Paul Kergin SS A1071 Tel: 4169783361
APM236H1F Applications of Linear Programming
http://www.math.toronto.edu/cms/courses-2/
Office hours: Mondays: 1:10 pm - 2:00 pm
Fridays: 1:10 pm - 2:00 pm
Marking scheme: Term 1 (20%) + Term 2 (20%) + Final(60%). No tutorials

a quick review of linear algebra chp. 0
convex analysis and basic solutions chp.1
the simplex method chp.2. omitting "big M method", pages 147-150
Duality chp.3, omitting "Now let us consider...", to page 201 inclusive, 3.6 and 3.7.

First week on linear programming problems
See Kolman and Beck section 1.3 for elementary solution methods ("graphical methods")
See page 51 for the definition of a general linear programming problem.

These are problems that may be stated
"Find x1,...,xn
which maximizes (or minimizes) z=c1x1+...+cnxn
subject to the constraints a11x1+...+a1nxn <= b1
⋮
am1x1+...+amnxn <= bn "
The linear function of x1, ... ,xn : z=c1x1+...+cnxn is
the objective function (all linear programming have one)
x1,..., xn are the decision variables of the problem.
The coefficients c1,..., cn and aij (i=1,...,m; j=1,...,n) are given data, as well as b1,...,bn.

To solve a problem means either
1. Find x1, ..., xn which maximizes (or minimizes) the objective function while satisfying all the constraints, and verify that your x1, ..., xn actually does maximizes (or minimizes) z. In case of a "maximize" problem, this means c1x1+ ... + cxn >= c1u1+ ... + cun, when u1, ..., un are any values of the decision variables which also satisfy the constraints.

2. Verify that there is no x1, ..., xn which maximizes z subject to the constraints.

The solution set of the constraints

a11x1+...+a1nxn <= b1

⋮

am1x1+...+amnxn <= bm

is called the feasible region of the problem. The feasible x1, ..., xn that maximizes (or minimizes) z (if there is such an x1, ..., xn) is called an optimal solution of the problem. The points in the feasible region are called feasible solutions.