July 10, 2012 Room 5.4 (2 pm to 7 pm):
Introduction to Combinatorial Optimization
(tailored for students who did not follow an Operations Research course):
Contents
1. Introduction: Some easy examples
2. Linear Programming
3. Optimization problems
4. Integer Linear Programming

July 17, 2012 Room 5.1, with possible change to room 4.2 (2 pm to 7 pm):
Approximate Solution of Optimization Problems
Contents
1. Mathematical model of combinatorial optimization problems
2. Approximation algorithms
3. Heuristic algorithms
4. Metaheuristic algorithms

October 29, November 5, November 12, November 19, 2012 Room 5.5 (2 pm to 7 pm):
Models and Algorithms for Matching and Assignment Problems (4 lectures, 5 hours each)
Contents
1. Introduction: matching, assignment, graphs, bipartite graphs, adjacency matrix, incidence matrix;
2. Theoretical foundations: matching problems, Hall's marriage theorem, Koenig's algorithm, augmenting path, complexity, stable marriage problem;
3. Maximum matching applications: vehicle scheduling, time slot assignment (TDMA), open shop scheduling;
4. Linear sum assignment problem: weighted matching, constraint matrix, unimodularity, duality, Egervary's theorem, initialization algorithms;
5. The Hungarian algorithm: main structure, rooted alternating tree, complexity, Kuhn's algorithm, Jacobi's theorem;
6. Non-Hungarian algorithms: Dinic-Kronrod's algorithm, primal simplex algorithms, Egervary's algorithm, Birkhoff-Von Neumann theorem;
7. Other linear assignment problems: k-cardinality assignment, bottleneck assignment, threshold algorithm , balanced assignment ;
8. Quadratic assignment problems: combinatorial formulation, complexity, integer quadratic formulation, inner product formulation, trace formulation, exact solution, heuristics.

The slides of each lecture will be available few days in advance at my site:
http://www.or.deis.unibo.it/staff_pages/martello/cvitae.html --> Courses --> PhD courses