Course Specifications of: Turbo-Machinery MEP 609

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

A. Basic Information

Title: Turbo-Machinery **Code: MEP 609**
Credit Hours:3 **Lecture:3**
Tutorial: **Practical:** **Total: 3**

B- Professional Information

1- Overall aims of course:

This course introduces students to:

1- Understand the energy equation for different devices such as turbines, compressors, nozzles and diffusers.
2- Demonstrate principles and practice for the different types of turbines.
3- Recognize the physical principles and the most important techniques in gas and steam turbines.

2- Intended learning outcomes of course (ILOs)

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

2.1 Knowledge and understanding

a1. Define theories, fundamentals and specialized knowledge in turbo machines. (2.1.1)
a2. Search for scientific developments in the area of turbo machinery engineering. (2.1.3)
a3. List the principles and fundamentals of quality in professional practice related to turbomachines. (2.1.5)
a4. Illustrate the methodologies used in computational and experimental turbomachinery research. (2.1.7)

2.2 Intellectual skills

b1. Analyze and assess information in the field of turbo machines and draw analogies to solve problems. (2.2.1)
b2. Solve problems in spite of the lack of some data. (2.2.2)
b3. Conduct a research study and/or write a scientific essay about a research problem.(2.2.4)
b4. Make professional decisions in various professional contexts.(2.2.7)
b5. Evaluate the relative enhancement in the turbomachinery system or process performance due to the innovative part or procedure application.(2.2.8)

2.3 Professional and practical skills

c1. perform basic professional and modern skills in turbo machines.(2.3.1)
c2. Have participated in the research, development, or application of engineering solutions that have had a positive impact on society in the area of turbo machinery. (2.3.3)
c3. Use the various software programs for simulating the turbomachinery system features.(2.3.6)

2.4 General and transferable skills

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. Work in a group and Lead a team in familiar professional contexts (2.4.6)
d4. Manage time effectively.(2.4.7)

3- Contents

Topic No.	Topic	No. of weeks	Total no. of hours
1	Basic definitions	1	3
2	Energy equation for adiabatic flow in nozzle and diffuser	1	3
2	Energy and efficiency equations for turbine and compressor and turbine stage	2	6
3	Gas turbines	2	6
4	Steam turbines	2	6
5	Wind turbines	2	6
6	Dimensional analysis and similarity	2	6
7	Flow through blade cascade	2	6
8	Exam	1	3
	Total	15	45

4- Course Matrix

ILO's code number	Teaching/learning methods and strategies	Assessment methods and strategies
2.1.1 2.1.3 2.1.5 2.1.7	Formal lectures	Individual coursework assignments, quizzes, oral discussions and reports. Mid-year and /or final written examination is given.
2.2.1 2.2.2 2.2.4 2.2.7	Analysis and problem-solving skills are developed through tutorial/problem sheets and small group exercises. Research skills are developed through a small	Analysis and problem-solving skills are assessed through oral and written examinations.

2.2.8	subject oriented research project.	Design and research skills are assessed through project write-ups, coursework and project reports.
2.3.1 2.3.3 2.3.6	Experiments demonstrations, practical work, laboratory visits.	Practical skills are assessed through laboratory experimental write-ups, coursework exercises and reports, project reports and presentations.
2.4.1 2.4.2 2.4.6 2.4.7	Those skills are not explicitly taught; however, along the course of study the student will acquire those skills to be able to perform his obligations. Attendance of seminars, workshops or conferences will help the student in developing those skills. Presentation by students (either group or individual) will train students for those skills.	Project presentation

4- Assessment schedule

Assessment 1 Assignemnts on weeks 3, 11
Assessment 2 Quizzes on weeks 4, 10
Assessment 3 Mid-term exam on week 7
Assessment 4 Oral Exam on week 14
Assessment 5 Final exam on week 15

6- Weighting of assessments

20% (60 marks) Home assignments, Quizzes, and reports
20% (60 marks) Mid-term examination and Oral examination
60% (180 marks) Final-term examination
100% (300 marks) Total

7- List of References

7.1 Text Books

- Turbomachinery: Design and Theory, Rama S.R. Gorla (Marcell Dekker), 2001
- Fundamentals of Fluid Mechanics, Bruce R. Munson, Donald F. Young, Theodore H. Okiishi; Wiley; 4 editions, (November 29, 2001).

7.2 websites

-www.4shared.com
- Yahoo mail group
- www.scence.direct.com

8- Facilities required for teaching and learning

- Lecture room equipped with overhead projector
- Presentation board, computer and data show
- Laboratory

Course Coordinator: Prof. Dr. Ahmed M. Osman, Dr . Mohamed Saber Sokkar

Head of Department: Prof. Dr. Osama Ezzat Abdellatif

Matrix of course content and ILO's

Course Title: **Advanced turbo machinery** **Code**: **MEP 609**
Lecture: 3 **Tutorial**: ---- **Practical**: ---- **Total:** 3
Program on which the course is given: Post Graduate **M. Eng.** in Power Engineering.
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Department offering the course: Mechanical Engineering / Power
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Course content	**ILO's A**	**ILO's B**	**ILO's C**	**ILO's D**
Basic definitions	a1	b1		
Energy equation for adiabatic flow in nozzle and diffuser	a1,a4	b2	c1	d2
Energy and efficiency equations for turbine and compressor and turbine stage	a1	b3		d1,d3
Gas turbines	a2	b1	c2	d2
Steam turbines	a2,a3	b4	c3	
Wind turbines	a2	b5		
Dimensional analysis and similarity	a2	b1	c2	
Flow through blade cascade	a2			d4

Matrix of course aims and ILO's

Course Title: **Advanced turbo machinery** **Code**: **MEP 609**
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Course aims	**ILO's A**	**ILO's B**	**ILO's C**	**ILO's D**
1- Understand the energy equation for different devices such as turbines, compressors, nozzles and diffusers.	a1,a4	b2	c2	d1,d2
2- Demonstrate principles and practice for the different types of turbines.	a2,a3	b3,b1	c3	d4
3- Recognize the physical principles and the most important techniques in gas and steam turbines.	a2	b4,b5	c1	d3