EE-366 Power Engineering (3-0)

1. Course Information	
CourseNumberand Title:	EE-366Power Engineering
Credits:	3 (3+0)
Instructor(s)-in-charge:	
Course type:	Lecture
Requiredor Elective:	Elective
Coursepre-requisites	-
Degree and Semester	
Month andYear	

2.

CourseSchedule	
Lecture:	3hrs/week,Meets twice weekly
Lab:	Nil
Discussion:	1 hrs/week
Office Hours:	3hrs/weekbyinstructor.

3. Course Assessment		
Exam:	OneMid Termand 1Final Examination	
Homework:	3 -4 Assignments	
Lab reports:	Nil	
Design reports:	-	
Quizzes:	3-5 Quizzes	
Grading:	Quizzes:	10%
	Assignments:	10%
	One Mid Term:	30%
	FinalExam:	50%
	SemesterProject/Lab:	25%

4. CoursebookandRelatedCourse Material

Textbooks:	• TheodoreWildi;ElectricalMachines,DrivesandPowersystems, 6th Ed., Prentice Hall 2007, ISBN 8131708152 • VKMehta;PrinciplesofPowerSystem,MulticolorEd.,S. Chand, 2012
ReferenceBooks:	S N Singh; Electric Power Generation, Transmission & Distribution,2ndEd.,PrenticeHall,2008,ISBN81-203-2192-8

5. CourseDescriptions

BasicconceptsofPowerSystems,Generationofelectricalenergy,VarioustypesofPowerPlants, Renewableenergyresources,TypesofconductorsforTransmission,TransmissionLine constants, MechanicalDesign,CoronaeffectandBundledconductors,PowerDistribution,DCandAC distribution,Substations,Circuitbreakers,fusesandrelays,Earthing,PowerFactorcorrection, Cables.

6. CourseObjectives

The course has been designed for thestudents to enable themacquire a comprehensive knowledge of Electrical Power system. It covers Generation, Transmission, Distribution and Protection of Power system.

	Topics	BookChapter	CLOs	Weeks
	Introduction • Basic Concepts: • Power system layout diagrams, • the per unit quantities • Single– line diagram, • Restructuring of Power Systems, •	1	1	Week-1
	• Single– line diagram, • Restructuring of Power Systems,	1	1	Week-2
	• Smart Grid, Distributed Generation • Renewable and non-renewable Energy Resources:	1	1,2	Week-3
	Generating Stations • GenerationofElectricalEnergy: • Base,intermediateandPeakLoadPower	2	1, 2	Week-4

	Stations			
	• Equipment of power station, • Conventional methods of Power Generation,	2	1, 2	Week-5
	Supply Systems, Mechanical Design of Overhead Lines • Power Transmission: • Over Head Power Transmission Lines, • Material and types of transmission line conductor, • Stranded and Bundled conductors,	7,8	2	Week-6
	• Transmission line Components, • Coronaeffect, • RFinterference, • Mechanicaldesignoftransmissionline, Sag and Tension.	7,8	2	Week-7
	Introduction to Switchgear • TypesofSubstations: • Substationlayout, • Bus-bararrangements	16	3	Week-8
	MID TERM			
	Electrical Design of Overhead Lines, Performance of Transmission Lines • ElectricalDesignoftransmissionlines: • Resistance,InductanceandCapacitanceof • transmissionlines; • SkinandProximityandFerrantieffects,Classificationof transmission lines,	9, 10	2, 3	Week-10
	Distribution Systems • Distributions: • OverheadandUndergrounddistribution,relatedmeritsandsafety issues, •	12, 13, 14	2, 3	Week-11
	• RadialandRingMainsystems, • DC2-wireand3-wiresystem, A.C distribution.	12, 13, 14	2,3	Week-12
	Neutral Grounding • Earthing: • Types of system earthing, • Distribution transformer neutral earthing, • Humansafety,earthingresistance,LightningandTowerearthing	26	3	Week-13
	Power Factor Improvement	6	4	Week-

	• PowerFactorandHarmonics: • Disadvantagesandcausesoflowpowerfactor, • Methodsforimprovement, • Harmonicsinpowersystems,theireffectsandmitigation			14
	Fuses, Protective Relays • Protection: • Circuit breakers, fuses & relays: • Requirement of protection, • Fuses andtheirtypes,	20, 21	4	Week-15
	• Functionofswitchgear, • ThermalandElectromechanicalrelays, • Types of Circuitbreakers,Arcextinctionincircuitbreakers	20, 21	4	Week-16
	Underground Cables • Cables: • Underground Cables, • Construction and classifications, • Types of cable faults, Sub-marine cables.	11	4	Week-17
Final Term				

8. CourseOutcomesandtheirRelationtoProgramOutcomes(Mapping CLO to PLO)

CourseLearningOutcome (CLOs)		PLOs	Learning Level	Week
CLO 1	ExplainthekeyconceptsofElectricalPowerSystemEngineering	1	C2	1-4
CLO 2	Analyzeacomplexproblemusinglogicalapproachbasedonknowledge and data	2	C4	5-8
CLO 3	Applyknowledgetoproposeeffectivedesigningapproachfor: Generating plants/Transmission lines/Distribution systems/Earthing/Power factorimprovement systems/Protection/Cables	3	C3	9-11
CLO 4	Understand the environmental and human safetyissues related to Power Generation/Transmission/Distribution.	7	C2	12-18

9. MappingofCLOstoProgramLearningOutcomes

PLOs/ CLOs	CLO 1	CLO 2	CLO 3	CLO4
PLO:1(Engineering Knowledge)	C2			
PLO:2(ProblemAnalysis)		C2		
PLO:3(Design/Developmentof Solutions)			C3	
PLO:4 (Investigation)				
PLO:5(ModernTool Usage)				
PLO:6(TheEngineerand Society)				
PLO:7(EnvironmentandSustainability)				C4
PLO:8(Professional Ethics)				
PLO:9(IndividualandTeam Work)				
PLO:10 (Communication)				
PLO:11(Project Management)				
PLO:12(Lifelong Learning)				