MA427 Mathematical Optimisation – 2018/19 syllabus

Topics.

- **Linear programming (4 lectures):** Fourier-Motzkin elimination, Farkas lemma, duality. Geometry of LP: cones, polyhedra, faces, facets, vertices. Basic solutions, Caratheodorys theorem. Simplex: tableau form, Blands rule, two phase simplex, dual simplex.
- **Integer programming (3 lectures):** Totally unimodular matrices and applications. Formulations: knapsack, traveling salesman, facility location. Ideal formulations. Branch-and-bound. Cutting planes: Gomory cuts, branch-and-cut.
- **Convex programming (3 lectures):** Convexity basics. Lagrangian duality, Karush-Kuhn-Tucker conditions. Gradient descent method.

Assessment.

- **Summative:** 90% final exam, 10% course work. Course work summative mark will be the average of two homework assessments, due in weeks 6 and 9.
- **Formative:** One homework in 3, mock exam due in week 1 of Summer Term.