Course Specifications of: Applied Fluid Mechanics MEP 522

Program(s) on which the course is given: Diploma in Mechanical Power Engineering
(Pumping and Pipe Networks 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: Applied Fluid Mechanics **Code: MEP 522**
Credit Hours: 3 **Lecture: 3**
Tutorial: **Practical:** **Total: 3**

B- Professional Information

1- Overall aims of course:

This course introduces students to:

1 - Recognize basic equations of motion- Navier –Stokes equations
2 - Solve laminar and turbulent boundary layer equations
3 – Apply Drag force of external flow on surfaces of bodies
4 – Know Diffuser fluid flow with pressure gradient &Diffuser fluid flow with pressure gradient.

2-**Intended learning outcomes of course (ILOs)**

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

2.1 Knowledge and understanding

a1. List principles of professional practice in fluid mechanics. (2.1.2)
a2. Solve problems in fluid mechanics. (2.1.3)
a3. Explain the effect of professional practice on the environment and work towards its conservation and maintenance. (2.1.4)

2.2 Intellectual skills

b1. Solve specialized problems in his/her profession. (2.2.2)
b2. Critically and analytically read research papers and topics related to applied fluid mechanic. (2.2.3)
b3. Make professional decisions in the light of available information. (2.2.5)

2.3 Professional and practical skills

c1. Apply professional skills in pumping and tubes networks. (2.3.1)
c2. Ability to plan and implement experiment design and evaluate testing. (2.3.3)

2.4 General and transferable skills

d1. Use different sources for obtaining information and knowledge. (2.4.4)
d2. Conduct self-learning and continuous education practices. (2.4.7)

3- Contents

Topic No.	Topic	No. of weeks	Total no. of hours
1	Basic Equations of Motion- Navier–Stokes Equations	1	3
2	Solution of laminar and turbulent boundary layer equations	4	12
3	Drag force of external flow on surfaces of bodies	2	6
4	Diffuser fluid flow with pressure gradient	2	6
5	Flow through pipes networks	3	12
6	Operating point for pipelines-pumps system	2	6
7	Exam	1	3
	Total	15	45

4- Course Matrix

ILO's code number	Teaching/learning methods and strategies	Assessment methods and strategies
2.1.2 2.1.3 2.1.4	Formal lectures	Individual coursework assignments, quizzes, oral discussions and reports. Mid-year and /or final written examination is given.
2.2.2 2.2.3 2.2.5	Analysis and problem-solving skills are developed through tutorial/problem sheets and small group exercises. Research skills are developed through a small subject oriented research project.	Analysis and problem-solving skills are assessed through oral and written examinations. Design and research skills are assessed through project write-ups, coursework and project reports.
2.3.1 2.3.3	Experiments demonstrations, practical work, laboratory visits.	Practical skills are assessed through laboratory experimental write-ups, coursework exercises and reports, project reports and presentations.
2.4.4 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.	Project presentation

	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.	

5- Assessment schedule

Assessment 1	Assignments	on weeks	1, 3, 6
Assessment 2	Quizzes	on weeks	2, 4, 9, 13
Assessment 3	Mid-term exam	on weeks	8
Assessment 3	Oral exam	on week	14
Assessment 4	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

- Fluid Mechanics With Engineering Applications, E. Finnemore, Joseph Franzini, McGraw-Hill; 10 edition, 2001
- Fluid Mechanics, Frank M. White, Mcgraw-Hill College,1998
- Fluid Mechanics, Second Edition: Volume 6 (Course of Theoretical Physics) by L. D. Landau and E.M. Lifshitz (Jan 15, 1987)
- Fundamentals of Fluid Mechanics, Bruce R. Munson, Donald F. Young, Theodore H. Okiishi; Wiley; 4 edition,(November 29, 2001)

7.2 Recommended books; Periodicals & Websites.

- Yahoo mail group

-www.sciencedirect.com

- www.4shared.com

8- Facilities required for teaching and learning

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

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Head of Department: Prof. Dr. Osama Ezzat Abdellatif

Matrix of course content and ILO's

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Course content	**ILO's A**	**ILO's B**	**ILO's C**	**ILO's D**
Basic Equations of Motion- Navier –Stokes Equations	a1, a2			d1
Solution of laminar and turbulent boundary layer equations		b1, b3		d2
Drag force of external flow on surfaces of bodies	a1, a3		c1	
Diffuser fluid flow with pressure gradient	a2	b1		
Flow through pipes networks		b2	c1	d1
Operating point for pipelines-pumps system	a1	b2	c1	

Matrix of course aims and ILO's

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Course aims	ILO's A	ILO's B	ILO's C	ILO's D
1- Understand basic equations of motion- Navier – Stokes equations	a1	b1	c1	d1
2- Solve laminar and turbulent boundary layer equations	a2, a3	b2		
3- Apply Drag force of external flow on surfaces of bodies	a3	b1, b3	c1	
4- Know Diffuser fluid flow with pressure gradient &Diffuser fluid flow with pressure. gradient	a1	b3		d2