Fall 2021
SYLLABUS

Course title	**Finite Diff. Methods for PDEs**
Course number	MAT 6932
Schedule, Room	**MWF 8**, Lit 205
Instructor	Maia Martcheva
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Main themes	**An Introduction to the Finite Difference Method for Solution of PDEs**

Goals: Introduce students to finite difference methods for ODEs. Introduce students to finite difference methods for first order and second order PDEs.

Topics:

(1) Numerical methods for ODEs.
(2) Introduction to PDEs. Basic tools of the Finite Difference Methods.
(3) Finite difference methods for first order PDEs.
(4) Finite difference methods for elliptic equations.
(5) Finite difference methods for hyperbolic equations.
(6) Finite difference methods for parabolic equations.
(7) Consistency, convergence, stability.
(8) Numerical methods for systems of (non-linear) PDEs.

Prerequisites: Some ODEs/PDEs. Introductory Numerical analysis class (MAD4401 or better).

Requirements:

(1) Project: Find a PDE equation from your area of expertise/interests. Develop finite difference method. Code it (in Matlab).
(2) Students will be expected to make presentations on their projects and project results. Alternatively, students may make a presentation of an article.
(3) Students will be expected to attend class.
(4) We will use Matlab for computation. Having access to the software may help you learn more in the class.

Grading: Grades will be based on (1) Attendance; and (2) Project/Article presentations.