Course Specifications of:
P.D thesis (MEP 720)

Program(s) on which the course is given : Ph.D. in Mechanical Power Engineering
Compulsory or Elective element of program: Compulsory
Department offering the program: Mechanical Engineering/ Power
Academic year / Level: year/ 2014/2015
Date of specification approval: 2012

A. Basic Information

Title: Advanced Thermodynamics **Code: MEP 720**
Credit Hours: 30 **Lecture:**
Tutorial: **Practical: 30** **Total: 30**

B- Professional Information

1. Overall aims of the Ph.D. thesis

By the end of the thesis preparation the students will be able to:

1 Master engineering research methods
2 Employ the direct application of knowledge to the assessment and solution of mechanical power engineering challenges.
3 Improve decision making skills within different professional framework.
4 Learn how to support his claims in discussions related to mechanical engineering
5 Apply the theories of heat transfer, thermodynamics, fluid mechanics, refrigeration and air conditioning, combustion, thermodynamics, etc.
6 Learn innovation and creativity and developing Software.
7 Enhance technical and academic writing skills.

2. Intended Learning outcomes of Ph.D. Thesis is to satisfy the following (ILOs)

2.1 Knowledge and Understanding:

Upon successful compilation of the thesis the students will be able to acquire knowledge and understanding of:

a1. Essential fundamentals, theories, concepts, techniques and modern knowledge in the area of mechanical power engineering as well as other related disciplines. (2.1.1)
a2. Basic methodologies in computational and experimental research, ethics of scientific research and its versatile tools. (2.1.2)
a3. Moral and legal ethics of the professional practice in the area of mechanical power engineering. (2.1.3)
a4. Advanced concepts and principles of quality of the professional practice in the area of mechanical power engineering. (2.1.4)
a5. Knowledge of the effects of exercise on the environment and ways of development and conservation. (2.1.5)
a6. Knowledge of critical evaluation of the current problems related to the selected topics. (2.1.6)

a7. Scientific developments in the area of mechanical power engineering. (2.1.7)
a8. Professional to work in interdisciplinary, and identify the roles and expertise of others professionals. (2.1.8)

2.2 Intellectual Skills

Upon successful compilation of the thesis the students will be able to:

b1. Critically analyse and assess information in mechanical power engineering and draw data analogies to solve complex problems. (2.2.1)
b2. Evaluate data and make sound judgments in the lack of some data to solve problems. (2.2.2)
b3. Plan and conduct a research study. (2.2.3)
b4. Write scientific papers. (2.2.4)
b5. Assess and analyse risks in professional practices in the area of mechanical power engineering. (2.2.5)
b6. Plan for performance enhancement in the area of mechanical power engineering. (2.2.6)
b7. Have creativity and make professional decisions in various professional contexts. (2.2.7)
b8. Evaluate the relative enhancement in the system or process performance due to the innovative part or procedure application. (2.2.8)
b9. Engage effectively in the disciplines philosophy and discourse of mechanical power engineering. (2.2.9)
b10. Add new information to the knowledge by carry out a research studies in the mechanical power engineering field. (2.1.10)
b11 Formulate valuable research questions in the mechanical power engineering field. (2.1.11)

2.3 Professional and Practical Skills

Upon successful compilation of the thesis the students will be able to:

c1. Perform professional and modern skills in the area of mechanical power engineering according to the relevant codes of practice. (2.3.1)
c2. Write and evaluate professional reports, thesis as well as a national conference paper. (2.3.2)
c3. Evaluate and develop appropriate methods and techniques to analyse problems in mechanical power engineering. (2.3.3)
c4. Use of the appropriate technological means and produce research opportunities to serve mechanical power practice. (2.3.4)
c5. Plan to improve the performance of the professional practice. (2.3.5)
c6. Use various software programs for simulating the system features. (2.3.6)
c7. Use the different instruments for measuring the system properties safely and according to the specified accuracy. (2.3.7)
c8. Perform presentations for discussing the thesis work. (2.3.8)
c9. Develop innovative solutions, demonstrating flexibility and resourcefulness in the mechanical power engineering field. (2.3.9)

2.4 General and Transferable Skills

By completion of the course, the student should be able to:

d1. Communicate effectively using different means. (2.4.1)
d2. Use information technology in order to serve the development of professional practice. (2.4.2)
d3. Set basis and standards to the self-assessment and assessment of the others. (2.4.3)
d4. Adopt self-assessment and adopt long life learning. (2.4.4)
d5. Asses and identify the required learning needs. (2.4.5)
d6. Demonstrate the ethical, legal, social and civic responsibility as a researcher and member of the discipline and ability to lead the team work. (2.4.6)
d7. Demonstrate a high level of competence the management of time and scientific meetings. (2.4.7)
d8. Conduct self-learning and continuous education practices. (2.4.8)
d9 Make use of the available resources of information. (2.4.9)

3- Contents

No	Topic	No. of hours / week
1	Research outlines	30
2	Literature review preparation	30
3	Preparation for data collection	30
4	Pilot study	30
5	Data collection	30
6	Data investigation	30
7	Data analysis	30
8	Comparative Studies	30
9	Writing finial thesis	30
10	Thesis revision & corrections	30
11	Publishing results of research work	30
12	Final seminar - Evaluation and discussion of final thesis	

4- Course Matrix

ILOs	Teaching / learning methods and strategies	Assessment method
2.1.1,2.1.2,2.1.3 2.1.4, 2.3.1, 2.3.2	directed reading, independent study	Reports and presentations
2.1.1,2.1.2,2.1.3 2.1.4 2.3.1, 2.3.2	directed reading, independent study	
2.2.1, 2.2.2, 2.3.1	Seminar, directed reading, independent study	

2.3.1 to 2.3.7	Seminar, directed reading, independent study	
2.3.1 to 2.3.7	Seminar, directed reading, independent study	
2.3.1 to 2.3.7	Seminar, directed reading, independent study	
2.3.1 to 2.3.7	Seminar, directed reading, independent study	
2.3.1, 2.3.2, 2.3.3, 2.3.4, 2.3.5, 2.3.6, 2.3.7	Seminar, directed reading, independent study	
d1 to d8	Seminar, directed reading, independent study	
d1 to d8	Seminar	
d1 to d8	oral discussion	Reports

5. Teaching and Learning Methods

_____Lectures
__√___ Directed reading
__√___Practical work / laboratory
__√___Seminar / workshop
__√___ Self study
_____problem sheets
_____Case study
_____Assignments / homework
Other :_____

6. Student Assessment Methods

√ Reports and presentations to assess ILOs: knowledge, intellectual, professional, and general skills
√ Final discussion to assess ILOs: knowledge, intellectual, professional, and general skills

7. Assessment schedule

Assessment 1 Reports and presentations every three months
Assessment 2 Final discussion after the end of thesis preparation

8. Weighting of Assessments

Assignments	00%
Quizzes	00%
Course work report	00%
Mid-year examination	00%
Oral examination	00%
Practical examination	00%
Final discussion	100%
Other	00%
Total	100%

9. List of References

9.1 Essential Books (Text Books)

Related to the topic

9.2 Recommended Books

Related to the topic

9.3 Periodicals Web sites, etc

- Science Direct
- American society of mechanical engineering journals
- Elsevier

10. Facilities Required for Teaching and learning

- Computer facilities and data show.
- Well-equipped Mechanical Engineering Laboratories.

10 Matrix of thesis aims and ILO's

Course aims	a.1	a.2	a.3	a.4	a.5	a.6	a.7	a.8	b.1	b.2	b.3	b.4	b.5	b.6	b.7	b.8	b.9	b.10	b.11
1. Master engineering research methods	●	●	●	●	●	●		●	●	●	●	●	●	●	●	●		●	
2. Employ the direct application of knowledge to the assessment and solution of mechanical power engineering challenges		●			●	●	●		●	●				●	●				●
3. Improve decision making skills within different professional framework.				●	●										●	●	●	●	
4. Learn how to support his claims in discussions related to mechanical engineering																			
5. Apply the theories of heat transfer, thermodynamics, fluid mechanics, refrigeration and air conditioning, combustion, thermodynamics, etc.	●	●	●	●		●		●		●	●	●		●	●	●			●
6. Learn innovation and creativity and developing Software																			●
7. Enhance technical and academic writing skills.																			

Course aims	c.1	c.2	c.3	c.4	c.5	c.6	c.7	c.8	c.9	d.1	d.2	d.3	d.4	d.5	d.6	d.7	d.8	d.9
1. Master engineering research methods	●	●	●	●	●	●				●	●	●	●	●	●	●	●	
2. Employ the direct application of knowledge to the assessment and solution of	●	●	●	●	●		●	●		●	●				●	●		

	mechanical power engineering challenges																
3.	Improve decision making skills within different professional framework.				●	●									●	●		
4.	Learn how to support his claims in discussions related to mechanical engineering	●							●	●		●		●		●		●
5.	Apply the theories of heat transfer, thermodynamics, fluid mechanics, refrigeration and air conditioning, combustion, thermodynamics, etc.	●							●	●								
6.	Learn innovation and creativity and developing Software	●		●			●		●									
7.	Enhance technical and academic writing skills.										●	●	●	●	●	●	●	●	●

Course coordinators:

Head of Department Prof. Dr. Osama Ezzat Abdellatif