DIPLOMA PROGRAMME COURSE STRUCTURE [2ND YEAR ONWARD COURSES]							
Based on CBCS system & OBE model Recommended scheme of study (For Diploma in Electrical & Electronics Engineering)							
Semester Of Study (Recommended)	**Category of course**	**Course Code**	**Subjects**	**Mode of delivery & credits** *L-Lecture. T-Tutorial. P-practical*			**Total Credits** *C-Credit*
				L	**T**	**P**	**C**
THEORY							
FOURTH	**PC**	DEE 401	Power Electronics	3	1	0	4
		DEC 403	Microprocessor and Microcontroller	3	0	0	3
		DEE 405	AC Rotating Machines	3	1	0	4
	PE	DPE 441/442/443	PE-I	3	0	0	3
	OE	DOE 441/442/443	OE-I [Courses from other Branches]	3	0	0	3
	SESSIONAL						
	PC	DEE 402	Power Electronics Lab	0	0	2	1
		DEC 404	Microprocessor and Microcontroller Lab	0	0	2	1
		DEE 406	Electrical machine Lab.	0	0	2	1
	Mandatory Course	DAU 401	Essence of Indian Knowledge and Tradition	2	0	0	0 (Non-credit)
PERIODS PER WEEK				**17**	**2**	**6**	
TOTAL (THEORY + LABS) CREDITS							**20**
TOTAL PERIODS PER WEEK							**25**
GRAND TOTAL CREDITS FOR SECOND YEAR							**42**

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING PROGRAMME ELECTIVES (PE)*							
SEMESTER	**Code no.**	**Name of the PE courses**	**Prerequisite/ Corequisite courses with code**	**L**	**T**	**P**	**C**
PE-I							
SEM-IV	DPE 441	Electrical Equipment Maintenance	Electrical Machine	3	0	0	3
	DPE 442	Industrial Instrumentation And Condition Monitoring	Electrical Measurements and Instrumentation	3	0	0	3
	DPE 443	Applied Communication	Basic Electronics	3	0	0	3
PE-II							
SEM- V	DPE 541	Industrial Automation & Control.	Electrical Measurements and Instrumentation	3	0	0	3
	DPE 542	Communication Technologies	Analog & digital Electronics	3	0	0	3
	DPE 543	Principle of Electric Vehicle	Power electronics	3	0	0	3
PE-III							
SEM-V	DPE 544	Solar Power Technologies	Electrical energy generation	3	0	0	3
	DPE 545	Electric Traction	Utilization of Electric power	3	0	0	3
	DPE 546	Electrical Testing and Commissioning	Power system	3	0	0	3
PE-IV							
SEM-VI	DPE 641	Applications of IOT	Microprocessor and Microcontroller	3	0	0	3
	DPE 642	Industrial Drives	Utilization of Electric power	3	0	0	3
	DPE 633	Programmable Logic Controllers	Microprocessor and Microcontroller	3	0	0	3
PE-V [Sessional]							
SEM-VI	DPE 635	Programmable Logic Controllers Lab	Microprocessor and Microcontroller	0	0	2	1
	DPE 644	Industrial Drives Lab	Utilization of Electric power	0	0	2	1

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING OPEN ELECTIVES (OE)*							
SEMESTER	**Code No.**	**Name of the OE courses**	**Prerequisites courses with code**	**L**	**T**	**P**	**C**
OE-I							
FOURTH	DOE 441	Utilization of Electrical Energy		3	0	0	3
	DOE 442	Electrical Energy Generation System		3	0	0	3
	D0E 443	Fundamental of Power Electronics		3	0	0	3
OE- II							
FIFTH	DOE 541	Introduction to Power System		3	0	0	3
	DOE 542	Computational technique in Electrical Engineering		3	0	0	3
	DOE 543	Building Electrification and House Wiring		3	0	0	3
OE- III							
SIXTH	DOE 651	Consumer Electronics		3	0	0	3
	DOE 652	Introduction to Sustainable Energy		3	0	0	3
	DOE 653	Electromechanical Energy Conversion		3	0	0	3
***OPEN ELECTIVES TO BE OPTED ONLY BY OTHER DEPARTMENT STUDENTS**							

IV Semester
POWER ELECTRONICS

PROGRAMME: DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DEE 401**			COURSE TITLE: **POWER ELECTRONICS**				
COMPULSORY / OPTIONAL: **COMPULSORY**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEEK	CREDIT	PE	FINAL	TOTAL
3	1	0	4	4	50	50	100

RATIONALE:
This course envisions imparting to students to:

1.	To understand the various applications of power electronic devices for conversion, control and conditioning of the electrical power and to get an overview of different types of power semiconductor devices and their dynamic characteristics.
2.	To understand the operation, characteristics and performance parameters of controlled rectifiers.
3.	To study the operation, switching techniques and basic topologies of DC-DC switching regulators.
4.	To learn the different modulation techniques of pulse width modulated inverters and to understand harmonic reduction methods.
5.	To study the operation of AC voltage controller and various configurations of AC voltage controller

Course Outcomes:
After the completion of this course, students will be able to:

CO 1.	Understand the operation of semiconductor controlled devices.
CO 2.	Analyze the various uncontrolled rectifiers and design suitable filter circuits
CO 3.	Analyze the operation of the n-pulse converters and evaluate the performance parameters
CO 4.	Understand various PWM techniques and apply voltage control and harmonic elimination methods to inverter circuits.
CO 5.	Understand the operation of AC voltage controllers and its applications.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**TITLE : Power Semiconductor Devices:** 1.1 Introduction to power electronics 1.2 Study of switching devices 1.3 Switching devices characteristics. 1.4 Performance parameters. ***Course Outcome: CO1 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
2	**TITLE : Thyristors:** 2.1 Introduction & basic structure of SCR 2.2 Static and dynamic characteristics of SCR 2.3 Two transistor model of SCR 2.4 Methods of turning & R and RC firing circuit 2.5 Protection of SCR 2.6 Commutation circuits for SCR ***Course Outcome: CO2 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
3	**TITLE : CONTROLLED RECTIFIERS:** 3.1 Review of uncontrolled rectifiers 3.2 1-phase controlled rectifiers 3.3 H.W and F.W with resistive and inductive load 3.4 Effect of freewheeling diode 3.5 Current distortion, ripple and harmonic factor 3.6 3-phase controlled rectifiers. ***Course Outcome: CO3 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
4	**TITLE : DC-DC Converters(Chopper)** 4.1 Step down and step up chopper 4.2 Different control strategies of chopper. 4.3 Classification of chopper. 4.4 Buck and Boost converter ***Course Outcome: CO4 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
5	**TITLE : Inverters:** 5.1 Single phase series resonant inverter 5.2 Single phase and three phase voltage source inverters 5.3 Voltage control of inverters. 5.4 Harmonic reduction techniques PWM and SPWM. 5.5 Current source inverter. ***Course Outcome: CO5 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***

Books recommended:

Textbook:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Power Electronics: Converters, applications and design	Ned Mohan, T.M.Undeland, W.P.Robbins, John Wiley and Sons, 3rd Edition (reprint), 2009	
2.	Power Electronics Circuits, Devices and Applications	Rashid M.H., , Prentice Hall India, 3rd Edition, New Delhi, 2004.	

Reference book:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Power Electronics	Cyril. W. Lander, McGraw Hill International, Third Edition, 1993.	
2.	Power Electronics	P.S.Bimbhra, Khanna Publishers, Third Edition 2003	
3.	Power Electronics	P.C.Sen, Tata McGraw-Hill, 30th reprint, 2008.	

E- Reference

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes							PSO		
	1	2	3	4	5	6	7	1	2	3
1	2	3	2	1	1	1	1	1	2	3
2	2	3	2	2	1	1	1	2	1	2
3	2	3	3	3	1	1	1	2	1	2
4	2	2	1	2	1	1	1	2	1	2
5	2	3	2	2	1	1	1	2	1	2

EXPERT CONSULTATION COMMITTEE (ACADEMICS / INDUSTRIES)

S. No	Name	DESIGNATION	INSTITUTE/ORGANIZATION
1.			
2.			

AC ROTATING MACHINES

PROGRAMME: DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DEE 405**			COURSE TITLE: **AC ROTATING MACHINES**				
COMPULSORY / OPTIONAL: **COMPULSORY**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEEK	CREDIT	PE	FINAL	TOTAL
3	1	0	4	4	50	50	100

RATIONALE:

This course envisions imparting to students to:

1.	Know fully about ac machines.
2.	Operation, maintenance and proper connection and hence will enable them to work as a good supervisor.
3.	The topics of special motor used and that of electroplating will provide full insight of practical.
4.	They will learn to use electrical equipment.
5.	Know and define the basic elements; electric circuit terminology; energy sources used in electric circuit and also AC waveform and its various quantities.

Course Outcomes:

After the completion of this course, students will be able to:

CO 1	State and explain working principle, constructions as well as steady- state behaviour of an ac machines
CO 2	Understanding the concepts of three phase Induction motors.
CO 3	Identify, formulate and solve problems related to Synchronous Generators.
CO 4	Specify, constructions and working principle of Three Phase Synchronous Motor
CO 5	Aspire for developing career with specialization in areas of single phase ac motor.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**Title: Introduction to AC Machine** 1.1 Basic Construction. 1.2 Induction and synchronous machine. 1.3 MMF of distributed single phase and three phase, 1.4 Generated voltage in AC machine, 1.5 Torque-slip characteristics. ***Course Outcome: CO1 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
2	**Title: Three Phase Induction Motors:** 2.1 Introduction, Construction and types of 3-ph Induction motors. 2.2 Speed, Slip & Torque. 2.3 Characteristics of 3-ph IM and its applications. 2.4 Starting of 3- phase Induction motor. 2.5 Speed control. ***Course Outcome: CO2 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
3	**Title: Synchronous Generators.** 3.1 Introduction of Alternators & Advantages of rotating field. 3.2 Voltage generation and EMF equation. 3.3 Armature reaction & voltage regulation. 3.4 Synchronizing of alternator ***Course Outcome: CO3 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
4	**Title: Three Phase Synchronous Motor:** 4.1 Principle of operation & Torque equation. 4.2 Study of Synchronous Motor. 4.3 Characteristics of Synchronous Motor. 4.4 Hunting or phase swaging. 4.5 Synchronous condenser and applications. ***Course Outcome: CO4 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
5	**Title: Single Phase AC motors:** 5.1 Introduction and basic types. 5.2 Starting method of single phase motor. 5.3 Speed control and its applications. 5.4 Comparison between 1-ph & 3-ph motor. ***Course Outcome: CO5 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***

Books recommended:

Textbook:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Electric Machines	J. Nagrath, D.P. Kothari, 4th Edition, TMH, New Delhi, 2014.	
2.	Electrical Machines	P. S. Bimbhra, Khanna Publishers, New Delhi, 7th Edition 2014.	

Reference book:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Electric Machinery	E. Fitzgerald, Charles Kingsley, Stephen D. Umans;, McGraw Hill Education (India) Pvt. Ltd., Noida, 6th Edition, 2003.	
2.	Theory of Alternating Current Machinery	Alexander Suss Langsdorf;, McGraw-Hill, New York 1955.	
3.	Electrical Machines	Smarajit Ghosh,; Pearson, New Delhi, 2nd Edition, 2012.	

E- Reference

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes							PSO		
	1	2	3	4	5	6	7	1	2	3
1	2	3	2	1	1	1	1	1	2	3
2	2	3	2	2	1	2	1	2	1	2
3	2	3	3	3	3	1	1	2	2	2
4	2	2	1	2	1	1	1	2	1	2
5	2	3	2	2	1	3	1	2	1	2

EXPERT CONSULTATION COMMITTEE (ACADEMICS / INDUSTRIES)

S. No	Name	DESIGNATION	INSTITUTE/ORGANIZATION
1.			
2.			

MICROPROCESSOR AND MICROCONTROLLER

PROGRAMME: : DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DEC 403**			COURSE TITLE: **Microprocessor and Microcontroller**				
COMPULSORY / OPTIONAL: Core							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

RATIONALE: Students are expected to:

1. Understand and Compare Fundamentals of Microprocessors and Microcontrollers.
2. Illustrate the Architecture of INTEL 8086 Microprocessor.
3. Interface I/O and Peripheral Devices with 8085 Microprocessor.
4. Understand the Architecture of the Microcontroller series (MCS) – 51.

COURSE OUTCOMES

After the completion of this course, students will be able to

CO1	Compare fundamentals of Microprocessors and Microcontrollers.
CO2	Discuss the Architecture of the INTEL 8086 Microprocessor
CO3	Identify Peripheral Devices and understand the process of partitioning.
CO4	Identify the Peripheral ICs and their Interfacing with microprocessors.
CO5	Demonstrate the architecture details of Microcontroller series (MCS) – 51

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**Introduction to Microprocessors and Microcontrollers** 1.1 Definition of microprocessors and microcontrollers 1.2 Differences between microprocessors and microcontrollers 1.3 Evolution and history 1.4 Applications in various fields Course Outcome: CO1 Teaching Hours: 6 hrs Marks: 31 (PE+FINAL)
2	**INTEL 8086 Microprocessor** 2.1 Introduction, Architecture: Bus Interface Unit, Execution Unit 2.2 Pin-description 2.3 Operating modes: Pin–description for Minimum and Maximum mode 2.4 Operation 2.5 Registers Course Outcome: CO2 Teaching Hours: 9 hrs Marks: 21 (PE+FINAL)
3	**Peripheral Devices** 3.1 Address space partitioning – Memory mapped I/O Scheme; 3.2 Address space partitioning –I/O mapped I/O Scheme 3.3 Memory and I/O interfacing, 3.4 Data-transfer schemes 3.5 Interrupts of Intel 8086 Course Outcome: CO3 Teaching Hours: 7 hrs Marks: 16 (PE+FINAL)
4	**Peripheral Devices and their Interfacing:** 4.1 Brief Introduction to 8255 4.2 Brief Introduction to 8253 4.3 Interfacing of 8255 with Microprocessor. 4.4 Interfacing of 8253 with Microprocessor. Course Outcome: CO4 Teaching Hours: 8 hrs Marks: 21 (PE+FINAL)
5	**Microcontroller series (MCS) – 51 Overview:** 5.1 Architecture of 8051/8031 Microcontroller 5.2 Pin Details 5.3 Input Output Ports 5.4 Memory Organization, 5.5 Special Function Registers (SFRs) 5.6 External Memory Course Outcome: CO5 Teaching Hours: 10 hrs Marks: 11 (PE+FINAL)

TEXT AND REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Fundamentals of Microprocessor and Microcontrollers	B. Ram, Dhanpat Rai Publications, Seventh Edition,31 March 2018	978-8189928605
2.	The 8051 Microcontroller	Kenneth J. Ayala THOMSON, Cengage Learning, Third Edition	978-1401861582
3.	Microcontrollers (Theory and Applications)	Ajay V. Deshmukh, McGraw-Hill Education (India) Pvt Limited, 2005	978-0070585959
4.	Microcontrollers and Applications	Santanu Chattopadhyay, All India Council for Technical Education, January 2023	978-81-960576-0-2
5.	Microprocessor and Microcontroller	Saurabh Chaudhury, Risha Mal, All India Council for Technical Education, March, 2023	978-81-960576-9-5
6.	Microprocessors and Microcontrollers	Krishna Kant, PHI Learning Private Limited, Second Edition, 2012	978-81-203-3191-4

E-REFERENCES:

1. https://dokumen.pub_microprocessors-and-microcontrollers-architecture-programming-and-system-design-8085-8086-8051-8096-8120331915-9788120331914
2. https://www.google.com/search?sca_esv=595668565&sxsrf=AM9HkKl1daRHzM4OLRqH_0V6BZO_w-uAHg:1704374518334&q=vdoc.pub_microprocessors-and-microcontrollers-architecture-programming-interfacing-using-8085-8086-and-8051&nfpr=1&sa=X&ved=2ahUKEwiK1Ort6cODAxVG3TgGHY0yA9sQvgUoAXoECAcQAw

CO VS PO MAPPING

	PO							PSO		
CO	1	2	3	4	5	6	7	1	2	3
1	1	2	2	2	1	3	3	2	2	2
2	1	3	3	2	1	3	3	2	2	2
3	1	2	2	2	1	3	3	2	2	2
4	1	2	2	2	1	2	3	2	2	2
5	1	2	2	2	1	3	3	2	2	2

MICROPROCESSOR AND MICROCONTROLLER LAB

PROGRAMME: DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DEC 404**			COURSE TITLE: **Microprocessor and Microcontroller Lab**				
COMPULSORY / OPTIONAL: Core							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEK	CREDIT	PE	FINAL	TOTAL
0	0	2	2	1	60	40	100

RATIONALE: Students are expected to:

1. List each component's various components and characteristics in an 8085 Microprocessor and commands for working on the experiment kit.
2. Understand the programming concepts of 8085 for efficient coding
3. Write and explain algorithms and flowcharts for simple programs.
4. Explain examples for different addressing modes and no. of bytes for different instructions.
5. Write the code for a given requirement, execute the program, debug, and demonstrate that the program produces the required result/output.

COURSE OUTCOMES: After the completion of the course, students will be able to:

CO1	Identify and explain the functionality of various components in an 8085 Microprocessor and 8051 Microcontroller and work on experiment kit.
CO2	Explain the programming concepts of 8085/8051 for efficient coding.
CO3	Write and explain algorithms and flowcharts for simple programs.
CO4	Explain examples for different addressing modes and no. of bytes for different instructions.
CO5	Write the code for a given requirement, execute the program, debug, and demonstrate that the program produces the required result/output.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**TITLE: Basics of 8085 Training Kit and Assembly Language Programming** 1. Study of 8085 microprocessor training kit. 2. Basics of Assembly Language Programming Course Outcome: CO1 Teaching Hours: 4 hrs
2	**TITLE: Program for addition** 2.1 Write an ALP to add two 8-bit numbers; sum: 8 Bits. 2.2 Write an ALP to add two 8-bit numbers; sum: 16 Bits. 2.3 Write an ALP to add two 16-bit numbers; sum: 16 Bits or more. Course Outcome: CO2 Teaching Hours: 4 hrs
3	**TITLE: ALP for Subtraction and Multiplication** 3.1 Write an ALP to subtract two unsigned numbers and store the result in memory location XX90H. How would you determine whether the result is a straight binary number or 2's complement? Verify with examples. 3.2 Write an ALP to multiply two 8-bit numbers, the product being 16 bits. Course Outcome: CO3 Teaching Hours: 4 hrs
4	**TITLE: ALP for Sorting and Block transfer of Data** 4.1 (a)Write an ALP to arrange a data array in ascending order. (b) Write an ALP to arrange a data array in descending order 4.2 Write an ALP for block transfer of data. Course Outcome: CO4 Teaching Hours: 4 hrs
5	**TITLE: Basics of 8051 Training Kit** 5.1 Study of microcontroller INTEL 8051 Training Kit. 5.2 Write and execute an assembly language program for 8-bit addition. 5.3 Write and execute an assembly language program for 8- bit subtraction 5.4 Write and execute an assembly language program for 8- bit multiplication 5.5 Write and execute an assembly language program for 8- bit division. Course Outcome: CO5 Teaching Hours: 4 hrs

TEXT AND REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Fundamentals of Microprocessor and Microcontrollers	B. Ram, Dhanpat Rai Publications, Seventh Edition,31 March 2018	978-8189928605
2.	Microprocessor Architecture, Programming, and Applications with the 8085	Ramesh Gaonkar, Penram International Publishing (I) PVT. LTD., 6th Edition, 1 October 2013	978-8187972884
3.	The 8051 Microcontroller	Kenneth J. Ayala THOMSON, Cengage Learning, Third Edition	978-1401861582

4.	Microcontrollers (Theory and Applications)	Ajay V. Deshmukh, McGraw-Hill Education (India) Pvt Limited, 2005	978-0070585959
5.	The 8051 Microcontroller and Embedded Systems	Md. Ali Mazidi, Pearson Education India, 2007	9788131758991

E-REFERENCES:

1. https://dokumen.pub_microprocessors-and-microcontrollers-architecture-programming-and-system-design-8085-8086-8051-8096-8120331915-9788120331914
2. https://www.google.com/search?sca_esv=595668565&sxsrf=AM9HkKl1daRHzM4OLRqH_0V6BZO_w-uAHg:1704374518334&q=vdoc.pub_microprocessors-and-microcontrollers-architecture-programming-interfacing-using-8085-8086-and-8051&nfpr=1&sa=X&ved=2ahUKEwiK1Ort6cODAxVG3TgGHY0yA9sQvgUoAXoECAcQAw

CO VS PO MAPPING

	PO							PSO		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**
1	1	3	3	2	1	3	3	2	2	2
2	1	3	3	2	1	3	3	2	2	2
3	1	3	3	2	1	3	3	2	2	2
4	1	3	3	2	1	3	3	2	2	2
5	1	3	3	2	1	3	3	2	2	2

POWER ELECTRONICS LAB.

PROGRAMME: DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DEE 402**			COURSE TITLE: **POWER ELECTRONICS LAB.**				
COMPULSARY / OPTIONAL: **COMPULSORY**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEEK	CREDIT	PE	FINAL	TOTAL
0	0	2	2	1	50	50	100

Course Objectives

This course envisions imparting to students to:

1.	Identify semiconductor switches and carryout experimentation to reproduce the I-V characteristics.
2.	Explain the operation of triggering circuits, commutation circuits for the semiconductor switches and different energy conversion topologies through experimentation.
3.	Demonstrate and draw the waveforms of the circuit variables such as current through and voltage across the switches and load in different energy conversion topologies, though experimentation.
4.	Calculate the performance parameters of energy conversion topologies through experimental and analytical approach. Design assigned circuit topology for given specification and fabricate the circuitry of any of the power converter;
5.	Design the proper closed loop controller and to evaluate the performance of controller in case of a power converter topologies.

Course Outcomes

After the completion of this course, students will be able to:

CO 1	Identify different types of semiconductor based switching devices available in market
CO 2	Observe different characteristics of semiconductor based switching devices
CO 3	Choose a suitable and proper switching device for a required power electronics based design
CO 4	Evaluate the performance of power converter based systems such as electrical drive , renewable energy integration.
CO 5	Design power electronics system which requires a multi disciplinary approach and teamwork.

List of Experiments (The experiment list may vary to accommodate recent development in the field)

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**TITLE: Power Semiconductor Devices:** 1.1 To determine characteristics of SCR. 1.2 To determine characteristics of Mosfet 1.3 To determine characteristics of IGBT. ***Course Outcome: CO1 Teaching Hours: 4 hrs***
2	**TITLE: Thyristors:** 2.1 To Generate gate pulse using R & RC circuit. 2.2 To study class A and Class B commutation circuits of SCR. 2.3 To study class C and Class D commutation circuits of SCR. ***Course Outcome: CO2 Teaching Hours: 4 hrs***
3	**TITLE: Converters:** 3.1 To study the performance of H.W uncontrolled rectifier. 3.2 To study the performance of F.W uncontrolled rectifier. 3.3 To study the performance of AC to DC fully Controlled converter for R and RL Load and calculate the ripple factor. ***Course Outcome: CO3 Teaching Hours: 4 hrs***
4	**TITLE: DC-DC Converters(Chopper)** 4.1 To determine the characteristics of step down chopper for different duty cycle and frequency 4.2 To determine the characteristics of step up chopper. 4.3 Control of dc motor using two quadrant chopper. ***Course Outcome: CO4 Teaching Hours: 4 hrs***
5	**TITLE: Inverter.** 5.1 To study the working of a series inverter. 5.2 To study single phase full bridge inverter and calculate THD. 5.3 Study of Three phase PWM and Non-PWM inverter. 5.4 To study speed control of induction motor and plot speed vs firing angle. ***Course Outcome: CO5 Teaching Hours: 4 hrs***

Books recommended:

Textbook:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
3.	Power Electronics: Converters, applications and design	Ned Mohan, T.M.Undeland, W.P.Robbins, John Wiley and Sons, 3rd Edition (reprint), 2009	
4.	Power Electronics Circuits, Devices and Applications	Rashid M.H., , Prentice Hall India, 3rd Edition, New Delhi, 2004.	

Reference book:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
4.	Power Electronics	Cyril. W. Lander, McGraw Hill International, Third Edition, 1993.	
5.	Power Electronics	P.S.Bimbhra, Khanna Publishers, Third Edition 2003	
6.	Power Electronics	P.C.Sen, Tata McGraw-Hill, 30th reprint, 2008.	

E- Reference

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes							PSO		
	1	2	3	4	5	6	7	1	2	3
1	2	3	2	1	1	1	1	1	2	3
2	2	3	2	2	1	1	1	2	1	2
3	2	3	3	3	1	1	1	2	1	2
4	2	2	1	2	1	1	1	2	1	2
5	2	3	2	2	1	1	1	2	1	2

EXPERT CONSULTATION COMMITTEE (ACADEMICS / INDUSTRIES)

S. No	Name	DESIGNATION	INSTITUTE/ORGANIZATION
1.			
2.			

ELECTRICAL MACHINE LAB.

PROGRAMME: DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DEE 406**			COURSE TITLE: **ELECTRICAL MACHINE LAB.**				
COMPULSORY / OPTIONAL: **COMPULSORY**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEEK	CREDIT	PE	FINAL	TOTAL
0	0	2	2	1	50	50	100

Course Objectives

This course envisions imparting to students to:

1.	To the basic fundamentals related to the principle, construction and operation of Transformer and DC Machines and to give them experimental skill
2.	To measure the performance of a transformer and DC Machines by conducting various tests and to calculate the parameters.
3.	To basic skills needed to test and analyse the performance leading to design of electric machines.
4.	To work in a group and evaluate the results to prepare the report.

Course Outcomes

After the completion of this course, students will be able to:

CO 1	Able to recognize various types of Transformer and DC Machines, detail of name plate data of the machines and sketches the various connection diagrams involving these machines.
CO 2	Describe the features and working principle of transformers, DC Machine and starters.
CO 3	ble to perform experiments which are necessary to determine the parameters and the performance characteristics of the transformer and dc machines.
CO 4	Describe the features and working principle of transformers, AC and DC rotating Machine and starters.
CO 5	Able to perform experiments which are necessary to determine the parameters and the performance characteristics of the transformer, AC and DC rotating machines.

List of Experiments (The experiment list may vary to accommodate recent development in the field)

1. Study of types, characteristic and applications of transformers.
2. Study of different types of D.C machines.
3. Study of different types of starters.
4. Open circuit and short circuit test on a single phase transformer.
5. Load test on a single phase transformer.
6. Magnetization characteristic of separately excited D.C. Generator.
7. Load Test of a D.C. shunt motor.
8. Load Test on a D.C. shunt Generator.
9. Load test on a D.C. series Generator..
10. Load test on a D.C. compound Generator.
11. Speed Control of D.C. Shunt Motor
12. Study of A.C. Machines and Starters
13. No-load and blocked-rotor test on 3-phase induction motor.
14. Load test on 3-phase induction motor
15. To perform no load test on induction motor.
16. To perform blocked rotor test on induction motor.
17. Reversal and Speed control of an Induction motor.
18. To find regulation of a 3 phase alternator by O.C. test.
19. To find regulation of a 3 phase alternator by S.C. test
20. Determination of 'Regulation' of 3 - phase alternator by direct loading.
21. To Study the Starting and Reversal of Synchronous motor.
22. Speed control of single phase Induction motor.
23. To Study of universal motor.
24. To study shaded pole motor.

Books recommended:

Textbook:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	The performance and design of DC machines	A.E. Clayton	
2.	Theory of AC machines	A. S. Langsdorf	

Reference book:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Laboratory experiments on electrical machines	C. K. Chanda & A. Chakraborty, Dhanpat Rai & Co., New Delhi.	
2.	Laboratory manual for electromechanics	S. S. Murty, B.P. Singh C. S. Jha and D. P. Kothari, Wiley Eastern Ltd., Delhi.	

E- Reference

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes							PSO		
	1	2	3	4	5	6	7	1	2	3
1	2	3	2	1	1	1	1	1	2	3
2	2	3	2	2	1	1	1	2	1	2
3	2	3	3	3	1	1	1	2	1	2
4	2	2	1	2	1	1	1	2	1	2
5	2	3	2	2	1	1	1	2	1	2

EXPERT CONSULTATION COMMITTEE (ACADEMICS / INDUSTRIES)

S. No	Name	DESIGNATION	INSTITUTE/ORGANIZATION
1.			
2.			

ELECTRICAL EQUIPMENT MAINTENANCE

PROGRAMME: DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DPE 441**			COURSE TITLE: **ELECTRICAL EQUIPMENT MAINTENANCE**				
COMPULSORY / OPTIONAL: **OPTIONAL**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

Course Objectives

This course envisions imparting to students to:

1.	Know safety measures & state safety precautions.
2.	Identify / Locate common troubles in electrical machines & switch gear.
3.	Test single phase, three phase transformer, DC & AC machine as per IS.
4.	Plan & carry out routine & preventive maintenance.
5.	Initiate total productive maintenance.

Course Outcomes

After the completion of this course, students will be able to:

CO 1	To know Safety procedure in electrical work.
CO 2	To know about the different installation techniques of AC machines.
CO 3	To know about the different installation techniques and maintenance of transformers.
CO 4	To know about the different Method and installation of earthing.
CO 5	To know about the different maintenance techniques of AC machines.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**Safety procedure and precautions** 1.1 Safety procedure in electrical work. 1.2 Fire safety in building and electrical installation. 1.3 Causes of Electrical Accident and preventive measures. 1.4 Electric shock and treatments ***Course Outcome: CO1 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
2	**Installation of Rotating Electric Machine.** 2.1 Introduction to installation 2.2 Location and layout, positioning of machine, foundation. 2.3 Leveling and alignment, grouting and final alignment. 2.4 Drying - out of Electric Machines. ***Course Outcome: CO2 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
3	**Installation of Transformer.** 3.1 Installation and maintenance of transformer 3.2 Delivery, handling and inspection at site. 3.3 Parts of Power Transformer. ***Course Outcome: CO3 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
4	**Earthing** 4.1 Method of Earthing 4.2 Installation of different types of Earthing 4.3 Testing and maintenance ***Course Outcome: CO4 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
5	**Maintenance of Electrical machine** 5.1 Fundamentals of maintenance, preventive maintenance – planning. 5.2 Tools and instruments use for maintenance. 5.3 Types & causes of vibration. ***Course Outcome: CO5 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***

Text books:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Installation, commissioning and maintenance of electrical equipment	Tarlok Singh, S K Kataria and Sons, 2013	978-9350143773
2.	A Course in Electrical Installation Estimating and Costing	J.B. Gupta, S K Kataria and Sons, 2013	978-9350142790

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication, ,	ISBN
1.	Electrical Design	Raina K B New Age International Private Limited	978-8122443585
2.	Maintenance of Electrical Equipment	P.P. Gupta. Dhanpat Rai & Co. (P) Ltd 2018	9789383182008

E-REFERENCES:

CO VS PO MAPPING

	PO							PSO		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**
1	1	2	3	2	1	2	3	2	1	2
2	1	2	3	2	1	2	3	2	1	2
3	2	3	3	1	1	2	2	3	1	2
4	2	3	3	1	1	3	2	3	2	2
5	2	3	3	1	1	3	2	3	2	2

INDUSTRIAL INSTRUMENTATION AND CONDITION MONITORING

PROGRAMME: DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DPE 442**			COURSE TITLE: **Industrial Instrumentation And Condition Monitoring**				
COMPULSARY / OPTIONAL: **OPTIONAL**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

Course Objectives

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences:

- Use instrumentation equipment for condition monitoring and control

Course Outcomes

After the completion of this course, students will be able to:

CO 1	Have an idea about the temperature standards, calibration, thermocouples; signal conditioning used in RTD's and pyrometer techniques.
CO 2	Learn about Tachometer, Load cells, Torque meter and various densitometers.
CO 3	Have an adequate knowledge about pressure transducers.
CO 4	Understand about various types of flow meters and their installation.
CO 5	Basic Concept of signal conditioning System

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**Fundamentals of instrumentation** 1.1 Basic purpose of instrumentation. 1.2 Basic block diagram (transduction, signal conditioning, signal presentation) and their function. 1.3 Construction, working and application of switching devices - Push button, limit switch, float switch, pressure switch, thermostat, electromagnetic relay. ***Course Outcome: CO1 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
2	**Transducers** 2.1 Distinguish between Primary and Secondary, Electrical and Mechanical, Analog and Digital, Active and Passive. 2.2 Advantages, Factors & characteristics of electric transducers 2.3 Construction and principle of resistive transducer-Potentiometer. 2.4 Strain gauges and its types. 2.5 Construction and principle of Inductive transducers. ***Course Outcome: CO2 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
3	**Measurement of Non-Electrical Quantities** 3.1 Temperature measurement, Construction and Working of RTD, Thermistor and Thermocouple, radiation pyrometer. 3.2 Pressure measurement – Construction and working of bourdon tube, bellow diaphragm and strain gauge, 3.3 Speed Measurement by contacting and non-Contact all types of tachometer, magnetic pickup and Stroboscope. 3.4 Construction and Working of Vibration measurement by accelerometer-LVDT accelerometer, Piezo electric type. ***Course Outcome: CO3 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
4	**Signal Conditioning** 4.1 Basic Concept of signal conditioning System. 4.2 Draw pin configuration of IC 741. 4.3 Different Parameters of op-amp:-Input offset voltage, Input offset current, Input bias current, Differential input resistance, CMMR, SVRR, voltage gain, output voltage, slew rate, gain bandwidth. Output, short circuit current. 4.4 Use of op-amp as inverting, non- inverting mode, adder, subtractor, and Working of Differential amplifier and instrumentation amplifier. ***Course Outcome: CO4 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***

5	**Data Acquisition System** 5.1 Generalized DAS- Block diagram and description of Transducer, signal conditioner, multiplexer, converter and recorder. 5.2 Draw Single Channel and Multi-channel DAS- Block diagram only. Difference between Signal Channel and Multi-Channel DAS. 5.3 Data conversion- Construction and Working of Analog to digital conversion- successive approximation method, ramp type method. 5.4 Digital to Analog conversion- Construction and Working of binary weighted resistance method. 5.5 Concept and methods of data transmission of electrical and electronic transmission. ***Course Outcome: CO5 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***

Text books:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Electric and Electronic Measurement and instrumentation	Sawhney, A.K., Dhanpat Rai and Co. Author, Nineteenth revised edition 2011 reprint, 2014,	8177001000
2.	Electronics and instrumentation	Mehta, V.K. Third edition- S.Chand and company Pvt Ltd Reprint, 2010,	81-219-2729-3

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication, ,	ISBN
1.	Instrumentation devices and system	Rangan, C.S. G.R.Sharma. andV.S.V.Mani, , Pen ram International Publishing India Pvt. Ltd. Fifth edition,	10: 0074633503
2.	Industrial instrumentation and control	Singh, S.K. Tata McGraw-Hill, 1987.	007451914X, 9780074519141.
3.	Electronic Measurement and Instrumentation	J.G. Joshi, Khanna Publishing House, New Delhi.	978-93-86173-621

E-REFERENCES:

CO VS PO MAPPING

	PO							PSO		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**
1	2	2	3	2	1	3	3	2	2	2
2	2	2	3	2	3	2	1	2	1	2
3	1	3	1	2	3	2	1	1	1	2
4	1	3	1	2	3	3	3	1	1	2
5	1	3	1	2	1	3	3	2	2	2

APPLIED COMMUNICATION

PROGRAMME: DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DPE 443**			COURSE TITLE: **Applied Communication**				
COMPULSORY / OPTIONAL: **OPTIONAL**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

Course Objectives

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences: • Use relevant data communication technique.

Course Outcomes

This course envisions imparting to students to:

CO 1.	To know the basics of signals needs of modulation and multiplexing techniques.
CO 2.	To know the modulation and de-modulation methods of AM wave, identify different section in radio receiver.
CO 3.	To describe FM system, comparison between AM, FM & PM and troubleshooting AM/FM radio receivers.
CO 4.	To know the comparisons between analog and digital communication, Channel capacity, entropy, Shannon-Hartley theorem, channel noise and its effect.
CO 5.	To know Sampling theorem, Nyquist rate, aliasing, PAM, PWM, PPM, PCM transmitter and receiver, quantization error, companding and inter symbol interference.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**Communication of Signals ad Transmission Media:** 1.1 The communication process, sources of Information 1.2 Message and signals, classification of signals, 1.3 Block diagram of communication system 1.4 Modulation, needs of modulation, Radio frequency spectrum, Coaxial cable and Optical fibers. 1.5 Multiplexing, Frequency division multiplexing (FDM) and Time division multiplexing (TDM). ***Course Outcome: CO1 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
2	**AM Transmitter and Receiver:** 2.1 Generation of AM wave, low level and high level modulation, 2.2 Mathematical representation of amplitude modulated wave 2.3 Bandwidth requirement, AM transmitter block diagram, Modulation and Demodulation of AM 2.4 Waves Super heterodyne receiver, Receiver parameters: sensitivity, selectivity, fidelity, tracking. 2.5 Image frequency and its rejection, IF amplifiers. ***Course Outcome: CO2 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
3	**FM Transmitter and Receiver:** 3.1 Mathematical representation of frequency and phase modulation, 3.2 Narrow-band FM, wideband FM, transmission BW of FM waves. 3.3 Generation of frequency modulated waves, Demodulation of FM waves 3.4 Pre-emphasis and de-emphasis, Block diagram of FM receiver 3.5 Comparison between AM and FM. ***Course Outcome: CO3 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
4	**Introduction of Digital Communication:** 4.1 Block diagram of basic digital communication system 4.2 Channel capacity-definition, Hartley's law, Shannon-Hartley theorem, Channel capacity equation 4.3 Channel noise and its effect, entropy. 4.4 Advantages and disadvantages of digital communication. ***Course Outcome: CO4 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
5	**Pulse Communication:** 5.1 Introduction, comparison with Continuous Wave Modulation 5.2 Sampling theorem, Nyquist rate, aliasing, natural and flat top sampling 5.3 PAM, PWM, PPM definition, generation. 5.4 Block diagram, waveform analysis, and their comparison. 5.5 Pulse code modulation- block diagram of PCM transmitter and receiver ***Course Outcome: CO5 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***

Text books:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Electronic communication system	Wayne Tomasi, Pearson Education	
2.	Digital Communication	Siman Haykin, Jhon wiley & sons	

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication, ,	ISBN
1.	Electronics Communication,	Louis E. Frenzl, Tata McGraw Hill	
2.	Electronic Communications systems,	Roy Blake, Thomson	
3.	Communication System	Roddy Collen, Prentice Hall of India.	

E-REFERENCES:

CO VS PO MAPPING

	PO							PSO		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**
1	1	3	3	2	1	3	3	2	2	2
2	1	3	3	2	1	3	3	2	2	2
3	1	3	3	2	1	3	3	2	2	2
4	1	3	3	2	1	3	3	2	2	2
5	1	3	3	2	1	3	3	2	2	2

UTILIZATION OF ELECTRICAL ENERGY

PROGRAMME: DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DOE 441**			COURSE TITLE: **Utilization of Electrical Energy**				
COMPULSORY / OPTIONAL: **OPTIONAL**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

Course Objective:

The aim of this course is to help the student to attain the following industry identified competency through various teaching learning experiences: • Maintain electric traction systems.

Course Outcomes

After the completion of this course, students will be able to:

CO 1	Understand the importance of good illumination in factory, residential and flood lighting.
CO 2	Compare different methods of electric heating and welding.
CO 3	Select Electric Drive for specific applications.
CO 4	Explain the working of various components in Electric Traction system and list the advantages.
CO 5	Analyze the electric circuits of refrigerator, water cooler and air conditioner for troubleshooting.
CO 6	Apply various measures for economic aspects of utilizing electrical energy.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**Electrical Heating and Welding:** 1.1 Introduction to Heating and Welding. 1.2 Advantages of electrical heating and welding. 1.3 Types of Electrical heating. 1.4 Types of Electrical welding. ***Course Outcome: CO1 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
2	**Illuminations:** 2.1 Introduction to Law of Illuminations. 2.2 Design of illumination scheme 2.3 control of lighting system. 2.4 Various types of modern lighting systems. ***Course Outcome: CO2 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
3	**Electrolysis and Electroplating:** 3.1 Basic principle and Laws of electrolysis 3.2 Extraction of metals. 3.3 Electroplating plating 3.4 Power supply for electrolysis process. ***Course Outcome: CO3 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
4	**Industrial Control:** 4.1 Control of DC and AC motors. 4.2 Industrial applications of various motors. 4.3 Methods of speed control of various motors. 4.4 Electrical breaking of motors. ***Course Outcome: CO4 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
5	**Traction:** 5.1 Introduction to traction. 5.2 Advantage of electric traction system over other system. 5.3 Alternating and direct current, traction motor. 5.4 Electrical and mechanical braking. ***Course Outcome: CO5 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***

Text books:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Utilization of electrical power and Electric traction	J.B. Gupta	
2.			

REFERENCE BOOKS:

S. N.	Title	Author, Publisher, Edition and Year of publication, ,	ISBN
1.	Generation ,distribution and utilization of electrical energy	C.L Wadhwa	
2.	Utilization of electrical power	N.V. Suryanarayana	
3.			

E-REFERENCES:

CO VS PO MAPPING

	PO							PSO		
CO	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**1**	**2**	**3**
1	1	3	3	2	1	3	3	2	2	2
2	1	3	3	2	1	3	3	2	2	2
3	1	3	3	2	1	3	3	2	2	2
4	1	3	3	2	1	3	3	2	2	2
5	1	3	3	2	1	3	3	2	2	2

Electrical Energy Generation System

PROGRAMME: DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DOE 442**			COURSE TITLE: **Electrical Energy Generation System**				
COMPULSARY / OPTIONAL: **OPTIONAL**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

RATIONALE:

1.	Explain the working of different power plants.
2.	Identify different components for various systems in generating stations.
3.	Select suitable sites for different power stations.
4.	Define the terms used in economics of power generation.
5.	Identify the working of Non-conventional Sources of Energy.

Course Outcomes:
After the completion of this course, students will be able to:

CO 1	Outline the significance of various components of the thermal power generation plants and explain the governing system for bulk energy generation.
CO 2	The basic knowledge of Hydro electric power generation.
CO 3	Outline the significance of nuclear power plant components.
CO 4	Understanding diesel power plant and its components.
CO 5	The basic knowledge of non-conventional energy sources power plants.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**TITLE: Thermal Power Station** 1.1 Selection of site for a thermal Power station. 1.2 Layout and Main components of Thermal Power Plant. 1.3 Types of boilers and theirs characteristics. 1.4 Steam turbines and their characteristics. 1.5 Governing system for thermal stations. ***Course Outcome: CO1 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)***
2	**TITLE : Hydro Power Station** 2.1 Selection of site, layout and Main components. 2.2 Classification of Hydro Plants. 2.3 General arrangement and operation of a Hydro Plant. 2.4 Types of turbines using Hydro Power Plant. 2.5 Governing system for Hydro Power Plant. ***Course Outcome: CO 2 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)***
3	**TITLE : Nuclear Power Station** 3.1 Selection of site and layout. 3.2 Main parts of a nuclear station. 3.3 Classification of nuclear reactor. 3.4 Safety of nuclear power reactor. ***Course Outcome: CO 3 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)***
4	**TITLE : Diesel Electric Station** 4.1 Selection of site, layout and Main components. 4.2 Choice and characteristics of diesel engines. 4.3 Diesel plant efficiency and heat balance. 4.4 Diesel plant maintenance. ***Course Outcome: CO 4 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)***
5	**TITLE : Non-conventional Sources of Energy** 5.1 Wind power plant and its applications. 5.2 Solar plant and its applications. 5.3 Tidal power plant and its applications. 5.4 Bio gas power plant. ***Course Outcome: CO 5 Teaching Hours : 8 hrs Marks: 20 (PE+FINAL)***

Text books:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Power Plant Engineering	Nag, PK McGraw Hill Education 4th Edition 2017	978-9339204044
2.	A Textbook on Power System Engg.	A. Chakrabarti M.L. Soni P.V. Gupta), U.S. Bhatnagar Dhanpat Rai & Co. (P) Limited. 2016	978-8177000207
3.	Principles of Power System	V.K. & Mehta Rohit S.Chand 2022	978-8121924962

Reference books:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Elements of Electrical Power Station Design	Deshpande M.V Prentice Hall India Learning Private Limited 2009	978-8120336476
2.	Electric Power Generation, Transmission and Distribution	Singh S.N , Prentice Hall India Learning Private Limited, 2nd 2008.	978-8120335608
3.	Generation, Distribution and Utilization of Electrical Power	C.L. Wadhwa, John Wiley & Sons (Asia) Pte Ltd, Revised, 1998	978-8122400731

E Reference:

2.	power-plant-engineering-pk-nag1-pdf-free.html

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes							PSO		
	1	2	3	4	5	6	7	1	2	3
1	2	3	2	1	1	1	1	1	2	3
2	2	3	2	2	1	1	1	2	1	2
3	2	3	3	3	1	1	1	2	1	2
4	2	2	1	2	1	1	1	2	1	2
5	2	3	2	2	1	1	1	2	1	2

EXPERT CONSULTATION COMMITTEE (ACADEMICS / INDUSTRIES)

S. No	Name	DESIGNATION	INSTITUTE/ORGANIZATION
1.			
2.			
3.			

FUNDAMENTAL OF POWER ELECTRONICS

PROGRAMME: DIPLOMA IN ELECTRICAL AND ELECTRONICS ENGINEERING							
COURSE CODE: **DOE 443**			COURSE TITLE**: Fundamental of Power Electronics**				
COMPULSORY / OPTIONAL: **OPTIONAL**							
Teaching Scheme and Credits					EXAMINATION SCHEME		
L	T	P	HOURS/WEEEK	CREDIT	PE	FINAL	TOTAL
3	0	0	3	3	50	50	100

RATIONALE:
This course envisions imparting to students to:

1.	To understand the various applications of power electronic devices for conversion, control and conditioning of the electrical power and to get an overview of different types of power semiconductor devices and their dynamic characteristics.
2.	To understand the operation, characteristics and performance parameters of controlled rectifiers.
3.	To study the operation, switching techniques and basic topologies of DC-DC switching regulators.
4.	To learn the different modulation techniques of pulse width modulated inverters and to understand harmonic reduction methods.
5.	To study the operation of AC voltage controller and various configurations of AC voltage controller

Course Outcomes:
After the completion of this course, students will be able to:

CO 1.	Understand the operation of semiconductor controlled devices.
CO 2.	Analyze the various uncontrolled rectifiers and design suitable filter circuits
CO 3.	Analyze the operation of the n-pulse converters and evaluate the performance parameters
CO 4.	Understand various PWM techniques and apply voltage control and harmonic elimination methods to inverter circuits.
CO 5.	Understand the operation of AC voltage controllers and its applications.

COURSE CONTENT DETAILS:

MODULE	TOPICS/SUBTOPICS
1	**TITLE : Power Semiconductor Devices:** 1.1 Introduction to power electronics 1.2 Study of switching devices 1.3 Switching devices characteristics. 1.4 Performance parameters. ***Course Outcome: CO1 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
2	**TITLE : Thyristors:** 2.1 Introduction & basic structure of SCR 2.2 Static and dynamic characteristics of SCR 2.3 Two transistor model of SCR 2.4 Methods of turning & R and RC firing circuit 2.5 Protection of SCR 2.6 Commutation circuits for SCR ***Course Outcome: CO2 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
3	**TITLE : CONTROLLED RECTIFIERS:** 3.1 Review of uncontrolled rectifiers 3.2 1-phase controlled rectifiers 3.3 H.W and F.W with resistive and inductive load 3.4 Effect of freewheeling diode 3.5 Current distortion, ripple and harmonic factor 3.6 3-phase controlled rectifiers. ***Course Outcome: CO3 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
4	**TITLE : DC-DC Converters(Chopper)** 4.1 Step down and step up chopper 4.2 Different control strategies of chopper. 4.3 Classification of chopper. 4.4 Buck and Boost converter ***Course Outcome: CO4 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***
5	**TITLE : Inverters:** 5.1 Single phase series resonant inverter 5.2 Single phase and three phase voltage source inverters 5.3 Voltage control of inverters. 5.4 Harmonic reduction techniques PWM and SPWM. 5.5 Current source inverter. ***Course Outcome: CO5 Teaching Hours: 8 hrs Marks: 20 (PE+FINAL)***

Books recommended:

Textbook:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Power Electronics: Converters, applications and design	Ned Mohan, T.M.Undeland, W.P.Robbins, John Wiley and Sons, 3rd Edition (reprint), 2009	
2.	Power Electronics Circuits, Devices and Applications	Rashid M.H., , Prentice Hall India, 3rd Edition, New Delhi, 2004.	

Reference book:

S. N.	Title	Author, Publisher, Edition and Year of publication	ISBN
1.	Power Electronics	Cyril. W. Lander, McGraw Hill International, Third Edition, 1993.	
2.	Power Electronics	P.S.Bimbhra, Khanna Publishers, Third Edition 2003	
3.	Power Electronics	P.C.Sen, Tata McGraw-Hill, 30th reprint, 2008.	

E- Reference

Mapping of Course Outcomes onto Program Outcomes

Course Outcome #	Program Outcomes							PSO		
	1	2	3	4	5	6	7	1	2	3
1	2	3	2	1	1	1	1	1	2	3
2	2	3	2	2	1	1	1	2	1	2
3	2	3	3	3	1	1	1	2	1	2
4	2	2	1	2	1	1	1	2	1	2
5	2	3	2	2	1	1	1	2	1	2

EXPERT CONSULTATION COMMITTEE (ACADEMICS / INDUSTRIES)

S. No	Name	DESIGNATION	INSTITUTE/ORGANIZATION
1.			
2.			