

RGPV (DIPLOMA WING) BHOPAL		OBE CURRICULUM FOR THE COURSE		FORMAT-3	Sheet No. 1/3
Branch	Cement Technology			Semester	V
Course Code	504	Course Name	ENERGY MANAGEMENT AND AUDIT		
Course Outcome 1	Students will be able to understand the energy conservation and Energy Management.			Teach Hrs	Marks
Learning Outcome 1	Students will be able to understand importance of energy, and its conservation.			08	10
Contents	Energy and developmental role of energy. Energy needs of growing economy. Energy demand and availability, Law of conservation of Energy. Different form of Energy, Conversion of one form of Energy into another form				
Method of Assessment	Theory Exam				
Learning Outcome 2	To enable the students to understand the concept of energy management and energy management opportunities			08	10
Contents	Definition and Objective of Energy Management, General Principles of Energy Management and Energy Management Planning. Energy Management Skills, Energy Management Strategy. Economics of implementation of energy optimization projects				
Method of Assessment	Theory exam				
Course Outcome 2	Students will be able to understand and analyse conventional and non conventional source of energy.				
Learning Outcome 1	Students will be able to understand and analyse conventional source of energy.			06	08
Contents	Conventional and non conventional source of energy. Conventional - Thermal, Hydro, Nuclear fission ,				
Method of Assessment	Paper Pen Test (Part of Progressive Test I)				

Learning Outcome 2	Students will be able to understand and analyse non-conventional source of energy.	10	12
Contents	Non – conventional source of energy, Solar, Wind, Biomass, wave energy, Fuel cells, Magneto Hydrodynamic (MHD) generator and Nuclear fusion. Comparison, Advantages and Disadvantages		
Method of Assessment	Theory Exam		
Course Outcome 3	Quantify the energy conservation opportunities in different Thermal and Electrical System	Teach Hrs	Marks
Learning Outcome 1	Student will be able to find the energy conservation opportunities in different Thermal System of Cement Plant	12	12
Contents	Heat balance, kiln-refractory interface lowering losses , Concepts of pre-heating and pre-calcining Fuel consumption economy Firing arrangement and selection of burners, Combustion losses. WHRS		
Method of Assessment	Paper Pen Test (Part of Progressive Test II)		
Learning Outcome 2	Student will be able to find the energy conservation opportunities in different Electrical System used in Cement Plant	8	8
Contents	Energy Efficient Techniques in Different electrical equipments in a cement plant, crushers, mills, kiln and fans, motors and drives, Commercial and domestic lighting		
Method of Assessment	Theory exam		
Course Outcome 4	Student will be able to write report on Energy Audit.	Teach Hrs	Marks
Learning Outcome 1	Student will be able to understand Energy Audit report writing procedure.	10	10
Contents	Preparations and presentations of energy audit reports, Guidelines for writing energy audit report, data presentation in report, Report-writing Recommendations.		
Method of Assessment	Theory exam		

Learning Outcome 2	Student will be able to analyse Energy Saving Techniques in Energy Audit	8	10
Contents	Impact of renewable energy on energy audit recommendations. Instruments for Audit and Monitoring Energy and Energy Savings.		
Method of Assessment	Assignment		
Course Outcome 5	Case-studies / Report studies of Energy Audits and energy cost optimization	Teach Hrs	Marks
Learning Outcome 1	Energy Audit Case Study -I	10	10
Contents	Case study of Small Scale Industry, Residential Building, Commercial Building,		
Method of Assessment	Theory exam		
Learning Outcome 2	Energy Audit Case Study -II	10	10
Contents	Case study of Medium Scale Industry, College Building, Auditorium		
Method of Assessment	Case Study as part of Term Work		

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Cod e	LO Cod e	Format No. 4
					<i>C</i>	<i>0</i>	<i>1</i>	<i>5</i>	<i>0</i>	<i>4</i>	<i>1</i>	<i>1</i>	
COURSE NAME	Energy Management and Audit												
CO Description	Students will be able to understand the energy conservation and Energy Management.												
LO Description	Students will be able to understand importance of energy, and its Conservation.												
SCHEME OF STUDY													
S. No .	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required			Remarks				
1	Energy and developmental role of energy. Energy needs of growing economy. Energy demand and availability, Law of conservation of Energy. Different form of Energy, Conversion of one form of Energy into another form.	Interactive classroom lecture method, Handout, Data Collection, video display, tutorials	Students will learn through discussion with the teacher on content provided by teacher. Data collection from internet, Student will prepare Power Point Presentation on current scenario.	8	0	Text book, charts, Paper Pen, Power point presentation, Video Lectures. data collection from internet searching.			Nil				
SCHEME OF ASSESSMENT													
S. No .	Method of Assessment	Description of Assessment		Maximum Marks	Resources Required			External / Internal					
1	Theory Exam	Student will be asked to explain the concepts as per learning content.		10	Question paper + Rating scale			External					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Part of end semester theory exam													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Co de	LO Co de	Format No. 4
					<i>C</i>	<i>0</i>	<i>1</i>	<i>5</i>	<i>0</i>	<i>4</i>	<i>1</i>	<i>2</i>	
COURSE NAME	Energy Management and Audit												
CO1 Description	Students will be able to understand the energy conservation and Energy Management.												
LO Description	To enable the students to understand the concept of energy management and energy management opportunities												
SCHEME OF STUDY													
S. No	Learning Content	Teaching Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required			Remarks				
1	Definition and Objective of Energy Management, General Principles of Energy Management and Energy Management Planning. Energy Management Skills, Energy Management Strategy. Economics of implementation of energy optimization projects	Interactive classroom lecture method, Handout, video display, tutorials	Students will learn through discussion on content provided by teacher. Data collection from internet, Student will prepare Power Point Presentation on given topic.	8	0	Text book, charts, Paper Pen, Power point presentation, Video Lectures.			Nil				
SCHEME OF ASSESSMENT													
S. No	Method of Assessment	Description of Assessment		Maximum Marks	Resources Required			External / Internal					
1	Theory Exam	Student will be asked to explain the concepts as per learning content.		10	Question paper + Rating scale			External					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													

Part of end semester theory exam

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format
					C	0	1	5	0	4	2	1	No. 4
COURSE NAME	Energy Management and Audit												
CO Description	Students will be able to understand and analyse conventional and non conventional source of energy.												
LO Description	Students will be able to understand and analyse conventional source of energy.												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required			Remarks				
1	Conventional and non conventional source of energy. Conventional - Thermal, Hydro, Nuclear fission ,.	Interactive classroom teaching, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz to make students practice their knowledge.	06		Text book, charts, Hand out/ lab manual, Power point presentation, Video Lectures.			Nil				
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment		Maximum Marks	Resources Required			External / Internal					
1	Paper Pen Test	Students will be asked to explain given learning content on specified manner.		08	Question paper + Rating scale			Internal					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
(Part of Progressive Test I)													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format
					C	0	2	5	0	4	2	2	No. 4
COURSE NAME	Energy Management and Audit												
CO Description	Students will be able to understand and analyse conventional and non conventional source of energy.												
LO Description	Students will be able to understand and analyse non-conventional source of energy.												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required			Remarks				
1	Non – conventional source of energy, Solar, Wind, Biomass, wave energy, Fuel cells, Magneto Hydrodynamic (MHD) generator and Nuclear fusion. Comparison, Advantages and Disadvantages	Interactive classroom lecture method Handout, video display, tutorials, Assignments, Demonstrations	Students will learn the processes through the discussion with the teacher on content provided by teacher. Field Visits	10	0	Text book, charts, Paper Pen, Power point presentation, Video Lectures.			Nil				
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment		Maximum Marks	Resources Required			External / Internal					
1	Theory Exam	Student will be asked to explain the concepts as per learning content.		12	Test paper + rating scale			External					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Part of end semester theory examination													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME				Branch Code			Course Code			CO Code	LO Code	Format
						C	0	1	5	0	4	3	1	No. 4
COURSE NAME		Energy Management and Audit												
CO Description		Quantify the energy conservation opportunities in different Thermal and Electrical System												
LO Description		Student will be able to find the energy conservation opportunities in different Thermal System of Cement Plant												
SCHEME OF STUDY														
S. No.	Learning Content	Teaching – Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks							
1	Heat balance, kiln-refractory interface lowering losses , Concepts of pre-heating and pre-calcining Fuel consumption economy Firing arrangement and selection of burners, Combustion losses. WHRS	Interactive classroom lecture method Handout, video display, tutorials, Assignments	Students will learn the processes through the discussion with the teacher on content provided by teacher and random quiz taken by them.	12	0	Text book, charts, Paper Pen, Power point presentation, Video Lectures.	Nil							
SCHEME OF ASSESSMENT														
S. No.	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal									
1	Paper Pen Test	Students will be asked to explain given learning content on specified manner.	12	Question paper + Rating scale	Internal									
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)														
(Part of Progressive Test II)														

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME				Branch Code			Course Code			CO Code	LO Code	Format
						C	0	1	5	0	4	3	2	No. 4
COURSE NAME		Energy Management and Audit												
CO Description		Quantify the energy conservation opportunities in different Thermal and Electrical System												
LO Description		Student will be able to find the energy conservation opportunities in different Electrical System used in Cement Plant												
SCHEME OF STUDY														
S. No.	Learning Content	Teaching Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required			Remarks					
1	Energy Efficient Techniques in Different electrical equipments in a cement plant, crushers, mills, kiln and fans, motors and drives, Commercial and domestic lighting	Interactive classroom teaching, demonstration, quiz, assignments.	Teacher will explain the contents and provide handouts to students. Teacher will conduct assignments/ quiz to make students practice their knowledge.	08		Text book, charts, Hand out/ lab manual, Power point presentation, Video Lectures.			Nil					
SCHEME OF ASSESSMENT														
S. No.	Method of Assessment	Description of Assessment		Maximum Marks	Resources Required			External / Internal						
1	Theory Exam	Students will be asked to explain given learning content on specified manner.		08	Question paper + Rating scale			External						
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)														
Part of end semester theory examination														

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format
					<i>C</i>	<i>0</i>	<i>1</i>	<i>5</i>	<i>0</i>	<i>4</i>	<i>4</i>	<i>1</i>	No. 4
COURSE NAME	Energy Management and Audit												
CO Description	Student will be able to write report on Energy Audit.												
LO Description	Student will be able to understand Energy Audit report writing procedure.												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required			Remarks				
1	Preparations and presentations of energy audit reports, Guidelines for writing energy audit report, data presentation in report, Report-writing Recommendations.	Interactive classroom lecture method Handout, video display, tutorials, Assignments	Teacher will describe the procedure of Energy audit report preparation. The students will learn through practice.	10	0	Text book, charts, Hand out/ Power point presentation, Video Lectures.			Nil				
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment		Maximum Marks	Resources Required			External / Internal					
1	Theory exam	Students will be asked to explain given learning content on specified manner.		10	Question paper + Rating scale			External					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Part of end semester theory examination													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format
					C	0	1	5	0	4	4	2	No. 4
COURSE NAME	Energy Management and Audit												
CO Description	Student will be able to write report on Energy Audit.												
LO Description	Student will be able to analyse Energy Saving Techniques in Energy Audit												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required			Remarks				
1	Impact of renewable energy on energy audit recommendations. Instruments for Audit and Monitoring Energy and Energy Savings.	Interactive classroom lecture method, Handout, video display, tutorials, Assignments	Students will learn the processes through the discussion with the teacher on content provided by teacher and random quiz taken by them.	8	0	Text book, charts, Paper Pen, Power point presentation, Video Lectures.			Nil				
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment		Maximum Marks	Resources Required			External / Internal					
1	Theory exam	Students will be asked to explain given learning content on specified manner.		10	Question paper + Rating scale			External					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Part of end semester theory examination													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format
					C	0	1	5	0	4	5	1	No. 4
COURSE NAME	Energy Management and Audit												
CO Description	Case-studies / Report studies of Energy Audits and energy cost optimization												
LO Description	Energy Audit Case Study -I												
SCHEME OF STUDY													
S. No.	Learning Content	Teaching Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required			Remarks				
1	Case study of Small Scale Industry, Residential Building, Commercial Building,	Interactive classroom lecture method, Handout, video display, Actual Field Data Collection,	Students will learn the processes of Case Study by actual data collection and analysis of data. Suggestions for improvement.	10	0	Text book, charts, Paper Pen, Power point presentation, Video Lectures. Internet			Nil				
SCHEME OF ASSESSMENT													
S. No.	Method of Assessment	Description of Assessment		Maximum Marks	Resources Required			External / Internal					
1	Theory exam	Student will be asked to write case study on any one case with data analysis..		10	Question paper + Rating scale			External					
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Part of end semester theory examination													

RGPV (Diploma Wing) Bhopal		SCHEME FOR LEARNING OUTCOME			Branch Code			Course Code			CO Code	LO Code	Format
					C	0	1	5	0	4	5	2	No. 4
COURSE NAME		Energy Management and Audit											
CO Description		Case-studies / Report studies of Energy Audits and energy cost optimization											
LO Description		Energy Audit Case Study -II											
SCHEME OF STUDY													
S. No	Learning Content	Teaching Learning Method	Description of T-L Process	Teach Hrs.	Pract. /Tut Hrs.	LRs Required	Remarks						
1	Case study of Medium Scale Industry, College Building, Auditorium	Interactive classroom lecture method, Handout, video display, Actual Field Data Collection,	Students will learn the processes of Case Study by actual data collection and analysis of data. Field Visits, Suggestions.	10	0	Text book, charts, Paper Pen, Power point presentation, Video Lectures. Internet	Nil						
SCHEME OF ASSESSMENT													
S. No	Method of Assessment	Description of Assessment	Maximum Marks	Resources Required	External / Internal								
1	Assignments, Report Writing	Student will be asked to submit assignment/ Case study Report / quiz on learning content	10	Observation / viva vice / Case study report valuation / Rating scale	Internal								
ADDITIONAL INSTRUCTIONS FOR THE HOD/ FACULTY (IF ANY)													
Part of Term work													

TEXT BOOKS AND REFERENCES

1. Energy Audit & Management

(Dr. Subhash Gadhave Anup Goel Siddu S. Laxmikant D. Jathar)

Publisher: Technical Publications
ISBN: 9789333218696, 9333218696
Edition: 2nd, 2019
Pages: 200

2. Energy Management Conservation and Audits

By Anil Kumar, Om Prakash, Prashant Singh Chauhan, Samsheer Gautam
Copyright Year 2021
ISBN 9780367343835
Published July 29, 2020 by CRC Press
200 Pages 35 B/W Illustrations

3. Energy Management Audit And Conservation

(Barun Kumar De)
Publisher: VRINDA PUBLICATIONS P LT-DELHI
ISBN: 9788182813434, 8182813433