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## *Course Specifications of: Pumping and Tubes Networks MEP 520*

**Program(s) on which the course is given:** Diploma in Mechanical Power Engineering  
(Pumping and Pipe Networks 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:** Pumping and Tubes Networks

**Code:** MEP 520

**Credit Hours:** 3

**Lecture:** 3

**Tutorial:**

**Practical:**

**Total:** 3

### **B- Professional Information**

#### **1- Overall aims of course:**

This course introduces students to:

- 1) Analyze pipe network and estimate the flow rate at different pipes.
- 2) Design different pipes in a pipe network.
- 3) Choose an appropriate pump required for the pipe network.

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

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

##### **2.1 Knowledge and understanding**

- a1. Identify fundamentals and specialized knowledge pumping and tubes networks and categorize sciences related to professional practice. (2.1.1)
- a2. Discuss the effect of professional practice on the environment and work towards its conservation and maintenance. (2.1.4)
- a3. Represent methodologies and computer tools for analysis, design and operation of tubes networks. (2.1.5)

##### **2.2 Intellectual skills**

- b1. Analyze the problems in pumping and tubes networks and categorize them according to their priority. (2.2.1)
- b2. Solve specialized problems in pumping and tubes networks. (2.2.2)
- b3. Analysis and criticize research papers and topics related to pumping and tubes networks. (2.2.3)
- b4. Assess the risks and hazards in professional practices. (2.2.4)



### 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 information technology in order to serve the development of professional practice. (2.4.2)
- d2. Assess self and identify own personal learning needs.(2.4.3)
- d3. Use different sources for obtaining information and knowledge. (2.4.4)
- d4. Work in a group and manage time effectively. (2.4.5)

## 3- Contents

Topic No.	Topic	No. of weeks	Total no. of hours
1	Flow through pipes- Darcy Weisbech and Hazen William formulas - Friction in pipelines – laminar and turbulent flow	2	6
2	Hardy Cross method for pipe network analysis	2	6
2	Newton Methods for pipe network analysis	3	9
3	Pipe network design	3	9
4	Pump selection and operating point	2	6
5	Water Hammer - the pipelines and pumping stations.	2	6
6	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 2.1.4 2.1.5	Formal lectures, seminars, tutorials, directed reading, project work and independent study.	Individual coursework assignments, quizzes, oral discussions and reports. Mid-year and /or final written examination is given.
2.2.1 2.2.2 2.2.3 2.2.4	Analysis and problem solving skills are developed through tutorial/problem sheets and small group exercises.	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.
2.4.2 2.4.3 2.4.4 2.4.5	Presentation by students (either group or individual) will train students for those skills.	Project presentation

### 5- Assessment schedule

Assessment 1	Assignments	on weeks	1, 3, 6
Assessment 2	Quizzes	on weeks	2, 4, 9 and 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

- Pump Handbook , Igor J. Karassik, William G. Krutzsch, Warren H. Fraser, McGraw-Hill; 3 edition, 1993
- Piping systems and Pipeline, J. Phillip Ellenberger, McGraw-Hillbook company copyright, 2005
- Hydraulics of Pipeline Systems by B.E. Larock, R.W.Jeppson and G.Z. Watters CRC , ISBN 0-8493-1806-8, TC174.L37

#### 7.2 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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## Matrix of course content and ILO's

**Course Title:** Pumping and Tubes Networks **Code:** *MEP 520*

**Lecture:** 3 **Tutorial:** ---- **Practical:** ---- **Total:** 3

**Program on which the course is given:** Diploma in Mechanical Power Engineering.

**Major or minor element of program:** Compulsory

**Department offering the program:** Mechanical Engineering / Power

**Department offering the course:** Mechanical Engineering / Power

**Academic year / level:** 2014/2015. **Date of specifications approval:** 2012

Course content	ILO's A	ILO's B	ILO's C	ILO's D
Flow through pipes- Darcy Weisbech and Hazen William formulas - Friction in pipelines – laminar and turbulent flow	a1, a2			d1
Hardy Cross method for pipe network analysis	a3	b1, b2, b3		
Newton Methods for pipe network analysis	a3	b4	c1	d2
Pipe network design		b2,b4		d3
Pump selection and operating point	a1		c1,c2	d1
Water Hammer - the pipelines and pumping stations.		b2	c1	d4



## Matrix of course aims and ILO's

**Course Title: Pumping and Tubes Networks**

**Code: MEP 520**

**Lecture: 3      Tutorial: ----      Practical: ----**

**Total: 3**

**Program on which the course is given:** Diploma in Mechanical Power Engineering. **Major or minor element of program:** Compulsory

**Department offering the program:** Mechanical Engineering / Power

**Department offering the course:** Mechanical Engineering / Power

**Academic year / level:** 2014/2015. **Date of specifications approval:** 2012

<b>Course aims</b>	<b>ILO's A</b>	<b>ILO's B</b>	<b>ILO's C</b>	<b>ILO's D</b>
1. Analyze pipe network and estimate the flow rate at different pipes.	a1,a3		c1	d2
2. Design different pipes in a pipe network.	a2,a3	b4	c2	d3
3. Choose an appropriate pump required for the pipe network.		b1,b2, b3	c2	