CO5	3	8	1

MappingstrengthCriteria	Level
>=40%	Level-3
25to 40%	Level-2
5 to 25%	Level-1
<5%	Level-0

DepartmentofElectricalEngineering

EE32008 Electrical Machies-II

Faculty: Mr. Abhishek Dubey

LessonPlan

S.no	Unit	Topic	No.oflectures	CO	PO	PSO
1	1	Comparativeanalysisofcylindricalrotormachineandsalientpole	1	CO1	PO1	1
2	1	Salientpolemachine-Tworeactiontheory,analysisofphasordiagram,	1	CO1	PO1,PO2	1
3	1	Poweranglecharacteristicsofsalientpolesynchronousmachine	1	CO1	PO2	1,3
4	1	Paralleloperationofalternators	1	CO1	PO3,PO6, PO7	1,3
5	1	Synchronizationofalternators-darklampmethod	1	CO1	PO4	1
6	1	Synchronizationofalternators-synchronoscope	1	CO1	PO4	1
7	1	Effectofchangingmechanicaltorqueandexcitation.	1	CO1	PO4	1,2
8	1	Loadsharingbetweentwoalternators,Capabilitycurve	1	CO1	PO3,PO7	1,3
9	1	Numericalproblemsassociatedwithparalleloperationofalternators	1	CO1	PO1,PO2	1
10	2	Hunting,damperwindingsinsychronousmachines	1	CO2	PO1,PO2	1
11	2	Varioussequencereactanceofasynchronousmachine-Introduction	1	CO2	PO2	1
12	2	Varioussequencereactanceofasynchronousmachine-Analysis	1	CO2	PO2,PO4	1,2
13	2	Directandquadratureaxistransientandsubtransientreactance	1	CO2	PO2,PO4	2
14	2	Negativesequencereactanceandzerosequencereactanceandtheirutility,	1	CO2	PO2,PO4	2
15	2	Sliptest-determinationofxdandxq	1	CO2	PO3	2
16	2	Numericalproblemsassociatedwithvariousreactancesofsynchronousmachines	1	CO2	PO2,PO3	1
17	3	OperationofinductionmotoronunbalancedsuppliesandNon-Sinusoidal supplies-Introduction	1	CO3	PO2	1
18	3	OperationofinductionmotoronunbalancedsuppliesandNon-Sinusoidal supplies-Analysis	1	CO3	PO2,PO4	1,2
19	3	Productionoftimeandspaceharmonicsandtheireffect-Introduction	1	CO3	PO3	1
20	3	Productionoftimeandspaceharmonicsandtheireffect-Analysis	1	CO3	PO3	1,3

21	3	Harmonictorques,motorde-rating,	1	CO3	PO4	1,3
22	3	Slip-powerrecoveryschemesforthreephaseinductionmotor	1	CO3	PO2,PO4	1
23	3	Numericalproblemsbasedonanalysisofthreephaseinductionmotor	1	CO3	PO2	1
24	4	IntroductiontospecialmotorsandfractionalHPmotorsandtheirapplication	1	CO4	PO1,PO2	1,2
25	4	Singlephaseinductionmotoroperation-doublerevovlingtheory	1	CO4	PO2	1,2
26	4	Singlephasemotors-methodsofstarting	1	CO4	PO2,PO3	1
27	4	Equivalentcircuitanditsanalysiswithexample	1	CO4	PO2,PO4	1,2
28	4	Principleandworkingofsteppermotors,	1	CO4	PO1,PO2	1
29	4	Variousconstructiontechniques,controlofsteppermotors,	1	CO4	PO3,PO4	1
30	4	Staticanddynamiccharacteristics	1	CO4	PO2,PO3	1
31	4	Constructionalfeatures,analysisandoperationofACseriesmotor,	1	CO4	PO1,PO2	1
32	4	ApplicationofACseriesmotor,UniversalMotor	1	CO4	PO2	1,2
33	4	Numericalproblemsbasedonanalysisofspeacialmotors	1	CO4	PO2,PO6	1
34	5	Inductionmachineasagenerator-Introduction	1	CO5	PO2	1
35	5	Inductionmachineasagenerator-Constructionalfeatures,operatingprincipl	1	CO5	PO2,PO7	2,3
36	5	Characteristicsandapplicationsof:Inductiongenerator,	1	CO5	PO4,PO6, PO7	2,3
37	5	DoublyfedInductionGenerator,Self-excitedinductiongenerator	1	CO5	PO3,PO6	2,3
38	5	Inductionmachineasaninductionregulator	1	CO5	PO3	1
39	5	Numericalproblemsbasedonanalysisofinductiongenerator	1	CO5	PO2	1
40	5	Numericalproblemsbasedonanalysisofinductionregulator	1	CO5	PO2	1
		TotalLectures	40			

ELECTRICAL ENGINEERING DEPARTMENT
B.Tech. THIRD YEAR SEM A (4 YDC)
EE 32009: CONTROL SYSTEM

CourseOutcomes

EE32009(T).1: Develop mathematics models (TF and state space) of various physical systems.
EE32009(T).2: Define time domain and frequency domain specifications of a control system.
EE32009(T).3: Determine stability of a control system using time domain techniques and design appropriate controller for a given problem.
EE32009(T).4: Propose alternate solution via compensator design to get desired frequency domain specifications.
EE32009(T).5: Explain concepts of controllability and observability as well design of state feedback controller.

Unit No.	Topics	Numberof lectures	CO Mapping	PO	PSO
1	Introduction	1	CO1	1	1
	ModellingofDynamicSystems and Simulation	1	CO1	2,3	1
	conceptoftransferfunction,Block diagram reduction method	1	CO1	2	1
	Signal flow graph method	1	CO1	3,5	1
	Analoguesimulation,linearity, impulse response	1	CO1	2	1
	Mason's gain formula	1	CO1	2	1
	a-c and d-c Servomotors, servo-amplifiers (a-c & d-c) using	1	CO1	1,4	1
	Gyro, Resolver component study	1	CO1	4	1

	Conceptandmathematicaltheory of feedback, return ratio, return	1	CO1	3	1
	understanding the necessity of feedback as real control action supplementedbyasmallexample	1	CO1	3	1
2	Time-Domain Analysis of FeedbackControlSystemswith Typical reference test signals	1	CO2	2	1
	transientbehaviourProportional plus derivative	1	CO2	2	1
	ratefeedbackcontrolactionsfor improving the transient response	1	CO2	2,3	1
	Steady state behaviour	1	CO2	2,4	1
	Types of open loop transfer functions,Steadystateerrors	1	CO2	2	1
	improvement of steady state errors	1	CO2	2,3	1
3	Frequency-DomainAnalysisof Feedback Control system	1	CO2	4	1,2
	Conceptoffrequency-domain analysis, Bode plots	1	CO2,3	3,4	1,2
	Numerical Exmple	1	CO3,4	3,4	1
	Polar plots	1	CO3	4,5	1,2
	Bodeofclosedlooptransfer function Mp	1	CO3,4	3,4	1
	SystemsBode plots of error transfer functions, Principle of	1	CO3,CO4	4	1

	Nyquist criteria	1	CO3	4,5	1
	Conditionallystableclosedloop systems	1	CO3	3	1
	Transportationlag,ConstantMand constant N loci	1	CO3	5	1
	Root locus and example	1	CO3	3,4	1
4	CompensationTechniques,need, Different types of compensation	1	CO4	4	2
	Phase-leadandPhase-lag compensation	1	CO4	4,5	2
	Designofcompensatingnetworks for the desired frequency-domain	1	CO4	3,4	2
	Examples	1	CO4	3,4	2
5	Fundamentals of state space: conceptofstateandstatevariable.	1	CO5	1,2	1
	Representationoflinearsystem through state dynamics	1	CO5	1,2	1
	CalculationofEigen-valuesand Eigen-vectors	1	CO5	1,2	1
	Modalmatrix,Modal transformation	1	CO5	1,2	1
	Elementary understanding controllabilityandobservability,	1	CO5	5	1
	BIBOstability,asymptoticstability	1	CO5	2	1
	Routh-Hurwitz stability analysis	1	CO2,3	2	1

	Nyquiststabilityanalysisand relative stability	1	CO2,3	2	1,2
	statefeedbackcontrol.-conceptof stability, gain margin and phase	1	CO3	2,3	1
	Total	40			

DepartmentofElectricalEngineering

SubjectCode:EE42704SubjectName:OPTIMIZATIONTECHNIQUESAPPLIEDTOPOWER SYSTEM

Session:2023-2024 Faculty:MrVineetMishra Lesson Plan

S.No.	Topic	No. of lecture required	COs	POs	PSOs
1	Introduction,history & classification of operationresearch and Optimization techniques	1	CO1	1	1
2	Optimization techniques, Fundamentals of optimization techniques, Definition-Classification of optimization problems	1	CO1	1	1
3	Unconstrained & Constrained Optimization approach with example	2	CO1	1,2	1
4	Formulatevariousobjectivefunction,Definitionofoptimality, optimality Conditions	2	CO1	1,2	1
5	Classical & Modern optimization techniques	2	CO1	1	1
6	Linear programming: Introduction & definition, Examples of linear programming	2	CO2	1,2	1
7	Simplex Method I, Fundamental of simplex method & theorem of linear programming	2	CO2	1	1
8	Standard&CanonicalformofSimplexMethod,Weakandstrong duality theorems	2	CO2	1	1
9	Analytical&GraphicalmethodofLPP,developaLPmodelfrom problem description.	3	CO2	1,4	2
10	Integer Linear programming problem & Network flow	1	CO2	1,2	2
11	Non-linear Programming: Introduction Comparison oflinear & Non-linear programming problem	2	CO3	1	1
12	Unconstrained & Constrained problems of Maxima and Minima, Equality andinequality constraints	2	CO3	1,2	1
13	Lagrangian Method with example	2	CO3	1,2	2

14	KuhnTuckerconditionswith example	2	CO3	1,2	2
15	GeneticAlgorithm:IntroductiontogeneticAlgorithm,Workingprincipleof Genetic Algorithm	1	CO4	1	1
16	Evolutionary Strategy and Evolutionary Programming, Genetic Algorithm & Flow chart	2	CO4	1,2,4,12	3
17	Genetic Operators-Selection, Crossover and Mutation fitness function.	2	CO4	1	2
18	Similaritiesanddifferencesbetween GAandtraditional methods, Unconstrained and constrained optimization using Genetic Algorithm.	2	CO4	1	2
19	Introduction & History of Particle Swarm Optimization, Fundamental Principle-Position&VelocityUpdating-AdvancedOperators-Parameter selection	2	CO5	1,2	1
21	Particle Swarm Optimization algorithm & Flow chart, Particle Swarm OptimizationalgorithmincludingIWAand CFA	2	CO5	1,2,4,12	2
22	HybridapproachesofGeneticAlgorithm&ParticleSwarmOptimization, Hybrid ofEvolutionary Programming andParticle Swarm Optimization, Binary,discreteandcombinatorial.	3	CO5	1,12	3
	Total	**40**			

B.TechThirdYear(4YDC)ElectricalEngineering
LessonPlan
Subject:EE32510HybridEnergySystem
Class:B.TechIIIYearElectrical

Lect No	Topic	CO
1	Introduction and Fossil fuel basedsystems	
2	Impactoffossilfuelbasedsystemsandenvironmental effects	
3	Greenhousegasemission,Non-conventionalenergy–seasonal variationsandavailability	CO1
4	Renewable energy–sourcesand features	
5	Hybridenergysystems,	
6	Distributedenergysystems anddispersedgeneration (DG)	
7	Distributedenergysystems anddispersedgeneration (DG)	
8	Solar radiationspectrum	
9	Technologies and Applications suchas heating, cooling, drying,power generation	
10	SolarPhotovoltaic systems:Operatingprinciple	
11	Photovoltaiccellconcepts	
12	Cell,module,array,Series andparallel connection	CO2
13	Electricalmodels	
14	Efficiencylimits	
15	Maximumpower point tracking	
16	Impactoftemperatureand applications	
17	Grid tiedandstand-alonesystems	
18	WindpatternsandwinddataandSiteselection	
19	Typesof wind mills	
20	Power inthewind andBetzlimit	
21	Wind turbineelectricalsystems	CO3

22	Constant and variablespeed models	
23	Characteristicsofwindgenerators	
24	Maximumpower point tracking	
25	Interfacingto the grid,gridtiedandstand-alonesystems.	
26	Energystorage systems.	CO4
27	OperatingprincipleandComponentsofamicrohydelpower plant	
28	TypesandcharacteristicsofturbinesandSelectionand modification	
29	Loadbalancing.Operatingprincipleof biomass,	
30	Combustionandfermentation,anaerobic digester,Wood gassifier,Pyrolysis,applicationincombustion engine,	
31	stand-aloneplants.	
32	HybridEnergySystems,blockdiagram,	CO5
33	NeedforHybridEnergySystems,RangeandtypeofHybrid Energysystems	
34	Wind-solarHybridstand-aloneEnergySystems	
35	Wind-solarHybridstand-aloneEnergySystems	
36	Wind-HydroHybridstand-aloneEnergySystems.	
37	Wind-HydroHybridstand-aloneEnergySystems.	
38	Examples	

B.TechThirdYear(4YDC)ElectricalEngineering
LessonPlan
Subject:EE32284ReliabilityEngineering
Class:B.TechIIIYearElectrical

Lect No.	Topic	CO
1	Introductiontoreliabilityandindices.	CO1
2	Introductiontoreliabilityandindices.	
3	Reviewofprobabilitytheory.	
4	Reviewofprobabilitytheory.	
5	Densityanddistributionfunctionofcontinuousrandom variable.	
6	Densityanddistributionfunctionofcontinuousanddiscrete randomvariable.	
7	Densityanddistributionfunctionofdiscreterandomvariable.	
8	Componentreliability	CO2
9	Hazardfunction,failurelaws	
10	Exponentialfailurelaw	
11	Wearinperiodanditsimportance.	
12	Safetyandreliability	
13	Replacement	
14	Methodsofreliabilityimprovement	
15	Reliabilityevaluationofseriesnetwork	CO3
16	Reliabilityevaluationofparallelnetwork	
17	Reliabilityevaluationofseries–parallelnetwork	
18	Complexnetworkreliabilityevaluationusingeventspace method	
19	Complexnetworkreliabilityevaluationusingdecomposition andtie-set,	
20	Complexnetworkreliabilityevaluationusingcut-set.	
21	MontecarlosimulationtechniqueandconvergenceinMonte carlosimulation.	
22	Standbysystemandloadsharingsystem,	
23	Multistatemodels.	
24	Markovprocess,Statediagram,	CO4
25	Availabilityandunavailabilityfunction.	
26	Evaluationoftimedependentandlimitingstateprobabilities.	
27	MTTFcalculation.	
28	Conceptoffrequencyanddurations.	
29	Stateenumerationmethodforevaluatingfailurefrequency	
30	MUT,MDT,	

31	frequencybalanceapproach.	
32	Practiceexamples	
33	Practiceexamples	
34	Reliabilitytesting	CO5
35	estimationofreliabilityfunction	
36	failurefunctionandMTTFfromgroupeddata	
37	failurefunctionandMTTFfromungroupeddata	
38	censoringandaccelerations,parametricmethods	
39	Practiceexamples	
40	Practiceexamples	

DepartmentofElectricalEngineering

SubjectCode:EE4XXXXSubjectName:SMARTGRID:STRUCTURE,MONITORINGAND

Session:2023-2024 Faculty:

Lesson Plan

S.No.	Topic	No.of lecture	COs	POs
1	IntroductiontoSmartGrid	1	CO1	1
2	Definitionofsmartgrid,needforsmartgrid	1	CO1	1
3	Smartgriddomain,enablersofsmartgrid.	1	CO1	1
4	Smartgridpriorityareas	1	CO1	1
5	Regulatorychallenges	1	CO1	1,2
6	Smart-gridactivitiesinIndia	1	CO1	1,2,3
7	SmartGridArchitechture	1	CO2	1,3
8	ThefundamentalcomponentsofSmartGriddesigns inTransmissionAutomation	2	CO2	2,3
9	SmartGriddesignsinDistributionAutomation	2	CO2	2,3
10	GeneralViewoftheSmartGridMarketDrivers, StakeholderRolesandFunction	2	CO2	2,6
11	WorkingDefinitionoftheSmartGridBasedon PerformanceMeasures,	2	CO2	2,3,4
12	RepresentativeArchitecture,FunctionsofSmartGrid Components	2	CO2	4,5
13	ComputationalTechniques–StaticOptimization TechniquesforpowerapplicationssuchasEconomic load dispatch	2	CO3	4,5
14	DynamicOptimizationTechniquesforpower applicationssuchasEconomicloaddispatch	2	CO3	4,5
15	ComputationalIntelligenceTechniques– EvolutionaryAlgorithmsinpowersystem	2	CO3	4,5
16	ArtificialIntelligencetechniquesandapplicationsin powersystem.	2	CO3	4,5
17	IntroductiontoCommunicationTechnology,Two WayDigitalCommunicationsParadigm,	2	C04	6,7
18	SynchroPhasorMeasurementUnits(PMUs)	2	CO4	3,4
19	WideAreaMeasurementSystems(WAMS)	2	CO4	3,4
20	IntroductiontoInternetofthings(IoT)-Applications ofIoTinSmart Grid	1	CO4	4,5,6
21	Activedistributionnetworks	2	CO5	3,4
22	Microgrids,distributionsystemautomation	2	CO5	5,6,7
23	Reliabilityandresiliencystudies	2	CO6	3,4

24	Smartcitypilotprojects,essentialelementsofsmart cities.	2	CO6	11,12
	Total	**40**		

POMapping

PO Mapped	**COs**	**noofLec**	**%of lec**	**Mapping strength**
PO1	CO1,CO2	7	18	1
PO2	CO1,CO2	10	25	1
PO3	CO1,CO2,CO4,CO5,CO6	16	40	2
PO4	CO2,CO3,CO4,CO5,CO6	21	53	3
PO5	CO2,CO3,CO4,CO5	13	33	2
PO6	CO2,CO4,CO5	7	18	1
PO7	CO4,CO5	4	10	1
PO11	CO6	2	5	1
PO12	CO6	2	5	1
PSO1	CO1,CO2,CO4,CO5,CO6	19	48	3
PSO2	CO1,CO2,CO3	15	38	2
PSO3	CO1,CO4,CO6	6	15	1

MappingstrengthCriteria	Level
>=40%	Level-3
25to 40%	Level-2
5 to 25%	Level-1
<5%	Level-0

LessonPlan
SubjectName:PowerSystemPlanning
Elective-II EE 32603
B.E.IIIyear

Course Outcomes

EE32603(T).1: Usetoolstoanalyzepowersystemplanningandload forecasting.
EE32603(T).2: Evaluatethesignificanceofgenerationplanningforpower systemreliability.
EE32603(T).3: Developplanfordesignandcalculationofdistributedpower system.
EE32603(T).4: Evaluatetherequirementforinterconnectedsystemand expansion of power system under cost consideration and expansion obligations.
EE32603(T).5: Determineloadmodelforreactivepowerplanningofdistributed generation system.

Unit	Lecture No.	Topics	Numberof lectures	COMapping
1	1	Introduction	1	3
	2	Nationaland regional planning,	1	2
	3	structureofpowersystem,	1	2
	4	planningtools,Stagesin planninganddesign,	1	2
	5	powersystemplanningissues,	1	1,2
	6	Loadforecasting,forecasting techniques,	1	1
	7	Electricityconsumption pattern,	1	1
	8	Peak demand energy forecastingbytrendand economicprojectionmethods.	1	1
2	9	Integratedpowergeneration	1	2
	10	co-generation/captivepower,	1	2
	11	powerpoolingandpower trading,	1	2
	12	Probabilisticmodelsof generatingunits,	1	3
	13	Growthrate,Rateof generationcapacity,	1	3
	14	Outageperformanceofsystem	1	2
	15	Systemevaluationoflossof load and loss of energy indices,	1	2

	16	Powersupplyavailability assessment.	1	2
3	17	Developmentofadistribution plan,	1	1,2,3
	18	typesofdistributionsystems arrangements,	1	3
	19	primarydistribution design,	1	3
	20	secondarydistributiondesign,	1	3
	21	calculationofdistributor sizes,	1	3
	22	Optimalconductorselection,	1	3
	23	Capacitorplacement,	1	3
	24	Reconfiguration,	1	3
	25	Substation planning.	1	2
4	26	Multiareareliabilityanalysis,	1	4
	27	Powerpooloperationand powerexchangeenergy contracts,	1	2,4
	28	Quantification of economic andreliabilitybenefitsofpool operation.	1	5
	29	PowerSystemexpansion planningmethods	1	4
	30	optimalPowersystem expansionplanning	1	4
	31	generationexpansion	1	4
	32	transmissionanddistribution expansion	1	4
	33	costconsiderationand expansionobligations	1	5
	34	RegulatoryIncentives	1	5
5	35	Staticanddynamicresource allocationand sizing	1	5
	36	modelingandeconomicissues pertaining to reactive power planning,	1	5
	37	planningfromthedistributed powersystemperformance	1	4
	38	distributed generation,	1	3
	39	effectofloadmodelin distributedgeneration planning	1	2
	40	researchtrendsinpower systemplanning	1	2

ShriG.S.InstituteofTechnologyandScience,Indore(MP)
DepartmentofElectricalEngineering
EE32005:MicroprocessorandOperatingSystem

LecturePlan

Lect#	Unit#	learningcontents	CO
1	1	Registertransfer,BusandMemoryTransfer,	CO1
2		Arithmeticmicro-operations,Four-bitarithmeticcircuit,	
3		logicmicro-operations,Shiftmicro-operation.	
4		SinglestageofALU.Evolutionanddevelopmentofmicroprocessor,	
5		internalorganizationof8-bitmicroprocessor8085,	
6		Systemclock,buscycle,timingdiagram	
7	2	Typesofmainmemory,	CO2
8		RAM/ROMinterfaceandaddressingdecodingtechnique.	
9		MemoryMappedI/OandPeripheralsI/O	
10		Serial I/O	
11		Serial I/O	
12	3	Softwaremodel,addressingmodes,	CO3
13		instructionset,assemblyandmachinelanguageprogramming,	
14		instructionset,assemblyandmachinelanguageprogramming,	
15		Counters,Timedelays.	
16		Counters,Timedelays.	
17		Stack	
18		Subroutines	
19		Interrupts	
20		Interrupts	
21	4	ProgrammablePeripheralInterface(8255),	CO4
22		ProgrammablePeripheralInterface(8255),	
23		Programmertimer(8254)	
24		KeyboardandDisplaycontroller(8279)	
25		ADC/DAC	
26		DMA controller(8237),	
27	5	Typesofoperatingsystem,services,	CO5
28		utilities,systemcalls	
29		Diskallocationmethods,	
30		disk schedulers	
31		CasestudyofUNIXandDOS.	
32		ProcessConcept,Schedulingconcept	
33		TypesofSchedulers,ProcessStateDiagram,SchedulingAlgorithms	
34		PagingSegmentation,PagedSegmentation	
35		DemandPaging	