



1 – Introduction

1.1 Learning objectives of the course

1.2 Introduction to the course

2 – Introduction to Solar Heat in Industrial Processes (SHIP)

2.1 Overview of heat demand, and potential of solar heat

2.2 Industrial processes suited to SHIP

2.3 Examples of installed SHIP plants

3 – SHIP collector technologies and storage systems

3.1 Introduction to solar thermal collector technologies

3.2 Flat plate collectors

3.3 Solar air collectors

3.4 Evacuated tube collectors

3.5 Concentrating linear Fresnel collectors

3.6 Parabolic trough collector

3.7 Thermal storage

4 – System design

4.1 Process optimisation and energy efficiency

4.2 Feasibility study

4.3 Integration concepts of SHIP into industrial processes

4.4 Steps in preliminary system design

4.5 Estimate collector area using rules of thumb

4.6 System sizing using simulation programs

5 – Practical considerations to ensure good system performance

5.1 Stagnation and its causes

5.2 How to avoid stagnation problems

5.3 Scaling and corrosion

5.4 Operation, maintenance and monitoring of SHIP systems

6 – System economics

6.1 SHIP installations: drivers and barriers

6.2 Economic Key Performance Indicators (KPI): payback, NPV,

IRR and LCOH

6.3 SHIP system cost and economic viability

7 – Last chapter: Summary

7.1 Summary of the course

7.2 References (cited)

7.3 Further reading (recommendations)