Åbo Akademi University

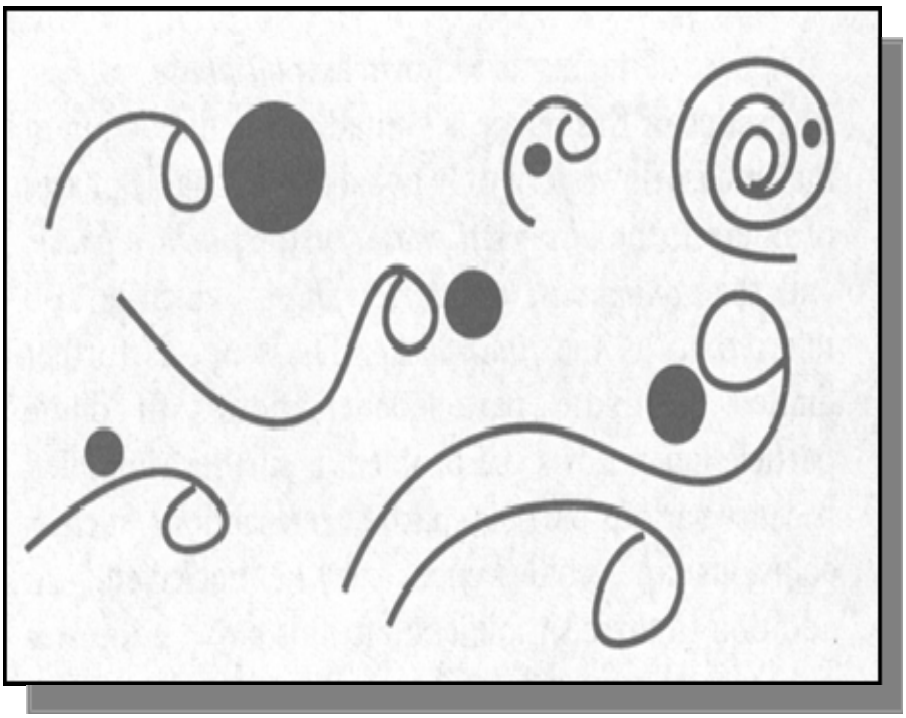
December 2013

Department of Chemical Engineering
Thermal and Flow Engineering Laboratory
Ron Zevenhoven

course 424514E

Fluid and Particulate Systems

version 2014



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Preface course 2014

This course compendium contains the material for Åbo Akademi University / Chemical Engineering course 424514 ”Fluid and Particulate Systems” 4 sp, as presented during 9x3 hours during January / February 2014. Being a (post-)graduate degree course under the so-called Bologna process, the course is presented in English.

It replaces course 424507 / 3342 / 3317 “Basic fluid mechanics” 4 sp, as presented for several years by dr. Jan Weegar, which in itself was primarily an update (and English version) of a course lectured by prof. Göran Öhman during the 1990s, in Swedish, under the title “Teknisk strömningslära”.

The current course differs significantly from the earlier courses as a result of added material dealing with multi-phase flow and particle technology-related topics such as aerosols, pneumatic conveying, gas/solid and liquid/solid separations, and powder flow. Also, a lecture on crystallisation is included, which was earlier part of course 3316 “Transport processer” lectured in Swedish by prof. Göran Öhman until 2005.

While the main objective of this course is to expand on basic principles as presented in second-year course 424101 “Processteknikens grunder” (“Introduction to process engineering”) it also gives some further background for course 424512 ”Introduction to Computational Fluid Dynamics”, 5 sp, where turbulence and turbulent flows are treated in more detail.

Some additional material handed out during the course dealt with the exercises that are included here.

Ron Zevenhoven

Åbo/Turku, December 2013

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List of contents course 2014

1. Basic principles / course overview

Fluid mechanics – re-wrap of principles

1.1 Balance equations
1.2 Viscosity; Newtonian/Non-Newtonian fluids
1.3 Tube flows, pressure drop
1.4 System boundaries
1.5 Pumps, compressors
1.6 Exercises 1

Overview/introduction to the second half of the course

1.7 Multi-phase flow and particle technology

2. Internal flows / Flows in ducts

2.1 Flow tube sections in series, in parallel, or branched
2.2 Pump combinations
2.3 System boundaries, unknown flow direction
2.4 Cavitation
2.5 Flow or flow velocity measurement
2.6 Exercises 2
2.7 Flow in non-circulars ducts, open channels
2.8 Exercises 3

3. External flows / Flow in porous structures

3.1 Flow around objects, drag forces, lift forces
3.2 Flow through or along tube bundles
3.3 Exercises 9
3.4 Flow in porous materials
3.5 Exercises 8

4. Dynamic flows / Compressible flows / Momentum balances

4.1 Dynamic, time-dependent flow
4.2 Example: water hammer
4.3 Exercises 4
4.4 Compressible flow
4.5 Exercises 5
4.6 Momentum balances: the ejector
4.7 Momentum balances: propellers and wind turbines
4.8 Exercises 7

5. Multi-phase flows / Aerosols

5.1 Overview
5.2 Lockhart-Martinelli's method
5.3 Newtonian suspensions, fibre-suspensions (Non-Newtonian)
5.4 Exercises 6
5.5 Particle (bubble, droplet, ...) size distribution, shape
5.6 Multi-phase flows in practice – dilute
5.7 Multi-phase flows in practice- dense
5.8 Particles in (turbulent) flows
5.9 Aerosols
5.10 Aerosol sampling and analysis

6. Fluidisation / Pneumatic / hydraulic conveying

6.1 Fluidised beds, basic features
6.2 Pressure drop
6.3 Fluidisation velocity, particle terminal velocity
6.4 Air distributors, non-mechanical valves
6.5 Fluidised bed modelling
6.6 Heat and mass transfer
6.7 Exercises 11
6.8 Pneumatic conveying
6.9 Hydraulic conveying
6.10 Exercises 12

7. Liquid/solid separations: Filtration, Sedimentation, Centrifuges

7.1 Filtration (Liquids)
7.2 Sedimentation
7.3 Centrifuges
7.4 Hydrocyclones
7.5 Exercises 13

8. Gas/solid separation: Cyclones, Electrostatic precipitators, (Hot) Gas filtration

8.1 Selection of devices
8.2 Cyclones
8.3 Exercises 10
8.4 Electrostatic precipitators (ESP)
8.5 Gas filtration
8.6 Hot gas filtration
8.7 Wet scrubbers
8.8 Exercises 14

9. Crystallisation (an introduction)

9.1 Basic principles
9.2 Crystal size, shape
9.3 Crystal growth
9.4 Equipment for solution crystallisation
9.5 Crystallisation process modelling (population balances)

10. Powder mechanics / Powder flow testing

10.1 Powder mechanics
10.2 Powder flow testing, shear testing
10.3 Silo design
10.4 Exercises 15