MATHEMATICS 648 - CALCULUS OF VARIATIONS
SPRING 2010

- **Instructor:** Professor Milena Stanislavova

- **Office:** Snow 525, Phone: 4-4369

- **Office Hours:** Monday 2-3p.m., Wednesday 11a.m.-12 and by appointment

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- **Prerequisite**: Math 220 or 320

- **Goals:** To expose students to the techniques of the modern theory of calculus
  of variations with mainly physical and geometrical applications.

- **Text:**
    - The caluculus of variations, by Bruce van Brunt, Springer, 2004.
- **Topics**:
    - Basic concepts of calculus of variations, formulating variational problems.
    - Geodesics, catenary, brachystochrone and minimal surfaces problems.
    - The first variation and the Euler-Lagrange equation.
    - Isoperimetric problems with constraints, using Lagrange multipliers.
    - Hamiltonian formalism, Legendre transformation, Hamilton's and Hamilton-
      Jacobi equations, conservation laws and Noether's theorem.
    - Second variation problems, convexity and the Legendre condition.
- **Grading**: The grading will be based on a set of three homework assignments
  - 30 %, a midterm - 30 % and a Final exam - 40 %.
- **Exams and Homework:** If you have a valid reason for missing the exam,
  you should discuss it with me BEFORE the exam. There will be NO MAKEUP
  EXAMS or HOMEWORK!
- **Students with disabilities:** The staff of Services for Students with Disabili-
  ties (SSD), 135 Strong, 785-864-2620, coordinates accomodations and services
  for KU courses. If you have a dissability for which you may request accomo-
  dation in KU classes and have not contacted them, please do so as soon as
  possible. Please also see me in regard to this course.
- **Policy on religious observances:** Any student in this course who plans to
  observe a religious holiday which conflicts in any way with the course schedule
  or requirements should contact the instructor as soon as possible to discuss
  alternative accommodations.