Reading instructions

Chapter 1

- All is part of the course; *Equations:* Basic definitions and equations should be known. They are important in most parts of the course.

Chapter 2

- All is part of the course; *Equations:* Know the connection between pressure and the weight of overlying air column; Understand how to use the barometric law

Chapter 3

- All is part of the course; *Equations:* Know how to use the mass balance equation in box and puff models, the definition of residence time and loss rate constant and to make calculations where they are used. Know how to solve simple first order differential equations (like eqn. 3.8 in Jacob).

Chapter 4

- All from beginning to section 4.3 is part of the course; *Equations:* Understand how the equations are used.
- Section 4.4 – 4.4.3 Not part of the course
- Section 4.4.4 Read through rapidly; Study enough to understand Figure 4-24 in Jacob on transport times.

Chapter 5

- Not part of the course

Chapter 6

- All is part of the course, but read rapidly through the deductions in section 6.5.3 (pp 101 – 103) *Equations:* Be able to carry out calculations based on geochemical cycles and to use chemical formalism with equilibrium constants that e.g. transforms eqn. 6.4 to 6.5.

Chapter 7

- All from beginning to section 7.4.1 is part of the course;*Equations:* Know the total radiation from a black body, the solar constant, calculate effective temperature and to explain and deduce the simple radiation model (section 7.3.2). Know how to calculate the radiative forcing using the simple model.
- 7.4.2 – 7.6 read rapidly through; Understand feedbacks and how they relate to radiative forcing. Know GWP. Know the meaning of the climate sensitivity parameter (λ), i.e. $\Delta T = \lambda \Delta F$. Know optical depth sufficiently to understand chapter 8.

Chapter 8 + extract by Martinsson + paper by Heintzenberg + Overheads from lectures on Aerosol + Aerosols, clouds and climate

- Overheads (OH): All is part of the course; *Equations:* Know how to use the equations.
- Chapter 8: All is part of the course; *Equations:* Know how to use the equations.
- Extract by Martinsson: All is part of the course; *Equations:* Know how to use the equations.

- Paper by Heintzenberg: Use the OH from the lecture to identify the important parts of the paper. *Equations:* The equations in Heintzenberg will not be used unless they are mentioned in the OH.

Chapter 9

- All is part of the course; *Equations:* Basic definitions and equations should be known. They are important in large parts of the course.

Chapter 10

- All from beginning to section 10.3: *Equations, reactions:* Know the formulation of the Chapman mechanism, catalytic ozone loss, chemical families (O_x, HO_x, NO_x and ClO_x) and reservoirs (for NO_x and ClO_x); schematic understanding of the ozone hole (Figure 10-13 in Jacob important);
- Section 10.4 read rapidly through.

Chapter 11

- All from beginning to section 11.1.1 is part of the course: *Equations, reactions:* Be able to describe the formation of OH.
- Section 11.1.2 (Global mean OH concentration) read rapidly through.
- Section 11.1.3 – until section 11.4 is part of the course. *Equations, reactions:* Know the circumstances for tropospheric ozone formation, schematic understanding of the oxidation of hydrocarbons in catalytic (HO_x-) cycles during formation of high ozone concentrations.
- Section 11.5 (Global budget of tropospheric ozone) read rapidly through.
- Section 11.6 (Anthropogenic influence on ozone and OH) read rapidly through.

Chapter 12

- All from beginning to section 12.2 is part of the course: *Equations, reactions:* Schematic understanding on why it is difficult to prevent the formation of high tropospheric ozone concentrations.
- Section 12.3 (Ozone production efficiency) read rapidly through.

Chapter 13

- All is part of the course: *Equations, reactions:* Know the description of S(IV) dissolution in water, and know how to use equilibrium constants and concentrations in water for different S(IV) compounds.

You can find more tips in the calculation exercise booklet.