



# A Course Scheduling System

Course scheduling, especially at universities and similarly large facilities, goes along with complex constraints. With increasing input and more constraints an optimal solution cannot be computed within a reasonable amount of time. The widely used approach of using a genetic algorithm seemed to be promising and was therefore chosen for our project. The genetic algorithm operations, setup, fitness function, crossover, mutate and selection, are best conceived of as core components of the scheduler algorithm.

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List of lectures

Create a new Room

Name:

Number:

Building:

Features:

Seat:

Projector:

Whiteboard:

Chemical Laboratory Equipment:

Computer:

Create new program

newProgram.programName:

newProgram.courses

- ☒ Economics Principles I:
- ☒ Economics Principles II:
- ☒ Mathematics for Economists
- ☒ Intermediate Microeconomic
- ☒ Intermediate Macroeconomic
- ☐ Macroeconomic Theory and
- ☐ Statistics:
- ☐ Regression and Forecasting
- ☐ Analytical Statistics:

Submit

Conflicting courses are highlighted to make review easier, direct shifting of courses is possible

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Time	Monday	Tuesday	Wednesday	Thursday	Friday
08:00:00		Urban Economics		Intermediate Microeconomic	
09:00:00					Intermediate Macroeconomic
10:00:00	Public Economics				
11:00:00			Macroeconomic II		
12:00:00					
13:00:00				Statistics	
14:00:00					
15:00:00	Economics Principles I				
16:00:00					
17:00:00					
18:00:00				Economic Statistics	
19:00:00					

Other room:

Conflicting courses are highlighted to make review easier, direct shifting of courses is possible

DEFINE

REFINE

CROSS  
OVER

SELECT

MUTATE

Crossover creates a new candidate solution by mixing and matching parts of two given candidate solutions. How the mixing and matching is done depends to the representation of a candidate solution. As our representation is a mapping of courses to allocated rooms and times, these allocations are mixed and matched.

Fitness function rates the candidate solution assigning it a score. The score is mapped to the number of constraints satisfied. The more constraints are satisfied the higher the candidate solution is scored. The score ranges from 0.0 to 1.0.

Mutation creates a new candidate solution by taking a given candidate solution and changing a specified amount of course allocations to new, randomly chosen, course allocations. Selection iterates the given candidate solutions and keeps only the  $\mu$  best solutions. The solutions are selected, according to the score given by the fitness function, through dropping the rest of the candidate solutions.

