Math 546  Numerical Analysis of Elliptic PDEs  Fall 2012

Instructor: Dr. Sergey Lapin  M,W,F 2:10  Neill 3W
email: slapin@math.wsu.edu
Web-page: http://www.math.wsu.edu/math/faculty/slapin/
Office: Neill 327
Office Hours: M,W 11-12 and by appointment

Suggested books:

• J.W. Thomas "Numerical Partial Differential Equations: Conservation Laws and Elliptic Equations"

• G. Birkhoff, R. Lynch "Numerical Solution of Elliptic Problems"

• S. Larsson, V. Thomee "Partial Differential Equations with Numerical Methods"

• K.W. Morton, D.F. Mayers "Numerical Solution of Partial Differential Equations"

• C. Grossmann, H.-G. Roos, M. Stynes "Numerical Treatment of Partial Differential Equations"

Grading:

<table>
<thead>
<tr>
<th>Homeworks (5 assignments)</th>
<th>100 pts</th>
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<tbody>
<tr>
<td>Final project</td>
<td>100 pts</td>
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<tr>
<td>Total Possible:</td>
<td>200 pts</td>
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The following scale lists the point values that will guarantee at least the grade shown. We reserve the right to be more lenient.

<table>
<thead>
<tr>
<th>Points</th>
<th>184</th>
<th>178</th>
<th>170</th>
<th>164</th>
<th>158</th>
<th>150</th>
<th>144</th>
<th>138</th>
<th>130</th>
<th>120</th>
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<tbody>
<tr>
<td>Percentage</td>
<td>92</td>
<td>89</td>
<td>85</td>
<td>82</td>
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<td>75</td>
<td>72</td>
<td>69</td>
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<td>60</td>
</tr>
<tr>
<td>Grade</td>
<td>A-</td>
<td>B+</td>
<td>B</td>
<td>B-</td>
<td>C+</td>
<td>C</td>
<td>C-</td>
<td>D+</td>
<td>D</td>
<td></td>
</tr>
</tbody>
</table>

Course outline:

1. Introduction and mathematical preliminaries

2. Overview of elliptic partial differential equations

3. Finite difference methods for elliptic equations

4. Solvability and convergence of elliptic difference schemes

5. Direct methods

6. Iterative methods

7. Numerical solution of Neumann problems
8. Numerical solution of mixed problems
9. Variational methods and Finite Element Approximation

**Students with Disabilities:** Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center (DRC). All accommodations MUST be approved through the DRC (Washington Building, Room 217). Please stop by or call 509-335-3417 to make an appointment with a disability specialist.

**WSU Safety Measures:** Washington State University is committed to maintaining a safe environment for its faculty, staff, and students. Please visit http://safetyplan.wsu.edu and http://oem.wsu.edu/emergencies to access the Campus Safety Plan and emergency information.

**Academic integrity** will be strongly enforced in this course. Any student caught cheating on any assignment will be given an F grade for the course and will be reported to the Office of the Dean of Students. Cheating is defined in the Standards for Student Conduct WAC 504-26-010 (3). It is strongly suggested that you read and understand these definitions: http://www.conduct.wsu.edu/