A SHORT COURSE IN CLASSICAL THERMODYNAMICS

Goal is for Learners to Understand Fundamentals for Applications

Content:

- Some review of concepts
- Mostly integration, connection, & extension
- Illustrations of Procedures
- Some ideas of modeling

Structure:

- Morning lectures, afternoon workshops
- Readings suggested, lecture notes provided
- "Active learning" exercises in all classes
- Discussion & problem solving mainly in workshops

Teacher assumes knowledge of thermodynamics

Questions strongly encouraged

DAY 1

Lecture 1-1
Thermodynamics I. Basics

Lecture 1-2
Thermodynamics II. Modeling

Lecture 1-3
Structures of
- Knowledge
- Thermodynamics
- Problem Solving

Workshop 1
Diagnostics

Reading 1
Copies of Slides
O'Connell & Haile, Preface, Chapter 0

DAY 2

Lecture 2-1
Foundations of Properties & Processes

Lectures 2-2 & 2-3
Property relations

Workshop 2
Problems from Chapters 1 - 3

Reading 2
O'Connell & Haile, Chapters 1 – 3, App A & B
Copies of Slides

DAY 3

Lecture 3-1
Ideal Gas Properties & Deviations

Lecture 3-2
Ideal Solution Properties & Deviations

Workshop 3
Problems from Chapters 4 & 5

Reading 3
O'Connell & Haile, Chapters 4 – 5
Copies of Slides

DAY 4

Lecture 4-1
Relations Between Ideal Gas & Ideal Solution Deviations

Lecture 4-2
Phase Transfer & Equilibria

Workshop 4
Problems from Chapters 6 & 7

Reading 4
O'Connell & Haile, Chapters 6, 7.1 & 7.2
Copies of Slides

DAY 5

Lectures 5
Thermodynamics of Reactions

Workshop 5
Problems from Chapter 7

Reading 5
O'Connell & Haile, Sections 7.3 - 7.7
Copies of Slides

DAY 6

Lectures 6
Observability of Systems

Workshop 6
Problems from Chapter 8

Reading 6
O'Connell & Haile, Chapter 8
Copies of Slides

DAY 7

Lecture 7-1
Independent Variables
Simple Binary Phase Diagrams

Lecture 7-2
Complex Binary Phase Diagrams

Workshop 7
Problems from Chapter 9

Reading 7
O'Connell & Haile, Chapter 9, App. H.

DAY 8

Lectures 8
Phase Equilibrium Calculations

Workshop 8
Problems from Chapter 10

Reading 8
O'Connell & Haile, Sections 10.1 - 2.
Copies of Slides

DAY 9

Lectures 9
Reaction Equilibrium Calculations

Workshop 9
Problems from Chapter 10

Reading 9
O'Connell & Haile, Sections 10.3 - 5.
Copies of Slides

DAY 10

Lectures 10
Computational Methods in Thermodynamics

Workshop 10
Problems from Chapter 11

Reading 8
O'Connell & Haile, Chapter 11
Copies of Slides

DAY 11

Lectures 11
Applications of Thermodynamics I.

Workshop 11
Problems from Chapter 12

Reading 11
O'Connell & Haile, Sections 12.1-2
Copies of Slides

DAY 12

Lectures 12

Applications of Thermodynamics II.

Workshop 12

Problems from Chapter 12

Reading 11

O'Connell & Haile, Sections 12.3-4
Copies of Slides

DAY 13

Lecture 13-1

Summary of Course

Lecture 13-2

Assessment of Course