ME 444 Engineering Piping System Design **Credit: 3 (3-0-6)**

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Course Description

Design and specification of various piping systems such as hot and chilled water piping, compressed air and gas piping, drainage and vent piping, steam and condensate piping, steam trapping, pressure reduction in pipes. Selection of equipment and accessories in piping system such as various types of valves, pipes and fittings, strainer, pipe hanger, insulation etc. Installation techniques. Inspection and maintenance of piping systems.

Tentative Schedule:

#	Topics
1	Introduction to Engineering Piping System. Review of Fluid Mechanics. Mechanics of flow in pipes. Units. Design consideration.
2	Introduction to piping materials such as pipes, valves, joints and other fittings. Pumps. Flow rate, elevation and pressure drop in pipes. Pump characteristic and response.
3	Pipe drawing. Symbols. Cost estimation. Theory of flow in pipes. Energy balance in fluid flow.
4	Calculation of pressure drop in pipe.
5	Design of general water piping system. Pipe sizing.
6	Pump selection. Pump installation.
7	Recap
	Midterm Examination.

#	Topics
8	Design of building water supply system. Estimation of water demand. Hunter's curve. Fixture unit. Use factor.
9	Design of building drainage system. Manning equation for gravity flow. Rain drainage.
10	Introduction to fire protection system.
11	Design of chilled water piping system. Valve coefficient. Flow balancing and control valve selection. Insulation of chilled water pipes.
12	Introduction to steam system. Steam properties. Steam equipment. Basic design of steam piping system.
13	Thermal stress. Steam trapping. Insulation.
14	Compressed air piping system. Thermodynamics of compressed air. Air compressor. Pressure drop and pipe sizing.
15	Course Summary.
	Final Examination.

Scoring

Midterm Exam	30%
Final Exam	30%
Project	30%
Homeworks	10%

References

- Michael Frankel, FACILITY PIPING SYSTEMS HANDBOOK, Second Edition, McGraw-Hill 2002.
- Mohinder L. Nayyar, PIPING HANDBOOK, Seventh Edition, McGraw-Hill 2000.
- ดุลยโชติ ชลศึกษ์ เอกสารคำสอน วิชา วก. 444 การออกแบบระบบท่อทางวิศวกรรม 2562
- ดร. วริทธ์ อึ้งภากร การออกแบบระบบท่อภายในอาคาร ว.ส.ท. 2551
- Various local and international rules and standards.
- Manufacturer’s catalogs

For more information, please visit the class web page at:

http://www.dulyachot.me.engr.tu.ac.th/me444/me444.htm