



NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE PLAN – PART I			
Name of the programme and specialization	B.Tech.		
Course Title	Power Systems Engineering		
Course Code	EEMI15	No. of Credits	3
Course Code of Pre/ Co-requisite subject(s)	EEMI11		
Session	January 2022	Section (if, applicable)	-
Name of Faculty	Dr. M. P. SELVAN	Department	EEE
Email	selvanmp@nitt.edu	Telephone No.	9444170638
Name of Course Coordinator(s) (if, applicable)			NA
E-mail	-	Telephone No.	-
Course Type	<input type="checkbox"/> Core course <input checked="" type="checkbox"/> Elective course		
Syllabus (approved in BoS)			
<p>Overview of generation systems: Sources of Energy, Steam, Diesel, Nuclear and Hydro power plants – site selection - Layout – essential components and operation.</p> <p>Modes of Transmission and Distribution: HVAC and HVDC Transmission system – over-head lines – towers, conductors and insulators, underground cables – types – laying methods and fault location, comparison of over-head and underground systems, distribution system – classification – components, power factor correction.</p> <p>Basic protection and switchgears: System faults and abnormal conditions, system grounding, need for protection system, overview of apparatus protection, switch gear mechanisms – fuse, switch, isolator and circuit breakers.</p> <p>Economics on power systems: Factors affecting cost of generation – load curve – load factor – diversity, base load and peak load stations – reduction of generation cost by interconnection of stations, price of electricity – types of tariff for HT and LT consumers.</p> <p>Regulation / Electricity Act: Evolution of Indian electricity act – regulator commissions, grid code, Introduction to restructuring of power system – GenCo, TransCo and DisCo, Independent power producers, Introduction to smart grid.</p> <p>Reference Books:</p> <ol style="list-style-type: none"> 1. R K Rajput, 'Power System Engineering', Laxmi Publications Ltd., 2006. 2. A Chakrabarti, M L Soni, P V Gupta and U S Bhatnagar, 'Power System Engineering', Dhanpat Rai & Co., Ltd., 2010. 3. S N Singh. 'Electric Power Generation, Transmission and Distribution', PHI Publications, 2008. 4. B.R. Gupta, 'Power System Analysis and Design', S. Chand Limited, 5th Edition, 2008. 			



COURSE OBJECTIVES

To impart knowledge on power generation, transmission, distribution and protection system, and overview of power system economics and regulations.

COURSE OUTCOMES (CO)

Course Outcomes	Aligned Programme Outcomes (PO)
Upon completion of the course, the students will be able to	
1. Illustrate the layout and operation of various power plants.	
2. Infer the modes of transmission and distribution of electrical energy.	
3. Select the appropriate protection scheme for various power apparatus.	
4. Identify tariff structure and calculate the energy pricing.	
5. Discuss about Indian electricity act and regulations.	

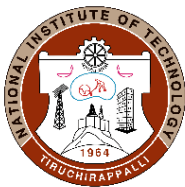
COURSE PLAN – PART II

COURSE OVERVIEW

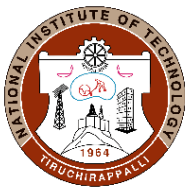
The use of electrical energy, stand by power sources, transformers, power distribution systems, protection and switchgear systems are mandatory for any industry. Use of electricity for operating any kind of process is very common and hence a fundamental knowledge on electric power system and its components is very essential for engineering students of any discipline. Therefore, this course is offered mainly for undergraduate third-year as well as fourth year non-Electrical Engineering students. This course will introduce and explain the fundamental concepts in the field of electrical power system engineering. Starting from the overview on sources of energy and electrical energy generation systems, the basic concepts of power transmission through HVAC and HVDC systems will be discussed. Technical and economical comparison of overhead and underground cable systems will be done. The importance of better power factor operation and the need for power factor correction will be dealt. Further, various fault conditions and fundamentals of protection schemes will be introduced. The protection of different power apparatus will be discussed qualitatively. Students will be exposed to different switchgears. The factors affecting economy of power system will be covered along with the different tariff structures for LT and HT consumers. The need for integrated operation of the system will be discussed. Finally, students will be made aware of Indian electricity act and the government initiatives on restructuring of power system and implementation of smart grid technologies. By the end of the course, the students would obtain good amount of knowledge on electrical power system components, operation and field implementation methods.



COURSE TEACHING AND LEARNING ACTIVITIES			
S.No.	Week/Contact Hours	Topic	Mode of Delivery
1	Week 1 17-01-2022 to 21-01-2022 (2 Contact Hours)	Course Plan Details & Introduction Generation systems & Sources of Energy	Online MS Teams
2	Week 2 24-01-2022 to 28-01-2022 (2 Contact Hours)	Steam & Nuclear power plants, Diesel & Hydro Power plants	Online MS Teams
3	Week 3 31-01-2022 to 04-02-2022 (3 Contact Hours)	HVAC and HVDC Transmission Systems	Online MS Teams
4	Week 4 07-02-2022 to 11-02-2022 (3 Contact Hours)	Underground Cables	Online MS Teams
5	Week 5 14-02-2022 to 18-02-2022 (3 Contact Hours)	Assessment-1 Distribution System	Online MS Teams
6	Week 6 21-02-2022 to 25-02-2022 (3 Contact Hours)	Distribution System	Online MS Teams
7	Week 7 28-02-2022 to 04-03-2022 (3 Contact Hours)	Need for protection system, Grounding	Online MS Teams
8	Week 8 07-03-2022 to 11-03-2022 (3 Contact Hours)	Overview of apparatus protection, Switch gear mechanisms	Online MS Teams
9	Week 9 14-03-2022 to 18-03-2022 (3 Contact Hours)	Assessment – 2 Factors affecting cost of generation	Online MS Teams
10	Week 10 21-03-2022 to 25-03-2022 (3 Contact Hours)	Reduction of generation cost, Price of electricity, Tariff structures	Online MS Teams
11	Week 11 28-03-2022 to 01-04-2022 (3 Contact Hours)	Electricity Act, Regulatory Commission, Grid Code	Online MS Teams
12	Week 12 04-04-2022 to 08-04-2022 (3 Contact Hours)	Introduction to Restructuring	Online MS Teams
13	Week 13 11-04-2022 to 15-04-2022 (2 Contact Hours)	Introduction to Smart Grid	Online MS Teams
14	Week 14 18-04-2022 to 22-04-2022 (3 Contact Hours)	Assessment 3 (Group Task)	Online MS Teams
15	Week 15 25-04-2022 to 29-04-2022 (1 Contact Hour)	Compensation Assessment	Online



16	Week 16 02-05-2022 to 06-05-2022 (2 Contact Hours)	Final Assessment		
COURSE ASSESSMENT METHODS (shall range from 4 to 6)				
S.No.	Mode of Assessment	Week	Duration	% Weightage
1	Surprise Quiz			5
	Scheduled Quiz	Week 5	60 Minutes	20
2	Surprise Quiz			5
	Scheduled Quiz	Week 9	60 Minutes	20
3	Group Task	Week 14		20
CPA	Compensation Assessment	Week 15	60 Minutes	20
4	Final Assessment	Week 16	90 Minutes	30
COURSE EXIT SURVEY (mention the ways in which the feedback about the course shall be assessed) Feedback from the students during class committee meetings Institute end semester feedback				
COURSE POLICY (preferred mode of correspondence with students, compensation assessment policy to be specified)				
<u>MODE OF CORRESPONDENCE (email/ phone etc)</u> 1. All the students are advised to check their NITT WEBMAIL regularly. All the correspondence (schedule of classes/ schedule of assessment/ any other information regarding this course) will be done through their Webmail only. Conduct of course and sharing of course material will be done through MS Teams. Suitable platform/software tool will be chosen for the conduct of assessments and will be informed to the students. 2. Queries (if required) to the course teacher shall only be emailed to selvanmp@nitt.edu .				



COMPENSATION ASSESSMENT POLICY

1. Attending all the assessments are MANDATORY for every student.
2. If any student is not able to attend any of the assessments (1 and 2, scheduled quizzes only) due to genuine reason, student is permitted to attend the compensation assessment (CPA).
3. At any case, CPA will not be considered as an improvement test.

ATTENDANCE POLICY

As directed by the Academic Office.

ACADEMIC DISHONESTY & PLAGIARISM

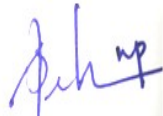
- Copying from others during an assessment will be treated as punishable dishonesty.
- Zero mark will be awarded for the offenders. For copying from another student, both students get the same penalty of zero mark.

The departmental disciplinary committee including the course faculty member, PAC chairperson and the HoD, as members shall verify the facts of the malpractice and award the punishment if the student is found guilty. The report shall be submitted to the Academic office.

ADDITIONAL INFORMATION

The faculty is available for consultation at times as per the intimation given by the faculty.

FOR APPROVAL


Course Faculty


CC-Chairperson


HOD