



Bhoj Reddy Engineering College for Women

Sponsored by Sangam Laxmibai Vidyapeet, Accredited by NAAC with A Grade,
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Department of Electrical and Electronics Engineering

Lesson Plan

Name of the Subject : HVDC Transmission Academic Year : 2026-27
Subject Code : EE741PE Semester : I
Name of the Faculty Member : Dr B Dhanadeepika Class & section : IV EEE

S. No.	Date	Name of the Topic	No. of Classes require	Cumulative number of periods	Teaching AID
UNIT-I Basic Concepts, Analysis of HVDC Converters					
1	06 July 2026	Introduction to the subject, Basic Concepts Necessity of HVDC systems	01	01	C&T, S/P
2	06 July 2026	Economics and Terminal equipment of HVDC transmission systems	01	02	C&T, S/P
3	07 July 2026	Types of HVDC Links Apparatus required for HVDC Systems	01	03	C&T, S/P Think–Pair–Share
4	13 July 2026	Comparison of AC and DC Transmission, Applications, Planning and Modern trends of DC Transmission System	01	04	C&T, S/P Videos
5	13 July 2026	Content Beyond Syllabus: Voltage Source Converter based HVDC Transmission systems.	01	05	C&T, S/P
6	14 July 2026	Analysis of HVDC Converters: Choice of Converter Configuration	01	06	C&T, S/P
7	20 July 2026	Analysis of Graetz circuit, Characteristics of 6 Pulse and 12 Pulse converters	01	07	C&T, S/P
8	20 July 2026	Slip Test	01	08	Test / Quiz
9	21 July 2026	Numericals on Converter with overlap	01	9	CPS
10	27 July 2026	Cases of two 3 phase converters in Y/Y mode – their performance.	01	10	C&T, S/P
UNIT-II Converter and HVDC System Control, Reactive Power Control in HVDC					
11	27 July 2026	Principle of DC Link Control, Converters Control Characteristics	01	11	C&T, S/P

12	28 July 2026	Firing angle control, Current and extinction angle control	01	12	C&T, S/P
13	03 August 2026	Effect of source inductance on the system	01	13	C&T, S/P
14	03 August 2026	Starting and stopping of DC link, Power Control.	01	14	C&T, S/P
15	04 August 2026	Reactive Power Control in HVDC: Introduction	01	15	SEM
16	11 August 2026	Reactive Power Requirements in steady state	01	16	C&T, S/P
17	17 August 2026	Sources of reactive power	01	17	Quiz/Puzzle
18	17 August 2026	Static VAR Compensators	01	18	C&T, S/P
19	18 August 2026	Reactive power control during transients	01	19	C&T, S/P
UNIT-III Power Flow Analysis in AC/DC Systems					
20	24 August 2026	Modelling of DC Links	01	20	C&T, S/P
21	24 August 2026	DC Network, DC Converter	01	21	C&T, S/P
22	25 August 2026	Controller Equations	01	22	C&T, S/P
23	07 September 2026	Solution of DC load flow	01	23	C&T, S/P
24	07 September 2026	P.U. System for DC quantities	01	24	C&T, S/P
25	08 September 2026	Solution of AC-DC Power flow	01	25	SEM
26	15 September 2026	Dc network	01	26	ASG
27	21 September 2026	Simultaneous method- Sequential method.	01	27	C&T, S/P
UNIT-IV Converter Faults and Protection					
28	21 September 2026	Introduction to Converter faults and protection	01	28	C&T, S/P
29	22 September 2026	Protection against over current and over voltage in converter station	01	29	C&T, S/P
30	28 September 2026	Surge arresters, Smoothing reactors	01	30	C&T, S/P
31	28 September 2026	DC breakers, Audible noise	01	31	C&T, S/P
32	29 September 2026	space charge field, Radio interference.	01	32	C&T, S/P
33	05 October 2026	Corona effects on DC lines	01	33	SEM
34	05 October 2026	Different types of faults.	01	34	GD
35	06 October 2026	Content Beyond Syllabus: Role of HVDC in Future smart grids and super grids.	01	35	C&T, S/P
UNIT-V Harmonics, Filters					
36	12 October 2026	Generation of Harmonics, Characteristics Harmonics	01	36	C&T, S/P
37	12 October 2026	Calculation of AC Harmonics, Non characteristics Harmonics	01	37	C&T, S/P
38	13 October 2026	Adverse effects of Harmonics	01	38	C&T, S/P

39	19 October 2026	Calculation of voltage and Current harmonics	01	39	C&T, S/P
40	19 October 2026	Effect of Pulse number on harmonics	01	40	C&T, S/P
41	26 October 2026	Explanation on Different types of Converters	01	41	SEM
42	26 October 2026	Types of AC filters, Design of Single tuned , High pass filters	01	42	Quiz/Puzzle
43	27 October 2026	Revision	01	43	C&T, S/P
		Total number of classes	43	43	

TEACHING METHODS:

C&T:-Chalk & Talk; S/P:-Slides/PPT; Videos; SEM: Seminar; Demo; CHART; ET/GL: Expert Talk/Guest Lecture; QUIZ; CPS: Class room problem solving;GD:-Group discussion; RTCS: Real time case studies; JAR:-Journal article review; PD:-Poster design; OL:-Online lecture/Google class room; Industrial Visit (IV), Assignment (ASG), Quiz/Puzzle (Q), Brain storming (BS), Think-Pair-Share (TPS), Certification(CERT), SIM: Simulation, P/G: Pledge/Greeting, Q/R: Quotes, references, LS: Literature Survey, RW: Report Writing, MM: Model making,PED: Professional/ethical dilemma, Coding, Activity/Event, FV: Filed Visit etc.

TEXT / REFERENCE BOOKS:

S. No.	TEXT / REFERENCE BOOKS	BOOK TITLE/AUTHORS/PUBLICATION
1	Text Book	K. R. Padiyar”, HVDC Power Transmission Systems: Technology and system Interactions, New Age International (P) Limited, and Publishers, 1990
2	Text Book	“S K Kamakshaiah, V Kamaraju”, HVDC Transmission, TMH Publishers, 2011
3	Reference Book	“S. Rao”, EHVAC and HVDC Transmission Engineering and Practice, Khanna publications, 3rd Edition 1999
4	Reference Book	“Jos Arrillaga”, HVDC Transmission, The institution of electrical engineers, IEE power & energy series 29, 2nd edition 1998.
5	Reference Book	E. W. Kimbark”, Direct Current Transmission, John Wiley and Sons, volume 1, 1971.
6	Reference Book	E. Uhlmann”, Power Transmission by Direct Current, B. S. Publications, 2009

Web Source References:

S. No.	Web Resource	Link
1	NPTEL – HVDC Transmission	https://nptel.ac.in/courses/108104013
2	Generation of Harmonics	https://electrical-engineering-portal.com/5-types-of-equipment-which-generates-the-most-harmonics
3	Voltage Source Converters	https://in.mathworks.com/help/sps/powersys/ug/vsc-based-hvdc-link.html

Signature of Faculty

HoD-EEE