University of Sana'a
Faculty of Engineering
Department: Electrical Engineering
Title of the Program: Electrical Power and Machines Engineering

Course Specification of Power Generation Plants

I. Course Identification and General Information:

1.	Course Title:	Power Generation Plants				
2.	Course Code & Number:	PME343				
3.	Credit hours:	C.H				Total
		Th.	Tu.	Pr.	Tr.	
		2	2	-	-	3
4.	Study level/ semester at which this course is offered:	Fourth Year / First Semester				
5.	Pre –requisite (if any):	Thermodynamics (ME150), Electrical Machines (PME225)				
6.	Co –requisite (if any):	None.				
7.	Program (s) in which the course is offered:	Electrical Power and Machines Engineering				
8.	Language of teaching the course:	English				
9.	Location of teaching the course:	Class				
10.	Prepared By:	Asst. Prof. Dr. Eng. Amin Abdelghani H. Mahyob				
11.	Date of Approval					

II. Course Description:

This introductory course in Electrical Power Generation Plants, basically, focuses on power generation principles for real world applications. More specifically this course is focused on application of energy principles and power generation cycles. The main purpose of implementing this course in curriculum is to learn about how the electrical power is generated in a power plant. The students will learn how to analyze the performance and the cycles of different classical power plants. Students will also learn how to study the economic and environmental impacts of power plants. Topics covered include steam turbine, diesel engine, gas turbine, combined cycle and nuclear power plants.

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Asst. Prof. Dr. Amin Abdelghani Mahyob	Asst. Prof. Dr. Adel Ahmed Al-Shakiri	Assoc. Prof. Dr. Mohammad Algorafi	Prof. Dr. Mohammed AL-Bukhaiti	Assoc. Prof. Dr. Huda Al-Emad

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III. Course Intended learning outcomes (CILOs) of the course		Referenced PILOs
a1	Learn the operation principles, components, performance characteristics, application areas, merits and demerits of the different types of the conventional power generation plants	A1
a2	Define various components of power plant and the factors influencing the site selection for each plant and determine the capacity of power plant	A2
b1	Analysis the performance and the thermodynamic cycles of steam, diesel, gas turbine, combined cycle and nuclear power plants	B1, B3
b2	Define Power Plant Economics and discus the environmental and safety aspects of power plant	B4
c1	Apply acquired knowledge in mathematics and thermodynamic in solving problems related to Power plant engineering.	C1,C4
d1	Work with small groups and distribute the tasks with his team.	D1, D5
d2	Present project results to a technical audience (Communication).	D2,D3,D4

(A) Alignment Course Intended Learning Outcomes of Knowledge and Understanding to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
a1- Learn the operation principles, components, performance characteristics, application areas, merits and demerits of the different types of the conventional power generation plants	Lectures, Demonstrations, Interactive class discussion Visits.	Assignments, Oral Presentations, Quizzes, Tests, Written Exams.

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a2-	Define various components of power plant and the factors influencing the site selection for each plant and determine the capacity of power plant	Lectures, Demonstrations, Interactive class discussion Visits.	Assignments, Oral Presentations, Quizzes, Tests, Written Exams.

(B) Alignment Course Intended Learning Outcomes of Intellectual Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes		Teaching strategies	Assessment Strategies
b1-	Analysis the performance and the thermodynamic cycles of steam, diesel, gas turbine, combined cycle and nuclear power plants	Lectures, Demonstrations, Interactive class discussion	Assignments, Oral Presentations, Quizzes, Tests, Written Exams.
b2-	Define Power Plant Economics and discus the environmental and safety aspects of power plant	Lectures, Demonstrations, Interactive class discussion.	Assignments, Oral Presentations, Quizzes, Tests, Written Exams.

© Alignment Course Intended Learning Outcomes of Professional and Practical Skills to Teaching Strategies and Assessment Strategies:

Course Intended Learning Outcomes		Teaching strategies	Assessment Strategies
c1-	Apply acquired knowledge in mathematics and thermodynamic in solving problems related to Power plant engineering	Lectures, Demonstrations, Interactive class discussion.	Assignments, Oral Presentations, Quizzes, Tests, Written Exams.

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(D) Alignment Course Intended Learning Outcomes of Transferable Skills to Teaching Strategies and Assessment Strategies:		
Course Intended Learning Outcomes	Teaching strategies	Assessment Strategies
d1- Work with small groups and distribute the tasks with his team.	Lectures, Demonstrations, Interactive class discussion.	Assignments, Oral Presentations, Quizzes, Tests, Written Exams.
d2- Present project results to a technical audience (Communication)	Lectures, Demonstrations, Interactive class discussion	Assignments, Oral Presentations, Quizzes, Tests, Written Exams.

IV. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Learning Outcomes	Sub Topics List	Number of Weeks	Contact hours
1.	Introduction	a1,a2	▪ Power and energy, sources of energy: renewable and nonrenewable resources, conventional and nonconventional resources ▪ Types of power plants: conventional and nonconventional power plants, renewable and nonrenewable power plants. ▪ Review of thermodynamic cycles related to power plants	1	2
2.	Power Plant Economics and Environmental	a1,a2,b2	▪ Power plant planning: load estimation, load curves, various terms and factors involved in	2	4

	Considerations		power plant calculations, Effect of variable load on power plant operation, Selection of power plant. ▪ Elements of costs: variable and fixed elements, energy elements, investor's profit; depreciation and replacement, theory of rates. ▪ Effect of plant type on costs, ▪ Effect of variable load on power plant operation ▪ Selection of site: general factors affecting the selection of power plant site, selection of site for nuclear and hydraulic power plants. ▪ Optimum operation of power plants.		
3.	Steam Power Plants	a1,a2,b1,b2, c1,d1,d2	▪ General layout of steam power plant, ▪ Basic Components of steam power plants and principles of operation. ▪ Power plant boilers including critical and super critical boilers. ▪ Different systems such as coal handling system, pulverizes and coal burners, combustion system, draft, ash handling system, Dust collection system, Feed water	3	6

			treatment and condenser and cooling towers and cooling ponds, Turbine auxiliary systems such as governing ▪ Effect of superheat and variation of steam conditions on thermal efficiency. ▪ Reheat and regeneration of steam. ▪ Analysis of steam power plant Cycles: (simple Rankin's Cycle, Reheat Cycle, re generative cycle, reheat-regenerative Cycle) ▪ Analysis of steam power plant performance: heat rates, work ratio, overall efficiency… ▪ Cogeneration of Power and process heat		
4.	Diesel Engine power plants:	a1,a2,b1,b2	▪ General layout ▪ Components of Diesel power plants ▪ Different systems of diesel power plant such as fuel system, lubrication system, air intake and admission system, supercharging system, exhaust system… ▪ Diesel plant operation (two and four stroke engines) ▪ Analysis of Diesel plant (efficiency heat balance…)	2	4

5.	Gas turbine power plant:	a1,a2,b1,b2, c1	▪ Layout of gas turbine power plant, ▪ Elements of gas turbine power plants and principles of operation, ▪ Gas turbine fuels, cogeneration, auxiliary systems such as fuel, controls and lubrication ▪ Effect of regeneration, intercooling and reheating ▪ Cycles of gas turbine power plants (open cycle, closed cycle, semi-closed cycle) ▪ Analysis of Gas turbine plants	2	4
6.	Combined cycle power plants	,b1,b2,c1,d1	▪ Advantage of combined cycle power plants ▪ Binary vapour cycles, Rankin-Rankins coupled cycles ▪ Combined cycle: (Gas Turbine-Steam cycles, thermionic-steam power plants, thermoelectric-steam power...) ▪ Combined cycles for cogenerations ▪ analysis of some combined cycles	2	4
7.	Nuclear power plant:	,a2,b1,b2, d2	▪ Principles of nuclear energy and reactions, nuclear radiation ▪ Basic components of nuclear plants ▪ Types of nuclear power reactor: such as Pressurized water reactor, boiling water reactor, gas cooled	2	4

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			reactor, liquid metal fast breeder reactor, Heavy water reactor … ▪ Nuclear waste disposal, ▪ Site selection of nuclear power plants		
Number of Weeks /and Units Per Semester				**14**	**28**

B - Tutorial Aspect:

Order	Tasks/ Experiments	Learning Outcomes	Number of Weeks	Contact hours
1	**Introduction** • Review of thermodynamic cycles related to power plants.	a1,a2,b1	1	2
2	**Power plant economic:** • Factors affecting the cost of electrical energy • Variable (operating) elements and fixed elements of cost • investor's profit; depreciation and replacement, theory of rates Forced outage rate. • Effect of plant type on costs • Optimum operation of power plants • Economics of plant selection, other considerations in plant selection	a1,a2,b2	2	4
3	**Steam power plants:** • Analysis of steam power plant Cycles: (simple Rankin's Cycle, Reheat Cycle, re generative cycle, reheat-regenerative Cycle) • Analysis of steam power plant performance: heat rates, work ratio, overall efficiency…	a1,a2,b1,b2	3	6

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	• Effect of superheat and variation of steam conditions on thermal efficiency. • Cogeneration of Power and heat process			
4	**<u>Diesel Engine power plants:</u>** • Analysis of Diesel performance plant (efficiency heat balance...) • Effect of supercharger	a1,a2,b1,d1,d2	1.5	3
5	**<u>Gas turbine power plant:</u>** • Cycles of gas turbine power plants (open cycle, closed cycle, semi-closed cycle) • Effect of regeneration, intercooling and reheating • Analysis of Gas turbine plants performance	a1,a2,b1,b2	1.5	3
6	**<u>Combined cycle power plants</u>** • analysis of some combined cycles • Combined cycles for cogenerations	a1,a2,b1,b2,d1, d2	2	4
7	**<u>Nuclear power plants:</u>** Principles of nuclear energy and reactions	a1,a2,b1,d1,d2	1	2
8	**<u>presentations</u>** (in a group of 4-6 students) The instructor will assign any one topic from the following: 1. steam power plants 2. Gas turbine power plants 3. Diesel engine power plants 4. Nuclear power plants **<u>students would:</u>** • Download technical specifications/ catalogues, videos or any other suitable presentations on	a1,a2,b1,b2,d1, d2	2	4

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	given topic. • Tabulate comparison of different power plants of same category, based on their different technical aspects. • Prepare the presentation and present the same during the laboratory hours in front of your classmates			
Number of Weeks /and Units Per Semester			**14**	**28**

V. Teaching strategies of the course:

- Lectures,
- Interactive class discussions,
- Demonstrations,
- Assignments,
- Self-study of computer aided design software
- Industrial visit (visits of some power plants)

VI. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Problem of Power plant planning	a1,a2,b1,b2	3	2.5
2.	Analysis of Diesel performance plant	a1,a2,b1,b2,c1	8	2.5
3.	Analysis of Gas turbine plants performance	a1,a2,b1,b2,,d1	13	2.5
Total				**7.5**

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VII. Schedule of Assessment Tasks for Students during the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment	Aligned Course Learning Outcomes
1.	Assignments	3,8,13	7.5	5%	a1,a2,b1,b2,
2.	Quizzes	4, 9 ,12	7.5	5%	a1,a2,b1,b2,
3.	Class attendance and participation, Presentation	weekly	15	10%	a1, a2, b1, b2 ,d1,d2
4.	Midterm Exam	7	30	20%	a1,a2,b1,b2,
5.	Final Exam	16	90	60%	a1,a2,b1,b2,
	Total		**150**	**100%**	

VIII. Learning Resources:

- *Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).*

1- Required Textbook(s) (maximum two).

1. P.K. Nag, 2008, "Power Plant Engineering", Third edition, Tata McGraw - Hill Publishing Company Ltd.,
2. Black & Veatch, 1996, "Power Plant Engineering", Springer.

2- Essential References.

1. R Rajput, "A Text Book of Power Plant Engineering", Laxmi Publications
2. M.M. El-Wakil, 2010, "Power Plant Technology", Tata McGraw - Hill Publishing Company Ltd
3. Thomas C. Elliott, Kao Chen and Robert C. Swanekamp, 1998, "Standard Handbook of Power Plant Engineering", Second Edition, McGraw - Hill.
4. Bernhard G a Sarotzki, William A Vopat, "Power Station Engineering and Economy", Tata Mc Graw Hill
5. Louis Allen Harding, " Steam power plant engineering", J. Wiley & Sons, inc
6. James H. Rust, "Nuclear Power Plant Engineering", Haralson Publishing Company

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3- Electronic Materials and Web Sites etc.	
	1. www.power-eng.com 2. www.rwe.com 3. www.plantengineering.com 4. -http://nptel.ac.in/courses/112105051/ 5. https://www.youtube.com/watch?v=Ota2_LUuar0 6. https://www.youtube.com/watch?v=3dJAtHaSQ98 7. https://www.youtube.com/watch?v=kbuLfXgw4Gs 8. https://www.youtube.com/watch?v=r9q80sSHxKM 9. https://www.youtube.com/watch?v=GZKKWz_tX1c

IX. Course Policies:

1.	**Class Attendance:** A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring a proof statement from university Clinic
2.	**Tardy:** For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he will be considered as absent.
3.	**Exam Attendance/Punctuality:** A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam-
4.	**Assignments & Projects:** The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time-
5.	**Cheating:** For cheating in exam, a student will be considered as fail. In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty-

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6.	**Plagiarism**: Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee proofed a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.
7.	**Other policies:** - Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room - Mobile phones are not allowed in class during the examination. Lecture notes and assignments my given directly to students using soft or hard copy

Reviewed By	**Vice Dean for Academic Affairs and Post Graduate Studies: Asst. Prof. Dr. Tarek A. Barakat** **President of Quality Assurance Unit: Assoc. Prof. Dr. Mohammed Algorafi** **Name of Reviewer from the Department: Assoc. Prof. Dr. Radwan Al bouthigy**
	Deputy Rector for Academic Affairs Asst. Prof. Dr. Ibrahim AlMutaa **Assoc. Prof. Dr. Ahmed Mujahed** **Asst. Prof. Dr. Munasar Alsubri**

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Faculty of Engineering
Department: Electrical Engineering
Title of the Program: Electrical Power and Machines Engineering

Template for Course Plan of Power Generation Plants

I. Information about Faculty Member Responsible for the Course:								
Name of Faculty Member	Asst. Prof. Dr. Amin Abdelghani H. Mahyob	**Office Hours**						
Location& Telephone No.	770249615	**SAT**	**SUN**	**MON**	**TUE**	**WED**	**THU**
E-mail	Amin.mahyob@gmail.com						

II. Course Identification and General Information:						
1-	Course Title:	Power Generation Plants				
2-	Course Number & Code:	PME343				
3-	Credit hours:	C.H				Total
		Th.	Tu.	Pr.	Tr.	
		2	2	-		3
4-	Study level/year at which this course is offered:	Fourth Year/ First Semester				
5-	Pre –requisite (if any):	Thermodynamics (ME150), Electrical Machines (PME225				
6-	Co –requisite (if any):	None.				
7-	Program (s) in which the course is offered	Electrical Power and, machines				
8-	Language of teaching the course:	English				
9-	System of Study:	Regular				
10-	Mode of delivery:	Semester				
11-	Location of teaching the course:	Class				

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III. Course Description:

This introductory course in Electrical Power Generation Plants, basically, focuses on power generation principles for real world applications. More specifically this course is focused on application of energy principles and power generation cycles. The main purpose of implementing this course in curriculum is to learn about how the electrical power is generated in a power plant. The students will learn how to analyze the performance and the cycles of different classical power plants. Students will also learn how to study the economic and environmental impacts of power plants. Topics covered include steam turbine, diesel engine, gas turbine, combined cycle and nuclear power plants

IV. Intended learning outcomes (ILOs) of the course:

- Brief summary of the knowledge or skill the course is intended to develop**:**

1. Learn the operation principles, components, performance characteristics, application areas, merits and demerits of the different types of the conventional power generation plants
2. Define various components of power plant and the factors influencing the site selection for each plant and determine the capacity of power plant
3. Analysis the performance and the thermodynamic cycles of steam, diesel, gas turbine, combined cycle and nuclear power plants
4. Define Power Plant Economics and discus the environmental and safety aspects of power plant
5. Apply acquired knowledge in mathematics and thermodynamic in solving problems related to Power plant engineering.
6. Work with small groups and distribute the tasks with his team.
7. Present project results to a technical audience (Communication).

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V. Course Content:

A – Theoretical Aspect:

Order	Units/Topics List	Sub Topics List	Number of Weeks	Contact hours
1.	Introduction	▪ Power and energy, sources of energy: renewable and nonrenewable resources, conventional and nonconventional resources ▪ Types of power plants: conventional and nonconventional power plants, renewable and nonrenewable power plants. ▪ Review of thermodynamic cycles related to power plants	1st	2
2.	Power Plant Economics and Environmental Considerations	▪ Power plant planning: load estimation, load curves, various terms and factors involved in power plant calculations, Effect of variable load on power plant operation, Selection of power plant. ▪ Elements of costs: variable and fixed elements, energy elements, investor's profit; depreciation and replacement, theory of rates. ▪ Effect of plant type on costs, ▪ Effect of variable load on power plant operation ▪ Selection of site: general factors affecting the selection of power plant site, selection of site for nuclear and hydraulic power plants. ▪ Optimum operation of power plants.	2nd ,3rd	4

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3.	Steam Power Plants	▪ General layout of steam power plant, ▪ Basic Components of steam power plants and principles of operation. ▪ Power plant boilers including critical and super critical boilers. ▪ Different systems such as coal handling system, pulverizes and coal burners, combustion system, draft, ash handling system, Dust collection system, Feed water treatment and condenser and cooling towers and cooling ponds, Turbine auxiliary systems such as governing ▪ Effect of superheat and variation of steam conditions on thermal efficiency. ▪ Reheat and regeneration of steam. ▪ Analysis of steam power plant Cycles: (simple Rankin's Cycle, Reheat Cycle, re generative cycle, reheat-regenerative Cycle) ▪ Analysis of steam power plant performance: heat rates, work ratio, overall efficiency… ▪ Cogeneration of Power and process heat	4^{th} ,5^{th} ,6^{th}	6
4.	Midterm Exam		7^{th}	2
5.	Diesel Engine power plants:	▪ General layout ▪ Components of Diesel power plants ▪ Different systems of diesel power plant such as fuel system, lubrication system, air intake and admission system, supercharging system, exhaust system…	8^{th} ,9^{th}	4

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		▪ Diesel plant operation (two and four stroke engines) ▪ Analysis of Diesel plant (efficiency heat balance…)		
6.	Gas turbine power plant:	▪ Layout of gas turbine power plant, ▪ Elements of gas turbine power plants and principles of operation, ▪ Gas turbine fuels, cogeneration, auxiliary systems such as fuel, controls and lubrication ▪ Effect of regeneration, intercooling and reheating ▪ Cycles of gas turbine power plants (open cycle, closed cycle, semi-closed cycle) ▪ Analysis of Gas turbine plants	10^{th} ,11^{th}	4
7.	Combined cycle power plants	▪ Advantage of combined cycle power plants ▪ Binary vapour cycles, Rankin-Rankins coupled cycles ▪ Combined cycle: (Gas Turbine-Steam cycles, thermionic-steam power plants, thermoelectric-steam power...) ▪ Combined cycles for cogenerations ▪ analysis of some combined cycles	12^{th} ,13^{th}	4
8.	Nuclear power plant:	▪ Principles of nuclear energy and reactions, nuclear radiation ▪ Basic components of nuclear plants ▪ Types of nuclear power reactor: such as Pressurized water reactor, boiling water reactor, gas cooled reactor, liquid metal fast breeder reactor, Heavy water reactor … ▪ Nuclear waste disposal,	14^{th} ,15^{th}	4

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		▪ Site selection of nuclear power plants		
9.	Final Exam		16th	2
Number of Weeks /and Units Per Semester			**16**	**32**

B - Tutorial Aspect:

Order	Tasks/ Experiments	Number of Weeks	Contact hours
1.	**Introduction** • Review of thermodynamic cycles related to power plants .	1st	2
2.	**Power plant economic:** • Factors affecting the cost of electrical energy • Variable (operating) elements and fixed elements of cost • investor's profit; depreciation and replacement, theory of rates Forced outage rate. • Effect of plant type on costs • Optimum operation of power plants • Economics of plant selection, other considerations in plant selection	2nd ,3rd	4
3.	**Steam power plants:** • Analysis of steam power plant Cycles: (simple Rankin's Cycle, Reheat Cycle, re generative cycle, reheat-regenerative Cycle) • Analysis of steam power plant performance: heat rates, work ratio, overall efficiency… • Effect of superheat and variation of steam conditions on thermal efficiency. • Cogeneration of Power and heat process	4th ,5th .6th	6
4.	**Diesel Engine power plants:**	7th ,8th	3

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	• Analysis of Diesel performance plant (efficiency heat balance...) • Effect of supercharger		
5.	**Gas turbine power plant:** • Cycles of gas turbine power plants (open cycle, closed cycle, semi-closed cycle) • Effect of regeneration, intercooling and reheating • Analysis of Gas turbine plants performance	8^{th} ,9^{th}	3
6.	**Combined cycle power plants** • analysis of some combined cycles • Combined cycles for cogenerations	10^{th} ,11^{th}	4
7.	**Nuclear power plants:** Principles of nuclear energy and reactions	12^{th}	2
8.	**presentations** (in a group of 4-6 students) The instructor will assign any one topic from the following: 5. steam power plants 6. Gas turbine power plants 7. Diesel engine power plants 8. Nuclear power plants **students would:** • Download technical specifications/ catalogues, videos or any other suitable presentations on given topic. • Tabulate comparison of different power plants of same category, based on their different technical aspects. • Prepare the presentation and present the same during the laboratory hours in front of your classmates	13^{th} ,14^{th}	4
Number of Weeks /and Units Per Semester		**14**	**28**

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VI. Teaching strategies of the course:

- Lectures,
- Interactive class discussions,
- Demonstrations,
- Assignments,
- Self-study of computer aided design software
- Industrial visit (visits of some power plants)

VII. Assignments:

No	Assignments	Aligned CILOs(symbols)	Week Due	Mark
1.	Problem of Power plant planning	a1,a2,b1,b2	3	2.5
2.	Analysis of Diesel performance plant	a1,a2,b1,b2,c1	8	2.5
3.	Analysis of Gas turbine plants performance	a1,a2,b1,b2,,d1	13	2.5
Total				**7.5**

VIII. Schedule of Assessment Tasks for Students during the Semester:

No.	Assessment Method	Week Due	Mark	Proportion of Final Assessment
1.	Assignments	3,8,13	7.5	5%
2.	Quizzes	4, 9 ,12	7.5	5%
3.	Class attendance and participation, Presentation	weekly	15	10%
4.	Midterm Exam	7	30	20%
5.	Final Exam	16	90	60%
	Total		**150**	**100%**

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IX. Learning Resources:

- *Written in the following order: (Author - Year of publication – Title – Edition – Place of publication – Publisher).*

1- Required Textbook(s) (maximum two).

1. P.K. Nag, 2008, "Power Plant Engineering", Third edition, Tata McGraw - Hill Publishing Company Ltd.,
2. Black & Veatch, 1996, "Power Plant Engineering", Springer.

2- Essential References.

1. R Rajput, "A Text Book of Power Plant Engineering", Laxmi Publications
2. M.M. El-Wakil, 2010, "Power Plant Technology", Tata McGraw - Hill Publishing Company Ltd
3. Thomas C. Elliott, Kao Chen and Robert C. Swanekamp, 1998, "Standard Handbook of Power Plant Engineering", Second Edition, McGraw - Hill.
4. Bernhard G a Sarotzki, William A Vopat, "Power Station Engineering and Economy", Tata Mc Graw Hill
5. Louis Allen Harding, " Steam power plant engineering", J. Wiley & Sons, inc
6. James H. Rust, "Nuclear Power Plant Engineering", Haralson Publishing Company

3- Electronic Materials and Web Sites etc.

1. www.power-eng.com
2. www.rwe.com
3. www.plantengineering.com
4. -http://nptel.ac.in/courses/112105051/
5. https://www.youtube.com/watch?v=Ota2_LUuar0
6. https://www.youtube.com/watch?v=3dJAtHaSQ98
7. https://www.youtube.com/watch?v=kbuLfXgw4Gs
8. https://www.youtube.com/watch?v=r9q80sSHxKM
9. https://www.youtube.com/watch?v=GZKKWz_tX1c

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	X. Course Policies:
1.	**Class Attendance:** A student should attend not less than 75 % of total hours of the subject; otherwise he will not be able to take the exam and will be considered as exam failure. If the student is absent due to illness, he/she should bring a proof statement from university Clinic
2.	**Tardy:** For late in attending the class, the student will be initially notified. If he repeated lateness in attending class he will be considered as absent.
3.	**Exam Attendance/Punctuality:** A student should attend the exam on time. He is Permitted to attend an exam half one hour from exam beginning, after that he/she will not be permitted to take the exam and he/she will be considered as absent in exam-
4.	**Assignments & Projects:** The assignment is given to the students after each chapter; the student has to submit all the assignments for checking on time-
5.	**Cheating:** For cheating in exam, a student will be considered as fail. In case the cheating is repeated three times during his/her study the student will be disengaged from the Faculty-
6.	**Plagiarism**: Plagiarism is the attending of a student the exam of a course instead of another student. If the examination committee proofed a plagiarism of a student, he will be disengaged from the Faculty. The final disengagement of the student from the Faculty should be confirmed from the Student Council Affair of the university.
7.	**Other policies:** - Mobile phones are not allowed to use during a class lecture. It must be closed, otherwise the student will be asked to leave the lecture room - Mobile phones are not allowed in class during the examination. Lecture notes and assignments my given directly to students using soft or hard copy

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