Course Number: AMCS152

Course Title: Applied Numerical Methods

Academic Semester: Summer  Academic Year: 2015/2016
Semester Start Date: June 5, 2016  Semester End Date: August 4, 2016

Class Schedule: TBD

Instructor(s) Name(s): Maria Alexandra Gomes
Email: Alexandra.Gomes@kaust.edu.sa
Office Location: Building 1, Room 3126
Office Hours: Every time I am available in my office or by appointment.
Teaching Assistant Name: Email:

COMPREHENSIVE COURSE DESCRIPTION

Preliminaries:

Nonlinear Equations:

Interpolation and Numerical Differentiation:

Numerical Integration:
Trapezoid, Simpson’s and Newton-Cotes rules. Gaussian quadratures.

Linear Systems:
Initial Values Problems:

Partial Differential Equations:
Hyperbolic problems: wave equation model. Lax and upwind models.
Elliptic problems: Helmholtz equation. Finite-element methods.

GOALS AND OBJECTIVES
The goal of the course is to provide the students with a strong background on numerical approximation strategies and a basic knowledge on the theory that supports numerical algorithms.

REQUIRED KNOWLEDGE
Undergraduate Calculus. Previous programming experience in any language is preferred.

REFERENCE TEXTS
Location: main library, Call no.: QA297.C426 2013

Location: main library, Call no.: Q183.9.H4 2002

METHOD OF EVALUATION

<table>
<thead>
<tr>
<th>Percentages</th>
<th>Graded content</th>
</tr>
</thead>
<tbody>
<tr>
<td>30%</td>
<td>Problem sets</td>
</tr>
<tr>
<td>30 %</td>
<td>Tests</td>
</tr>
<tr>
<td>40 %</td>
<td>Final Exam</td>
</tr>
</tbody>
</table>

There are three components to the final grade: problem sets, 2 tests and a final exam. The contribution of each component to the course grade is as follows:
COURSE REQUIREMENTS

Assignments

The tests and the final exam are both written individual papers with emphasis on the interpretation of the results. The problem sets are also individual assessments. These involve numerical implementation of algorithms and guided development of methodologies. As such, some problems require simple programming in Matlab.

Course Policies

The students are required to attend all lectures and take notes. Late homework submissions have a 10% penalty per day and are no longer accepted once the solutions are made available. Students that do not show up for a test or for the exam should expect a zero in that assessment.

Additional Information

NOTE
The instructor reserves the right to make changes to this syllabus as necessary.