Metaheuristics for Optimization OR 670 and OR 750
Fall 2016
Prereq: OR 541 or permission of instructor
Instructor: Dr. Rajesh Ganesan, rganesan@gmu.edu, office hrs Wed 12:30-2-30 PM

This course covers both basic and advanced topics on the theory and practice of metaheuristic approaches to solve optimization problems whose solution structure and solution space is known but that are not solvable by exact methods such as LP, IP, NLP, and DP due to computational burden and/or lack of well-defined models. The course will stress on several applications and algorithmic aspects of the metaheuristic approaches while keeping in mind both time and space needs for computation. While optimality cannot be proved, the goal is to find good-enough solutions quickly. The course will use Excel and Matlab. You are welcome to use the free-download software ParadisEO for metaheuristic which runs on C++.

Text book:
Planning and Scheduling in Manufacturing and Services - Pinedo, Michael L.
ISBN 978-1-4419-0910-7 (also an e-version is available from Springer)

Notes prepared from
- Operations scheduling – Michael Pinedo and Xiuli Chao
- Metaheuristics – El-Gazhali Talbi
- Essentials of Metaheuristics – Sean Luke (GMU Comp Sc faculty)
- Scheduling - Michael Pinedo

Topics
Applications:
- Several heuristics with applications in sequencing, scheduling, parameter optimization and assignment problems

Algorithms:
- Single solution Metaheuristics- Local search – guided and iterative, tabu search, simulated annealing etc
- Population Metaheuristics- evolutionary computation – Genetic algorithm, swarm intelligence etc.
- Special heuristics such as graph coloring, shifting bottleneck, profile fitting etc
- Hybrid approaches
- Parallel Metaheuristics

Student Evaluation Criteria

Mid-term:	40%
Project	20%
Final Exam:	40%

Academic Policy:
All academic policies as given in the Honor System and code will be strictly followed. The University Honor Code is upheld and supported by the Office for Academic Integrity.

Grades:
Letter grades will be decided as follows:
97% and above –A^+, 94-96%- A, 90-93% -A^-, 86-89- B+, 83-85%-B, 80-82%-B-, 76-79%- C^+, 73-75%- C, 70-72%-C^-, 66-69%-D^+, 63-65%-D, 60-62%-D^-, at or below 59%-F

Please visit http://mason.gmu.edu/~rganesan/class.html to check for announcements, class notes, practice problems, and solutions