

**UTKALMANI GOPABANDHU INSTITUTE OF**  
**ENGINEERING,ROURKELA**



**LESSON PLAN**

**SESSION-2022-2023**

**DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING**

<b>SUBJECT CODE:</b>	<b>Th.5</b>
<b>NAME:</b>	<b>POWER ELECTRONICS &amp; PLC.</b>
<b>BRANCH:</b>	<b>ELECTRONICS &amp; TELECOMMUNICATION</b>
<b>SEMESTER:</b>	<b>DIPLOMA -V</b>
<b>PERIODS PER WEEK:</b>	<b>4</b>
<b>NAME OF THE FACULTY:</b>	<b>PRASANTA KUMAR DAKHIN RAY</b>
<b>NO. OF PERIODS PER WEEK:</b>	<b>4(AS PER AICTE)</b>
<b>NO OF CLASSES ALLOTTED PER WEEK OFFLINE MODE:</b>	<b>04(15/09/2022 to 22/12/2022)</b>

**UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA**



**LESSON PLAN**

**DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING**

**SUBJECT CODE:**

**Th.5**

**NAME:**

**POWER ELECTRONICS & PLC.**

**BRANCH:**

**ELECTRONICS & TELECOMMUNICATION**

**SEMESTER:**

**DIPLOMA -V**

**PERIODS PER WEEK:**

**4**

**NAME OF THE FACULTY:**

**PRASANTA KUMAR DAKHIN RAY**

**NO. OF PERIODS PER WEEK:**

**4(AS PER AICTE)**

**NO OF CLASSES ALLOTTED PER WEEK OFFLINE MODE: 04(15/09/2022 to 22/12/2022)**

Week/Date	Lecture	Topic to be covered	Remarks
1 <sup>st</sup> week 15/09/2022 to 17/09/2022	1 <sup>st</sup>	Introduction to power electronic	
		SCR ,CONSTRUCTION OF SCR , ITS OPERATION	
		v-i characteristics of scr , symbol & its application .	
		Diac ,	
2 <sup>nd</sup> week 19/09/2022 to 24/09/2022	1 <sup>st</sup>	Construction of diac , v-I characteristics of diac , symbol & its application	
	2 <sup>nd</sup>	Triac , constructions of Triac ,v-I characteristics of Triac ,symbol ,& its application .	
	3 <sup>rd</sup>	GTO ,construction of GTO ,operation of GTO ,symbol ,&its application	
	4 <sup>th</sup>	IGBT ,construction of IGBT ,operation of IGBT ,symbol,& its application .	
3 <sup>rd</sup> week 26/09/2022 to	1 <sup>st</sup>	Power diode, construction of power diode, symbol & v-I characteristics of power diode .	
	2 <sup>nd</sup>	Power mofet , construction detail of power mofet	

01/10/2022		,v-I characteristics of power MOSFET & symbol .	
	3 <sup>rd</sup>	Discuss two transistor analogy of SCR, & Gate characteristics of SCR .	
	4 <sup>th</sup>	Explain Turn on method of SCR, & also Turn – off method of SCR (a) line commutation .	
4 <sup>th</sup> week 03/10/2022 to 08/10/2022	1 <sup>st</sup>	(b) forced commutation, (c) load commutation & (d) resonant pulse commutation .	03/10/2022 to 08/10/2022(holiday ) Need four extra classes for adjustment
	2 <sup>nd</sup>	Discuss voltage & current rating of SCR, how to protect the SCR due to over voltage, over current & gate protection .	
	3 <sup>rd</sup>	What is firing circuits . explain general layout diagram of firing circuits . describe R firing circuits .	
	4 <sup>th</sup>	Explain R-C firing circuits, & also describe UJT pulse trigger circuits .	
5 <sup>th</sup> week 10/10/2022 to 15/10/2022	1 <sup>st</sup>	Explain synchronous triggering (RAMP TRIGGERING) & also how to design of snubber circuits . introduction to controlled rectifiers techniques .	
	2 <sup>nd</sup>	Define( phase angle, extinction angle) . what is single quadrant semi-converter, two quadrant full converter & dual converter .	
	3 <sup>rd</sup>	Working of single – phase half wave controlled converter with R & R-L LOADS & also what do mean by freewheeling diode .	
	4 <sup>th</sup>	Working of single phase fully controlled converter with R & R-L loads & working of three phase half wave controlled converter with R load .	

**UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING, ROURKELA**



**LESSON PLAN**

**DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING**

**SUBJECT CODE:** Th.5

**NAME:** POWER ELECTRONICS & PLC  
**BRANCH:** ELECTRONICS & TELECOMMUNICATION

**SEMESTER:** DIPLOMA -V

**PERIODS PER WEEK:** 4

**NAME OF THE FACULTY:** PRASANTA KUMAR DAKHINRAY

**NO. OF PERIODS PER WEEK:** 4(AS PER AICTE)

**NO OF CLASSES ALLOTTED PER WEEK OFFLINE MODE:** 04(15/09/2022 to 22/12/2022)

Week/Date	Lecture	Topic to be covered	Remarks
6 <sup>th</sup> week 17/10/2022 to 22/10/2022	1 <sup>st</sup>	Working of three phase fully controlled converter with R load .& working of single phase AC regulator .	
	2 <sup>nd</sup>	Working principle of step up & step down chopper & control modes of chopper with its operation of chopper in all four quadrants .	
	3 <sup>rd</sup>	What is inverter & classify inverter & also working operation of series inverter .	
	4 <sup>th</sup>	Working of parallel inverter ,working of single -phase bridge inverter .	
7 <sup>th</sup> week 24/10/2022 to 29/10/2022	1 <sup>st</sup>	What is cyclo – converter & its basic principle & working of single – phase step up cyclo – converter .	24/10/2022(holiday ) Need one extra class for adjustment
	2 <sup>nd</sup>	Working of single -phase step –down cyclo – converter & with its application .	

	3 <sup>rd</sup>	Lists applications of power electronic circuits & also lists the factors affecting the speed of DC motors & explain. Speed control for DC shunt motor using converter.	
	4 <sup>th</sup>	Explain speed control for DC shunt motor using chopper & list the factors affecting speed of the AC motors .	
8 <sup>th</sup> week 31/10/2022 to 05/11/2022	1 <sup>st</sup>	Explain speed control of induction motor by using AC voltage regulator .	
	2 <sup>nd</sup>	Explain speed control of induction motor by using converters & inverters ( v/f control ) .	
	3 <sup>rd</sup>	What is UPS ? working of UPS with it block diagram & types of UPS ( i.e. on –line ups & off – line ups )	
	4 <sup>th</sup>	Explain with the help of a diagram of battery charger circuit using SCR .	
9 <sup>th</sup> week 07/11/2022 to 12/11/2022	1 <sup>st</sup>	What is SMPS ( switched mode power supply ) & its types & Explain the fly back converter SMPS .	08/11/2022(holiday ) Need one extra class for adjustment
	2 <sup>nd</sup>	Explain half – bridge converter SMPS & also Explain full – bridge converter SMPS .	
	3 <sup>rd</sup>	Explain push –pull converter SMPS & its applications .	
	4 <sup>th</sup>	Introduction of programmable logic controller (PLC) & its advantage's PLC .	
10 <sup>th</sup> week 14/12/2022 to 19/12/2022	1 <sup>st</sup>	Describe different part of plc ( input module , output module , power supply & cpu )	
	2 <sup>nd</sup>	What is ladder diagram& describe of contacts & coils in the states 1) normally open 2) normally close 3) Energized output 4) latchd output & 5) branching	
	3 <sup>rd</sup>	Explain ladder diagram for 1) AND gate 2) OR gate 3)NOT gate	
	4 <sup>th</sup>	Discuss ladder diagram for combination ckt using NAND gate , NOR gate , etc	

**UTKALMANI GOPABANDHU INSTITUTE OF ENGINEERING,ROURKELA**



**LESSON PLAN**

**DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION ENGINEERING**

**SUBJECT CODE:** Th.5

**NAME:** POWER ELECTRONIS & PLC

**BRANCH:** ELECTRONICS & TELECOMMUNICATION

**SEMESTER:** DIPLOMA -V

**PERIODS PER WEEK:** 4

**NAME OF THE FACULTY:** PRASANTA KUMAR DAKHINRAY

**NO. OF PERIODS PER WEEK:** 4(AS PER AICTE)

**NO OF CLASSES ALLOTTED PER WEEK OFFLINE MODE:** 04(15/09/2022 to 22/12/2022)

Week/Date	Lecture	Topic to be covered	Remarks
11 <sup>th</sup> week 21/11/2022 to 26/11/2022	1 <sup>st</sup>	Describe timer instruction of plc 1) T-ON 2) T – OFF	
	2 <sup>nd</sup>	Discuss Rextive Timer instruction of plc	
	3 <sup>rd</sup>	Discuss counter instruction of plc 1) count - up instruction 2) count – down instruction .	
	4 <sup>th</sup>	Explain ladder diagram using Timers & C counter	
12 <sup>th</sup> week 28/12/2022 to 03/12/2022	1 <sup>st</sup>	Describe PLC INSTRUCTION SET	
	2 <sup>nd</sup>	Describe ladder diagram for following 1) DOL starter & STAR – DELTA starter	
	3 <sup>rd</sup>	Discuss ladder diagram for stair case lighting & Traffic light control	
	4 <sup>th</sup>	Discuss ladder diagram for TEMPERATURE CONTROLLER	

13 <sup>th</sup> week 05/12/2022 to 10/12/2022	1 <sup>st</sup>	Special control system ( Basic DCS )	
	2 <sup>nd</sup>	Basic concepts of SCADA systems .	
	3 <sup>rd</sup>	Explain computer control - Data Acquisition	
	4 <sup>th</sup>	Explain computer -control Direct Digital control systems .	
14 <sup>th</sup> week 12/12/2022 to 17/12/2022	1 <sup>st</sup>	Review unit -1	
	2 <sup>nd</sup>	Review unit -2	
	3 <sup>rd</sup>	Review unit -3	
	4 <sup>th</sup>	Review unit -4	
15 <sup>th</sup> week 19/12/2022 to 24/12/2022	1 <sup>st</sup>	Review unit -5	
	2 <sup>nd</sup>	Discussion of MCQ	
	3 <sup>rd</sup>	Discussion of MCQ	
	4 <sup>th</sup>	Discussion of MCQ	