

Kadi Sarva Vishvavidyalaya, Gandhinagar
Bachelor of Engineering (Electrical Engineering Syllabus)
ELECTRICAL POWER-I
B.E. SEM – IV SUBJECT CODE: EE-406

Course Objective:

- To present a problem oriented introductory knowledge of Economics and planning of Electrical Engineering systems.
- To understand basic concepts of National Economic growth of Electrical power system.
- To understand Energy generation and benefit of all system analysis.

A. Teaching / Examination Scheme

SUBJECT		Teaching Scheme				Total Credit	Examination Scheme					Total Marks
		L	T	P	Total		THEORY		IE	CIA	PR. / VIVO	
CODE	NAME	Hrs	Hrs	Hrs	Hrs		Hrs	Marks	Marks	Marks	Marks	
EE-406	ELECTRICAL POWER-I	3	0	0	3	3	3	70	30	20	00	120

Steam power station:

Schematic arrangement, advantages and disadvantages, choice of site, efficiency of steam power station, Types of prime movers, characteristic, speed control & auxiliaries. Environmental aspects for selecting sites and locations of thermal power stations.

Hydro power station:

Schematic arrangement, advantages and disadvantages, choice of site constituents of hydro power plant, Hydro turbine. Environmental aspects for selecting sites and locations of hydro power stations

Nuclear power station:

Schematic arrangement, advantages and disadvantages, selection of site, types of reactors, Hazards Environmental aspects for selecting sites and locations of nuclear power stations.

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Gas turbine power plant:

Schematic arrangement, advantages and disadvantages. Combined cycle power plant: Combined cycle power plant, Comparison of various power plants

Distribution:

Overhead & underground transmission of power, Types of distribution systems, types of cables & their construction, Types of conductors. Types of insulators, string efficiency

Transmission line parameters:

Inductance of 1-phase, two-wire line and composite conductor lines, inductance of 3-phase line with symmetrical and unsymmetrical spacing with and without transposition, double circuit line, bundled conductors, resistance and skin effect and proximity effect, , capacitance of 1-phase and 3-phase transmission line, effect of earth on transmission line capacitance performance, Ferranti effect.

Substation:

Classification of Substations, substation equipments, Neutral Earthing. Consideration of effect of low power factor, Advantages of power factor improvement, methods of improving power factor, the most economical power factor.

INSTRUCTIONAL METHOD AND PEDAGOGY (Continuous Internal Assessment (CIA) Scheme)

- At the start of course, the course delivery pattern, prerequisite of the subject will be discussed.
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc.
- Attendance is compulsory in lectures, practical's and Tutorial which carries 05 Marks.
- At regular intervals assignments is given. In all, a student should submit all assignments of 05 marks each.
- Classroom participation and involvement in solving the problems in Tutorial rooms carries 05 Marks.
- Viva Voce will be conducted at the end of the semester of 05 Marks.
- One internal exam of 30 marks is conducted as a part of mid semester evaluation.
- Experiments shall be performed in the laboratory related to course contents.
- The course includes a laboratory, where students have an opportunity to build an appreciation for the concept being taught in lectures.

STUDENTS LEARNING OUTCOME:

On successful completion of the course

- The student can learn about various methods of network reduction and analysis.

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Lesson Planning

SR No.	Lectures (Hours)	Weight age in % in Exam	Topic
1	06	30	Steam power station: Schematic arrangement, advantages and disadvantages, choice of site, efficiency of steam power station, Types of prime movers
2	06		Characteristic, speed control & auxiliaries. Environmental aspects for selecting sites and locations of thermal power stations.
3	06		Hydro power station: Schematic arrangement, advantages and disadvantages, choice of site constituents of hydro power plant, Hydro turbine. Environmental aspects for selecting sites and locations of hydro power stations
4	06	25	Nuclear power station: Schematic arrangement, advantages and disadvantages, selection of site, types of reactors, Hazards Environmental aspects for selecting sites and locations of nuclear power stations.
5	06		Gas turbine power plant: Schematic arrangement, advantages and disadvantages. Combined cycle power plant: Combined cycle power plant, Comparison of various power plants
8	06	45	Distribution: Overhead & underground transmission of power, Types of distribution systems, types of cables & their construction, Types of conductors. Types of insulators, string efficiency
9	06		Transmission line parameters: Inductance of 1-phase, two-wire line and composite conductor lines, inductance of 3-phase line with symmetrical and unsymmetrical spacing with and without transposition, double circuit line, bundled conductors, resistance and skin effect and proximity effect, , capacitance of 1-phase and 3-phase transmission line, effect of earth on transmission line capacitance performance, Ferranti effect.

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10	03	Substation:	Classification of Substations, substation equipments, Neutral Earthing. Consideration of effect of low power factor, Advantages of power factor improvement, methods of improving power factor, the most economical power factor.
	45	100	

Instructional Method & Pedagogy

- At the start of course, the course delivery pattern , prerequisite of the subject will be discussed
- Lecture may be conducted with the aid of multi-media projector, black board, OHP etc. & equal weightage should be given to all topics while teaching and conduction of all examinations.
- Attendance is compulsory in lectures, which may carries five marks in overall evaluation.
- One/Two internal exams may be conducted and total/average/best of the same may be converted to equivalent of 30 marks as a part of internal theory evaluation.
- Assignment based on course content will be given to the student for each unit/topic and will be evaluated at regular interval. It may carry an importance of ten marks in the overall internal evaluation.
- Surprise tests/Quizzes/Seminar/Tutorial may be conducted and having share of five marks in the overall internal evaluation.

Students Learning Outcomes

On successful completion of the course

- The student can be acquired the basic knowledge of electric power system, electrical fundamentals, thus being prepared to pursue any area of engineering spectrum in depth as desired.
- The students will be able to effectively employ electrical systems and lead the exploration of new applications and techniques for their use.

Suggested Books:

1. Electrical Power Transmission and Distribution, by Sivanagaraju & Satyanarayana, Pearson Edu.
2. Power System Analysis and Design – Glover, Sarma , Overbye. Cengage Publication
3. Energy Technology by S. Rao & Dr. B.B.Parulekar
4. Renewable energy sources and conversion technology by N.K. Bansal
5. Renewable Energy Sources – G. D. Rai
6. Power System Generation– B.A. Oza
7. Electrical Power Stations– M.V. Deshpande, PHI Publications
8. Electrical Power — Dr. S.L. Uppal,
9. A course in electrical power — Soni, Gupta and Bhatnagar