SYLLABUS FOR MATH 710-01 (3695)
Spec Topics In Appl Math (INTERIOR POINT METHODS)
Spring 2015
MW.........4:00pm - 5:15pm (SOND 204)

Instructor: Florian Potra
Office: 429 Math and Statistics (MP), Telephone: 455-2429
Home Page: http://www.math.umbc.edu/~potra
Office Hours: M 5:30-6:30 PM, W 1:15-2:15 PM.


GRADING POLICY
Your grade in this course will be based on two projects and a comprehensive final take home exam. For the projects you will have the choice between a theoretical or an application problem.

<table>
<thead>
<tr>
<th></th>
<th>Weight</th>
<th>Due Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework and quizzes</td>
<td>30%</td>
<td>Due every Monday</td>
</tr>
<tr>
<td>Project 1</td>
<td>30%</td>
<td>Feb. 23, Monday</td>
</tr>
<tr>
<td>Project 2</td>
<td>30%</td>
<td>Apr. 13, Monday</td>
</tr>
<tr>
<td>Final Exam</td>
<td>30%</td>
<td>MON, MAY 18 3:30-5:30 PM</td>
</tr>
</tbody>
</table>

Letter grades for the course will be based on your total score(S) which is the weighted sum of scores in the two projects and the final exam:

<table>
<thead>
<tr>
<th>Score (S)</th>
<th>85 &lt; S ≤ 100</th>
<th>75 &lt; S ≤ 85</th>
<th>65 &lt; S ≤ 75</th>
<th>50 &lt; S ≤ 65</th>
<th>0 ≤ S ≤ 50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade</td>
<td>A</td>
<td>B</td>
<td>C</td>
<td>D</td>
<td>F</td>
</tr>
</tbody>
</table>

The grading system may be changed for the entire class or in individual cases at the discretion of the instructor. In particular, class attendance and participation will be taken into account.

By enrolling in this course, each student assumes the responsibilities of an active participant in UMBC’s scholarly community in which everyone’s academic work and behavior are held to the highest standards of honesty. Cheating, fabrication, plagiarism, and helping others to commit these acts are all forms of academic dishonesty, and they are wrong. Academic misconduct could result in disciplinary action that may include, but is not limited to, suspension or dismissal. To read the full Student Academic Conduct Policy, consult the UMBC Student Handbook, the Faculty Handbook, or the UMBC Policies section of the UMBC Directory.
Learning Goals

The modern era of interior-point methods dates to 1984, when Karmarkar proposed his algorithm for linear programming. In the years since then, algorithms and software for linear programming have become quite sophisticated, while extensions to more general classes of problems, such as convex quadratic programming, semidefinite programming, and nonconvex and nonlinear problems, have reached varying levels of maturity. The first part of the course will review the most important results in interior-point methods obtained over the past two decades, emphasizing the distinction between computational complexity and superlinear convergence. While the work on computational complexity has shown that interior-point methods can solve in polynomial time some important mathematical programming problems, superlinear convergence results explain why the practical performance of interior-point methods is better than predicted by the computational complexity results. The second part of the course will be dedicated to some recent research in the field and/or some numerical experiments.

By the end of this course, you should:

- understand and remember the key ideas, concepts, definitions, and theorems of the subject,
- be able to apply mathematical theorems and computational algorithms correctly to answer basic questions,
- be able to choose the most useful theorem or most efficient computational algorithm for a given practical application.

To achieve these goals, you should:

- come to every class and ask questions,
- read the suggested material,
- try hard to assimilate all the material presented in class before attending the next class,
- do and hand in each assignment on time.