Teaching Plan
AY 2020-21

An ISO 9001:2015 Certified Institution

PRIYADARSHINI INSTITUTE OF SCIENCE AND TECHNOLOGY FOR WOMEN

(Approved by AICTE, New Delhi and Affiliated to JNTUH Hyderabad)

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TEACHING PLAN

Name of the Faculty: Mr. G. Kumara Swami **Subject Code:** EE501PE

Subject Name: Power Electronics **Academic Year:** 2020-21

B.Tech III Year II Sem

S. No	Unit No.	Topics to be covered	Ref	Teaching Method
1.	I	Introduction to Power Switching Devices	T1,R1	Chalk and Talk
2.		Concept of power electronics, scope and applications, types of power converters	T1,R1	Chalk and Talk
3.		Power Diodes and it's V-I characteristics	T1,R1	Chalk and Talk.
4.		Power BJT and it's V-I characteristics	T1,R1	Chalk and Talk
5.		SCR, Power MOSFET, Power IGBT and their V-I characteristics	T1,R1	Chalk and Talk
6.		Thyristor ratings and protection	T1,R1	Chalk and Talk
7.		methods of SCR commutation	T1,R1	Chalk and Talk
8.		UJT as a trigger source	T1,R1	Chalk and Talk
9.		gate drive circuits for BJT and MOSFETs and numerical problems	T1,R1	Chalk and Talk
10.		Revision	T1,R1	Chalk and Talk/ Quiz
11.	II	AC-DC Converters (Phase Controlled Rectifiers)	T1,R1	Chalk and Talk
12.		Principles of single-phase fully-controlled converter with R	T1,R1	Chalk and Talk
13.		Principles of single-phase fully-controlled converter with RL, and RLE load	T1,R1	Chalk and Talk
14.		Principles of single-phase half-controlled converter with RL	T1,R1	Chalk and Talk
15.		Principles of single-phase half-controlled converter with RLE load	T1,R1	Chalk and Talk

16.		Principles of three-phase fully-controlled converter operation with RLE load	T1,R1	Chalk and Talk
17.		Effect of load and source inductances	T1,R1	Chalk and Talk
18.		General idea of gating circuits	T1,R1	Chalk and Talk
19.		Single phase and Three phase dual converters	T1,R1	Chalk and Talk
20.		Numericals	T1,R1	Chalk and Talk
21.		Revision	T1,R1	Chalk and Talk / Quiz
22.	III	DC-DC Converters (Chopper/SMPS): Introduction, , elementary chopper with an active switch and diode	T1,R1	Chalk and Talk
23.		concepts of duty ratio, average inductor voltage, average capacitor current	T1,R1	Chalk and Talk
24.		Buck converter - Power circuit, analysis and waveforms at steady state, duty ratio control of output voltage	T1,R1	Chalk and Talk
25.		Boost converter - Power circuit, analysis and waveforms at steady state, relation between duty ratio and average output voltage	T1,R1	Chalk and Talk
26.		Buck-Boost converter - Power circuit, analysis and waveforms at steady state, relation between duty ratio and average output voltage, Numericals	T1,R1	Chalk and Talk
27.		Numerical problems	T1,R1	Chalk and Talk
28.		Revision	T1,R1	Chalk and Talk / Quiz
29.		AC-DC Converters (Inverters): Introduction, principle of operation, performance parameters, single phase bridge inverters with R load	T1,R1	Chalk and Talk

30.	IV	AC-DC Converters (Inverters): Introduction, principle of operation, performance parameters, single phase bridge inverters with RL load	T1,R1	Chalk and Talk
31.		3-phase bridge inverters - 120- and 180-degrees mode of operation	T1,R1	Chalk and Talk
32.		Voltage control of single-phase inverters –single pulse width modulation	T1,R1	Chalk and Talk
33.		Voltage control of single-phase inverters – multiple pulse width modulation, sinusoidal pulse width modulation.	T1,R1	Chalk and Talk
34.		Numerical problems	T1,R1	Chalk and Talk
35.		Revision	T1,R1	Chalk and Talk/ Quiz
36.	V	AC-AC Converters: Phase Controller (AC Voltage Regulator)-Introduction	T1,R1	Chalk and Talk
37.		principle of operation of single-phase voltage controllers for R, and its applications	T1,R1	Chalk and Talk
38.		principle of operation of single-phase voltage controllers for R-L loads and its applications	T1,R1	Chalk and Talk
39.		Cyclo-converter-Principle of operation of single phase cyclo-converters, relevant waveforms	T1,R1	Chalk and Talk
40.		Cyclo-converter- circulating current mode of operation, Advantages and disadvantages	T1,R1	Chalk and Talk
41.		Numerical problems	T1,R1	Chalk and Talk
42.		Revision	T1,R1	Chalk and Talk / Quiz

TEXT BOOKS:

1. M. H. Rashid, "Power electronics: circuits, devices, and applications", Pearson Education India, 2009
2. N. Mohan and T. M. Undeland, "Power Electronics: Converters, Applications and Design", John Wiley & Sons, 2007.

REFERENCE BOOKS:

1. R. W. Erickson and D. Maksimovic, "Fundamentals of Power Electronics", Springer Science & Business Media, 2007.
2. L. Umanand, "Power Electronics: Essentials and Applications", Wiley India, 2009.

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