Math 550 – Syllabus

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Lectures: MWF 100-150 pm in AH 303 .
Office hours / discussion sessions: W 5-6 pm in SEO 427, and by appointment.

CRN: 37861.   **Credits:** 4.
Prerequisites: Differential topology (basic theory of manifolds): Math 547 or equivalent.
Books (optional): We will cover material contained in a number of books with some overlap. All books are optional for the course but can be used as reference.
The main sources are "Introduction to Smooth Manifolds" by Lee, and "Differential Geometry: Bundles, Metrics, Connections and Curvature" by Taubes. In smaller part we will encounter material from "Differential Forms in Algebraic Topology" by Bott and Tu, and "Differential Geometry" (especially volume 1) by Kobayashi-Nomizu.

Grading policy: There will be homework assignments and a final project, weighed as follows:
    Project: 50%
    Homework: 50%

Homework assignments: It is essential that you encounter the material in problems yourself (and it's the fun part!). You are encouraged to work together in small groups (2 or 3 people) to solve the assignments.
Discussion session: For presentations of HW problem solutions. You should not aim to solve all the problems (otherwise you will not learn much by attending the session), but **solve a few** (at least 3). Due to time constraints, it is unlikely that you will be able to present every week. But I expect you to present approximately every 3-4 weeks.
If you have a systematic conflict for the discussion session time slots: Hopefully we can find a time so that everyone can attend, but if not, please let me know and we will make an arrangement for you to hand in solutions.

Final project: You will be required to give a 15-minute in-class presentation at the end of the semester on a topic related to (but not contained in) the regular course material but not covered by the regular lectures. The presentation should be expository (i.e. no original research). A good source of topics is optional sections in the books listed above. Beyond this, a list of topic suggestions will be posted and you are welcome to discuss potential topics with me.
The process for selecting a presentation topic will be as follows:

1. Submit a proposal to me by email by Friday, April 4. This is the latest to submit the proposal and I recommend you submit a proposal earlier. If two very similar proposals are submitted, the first one takes precedence. The proposal should consist of the title, a short outline of the content of the presentation (say what you will define/state/prove/etc., this can be just a bullet point list), and which reference(s) (including which chapters or sections) you will use to prepare the presentation.

2. I will confirm receipt of the proposal (as soon as possible) and then within a few days, either approve your topic, suggest some changes, or reject it (e.g. if it is too similar to another presentation).

3. Final topic proposals (in case your first proposal was not outright approved) are due Friday, April 18.

Presentations: During the last week of classes (possibly including the discussion session). The exact schedule will be announced at a later date.
Your grade will be based on your own presentation (content and exposition). Further, failure to submit a proposal (initial and final) by the deadlines will be an automatic 10% deduction (additional 10% for each week thereafter). In addition, you should attend the presentations of your peers. Absence (without

providing a reason in advance) at any class meeting where presentations are scheduled will also result in a 10% deduction.

Course topics: De Rham cohomology, foliations, Lie groups, fiber bundles and their connections, characteristic classes.

Disability services: Students with disabilities must inform the instructor of the need for accommodations. Those who require accommodations for access and participation in this course must be registered with the Disability Resource Center. Please contact ODS at 312/413-2183 (voice) or 312/413-0123 (TTY).

Academic integrity: Students should act in accordance with the Standards of Conduct as set forth by the university (available at https://dos.uic.edu/docs/Standards%20of%20Conduct.pdf). Violations will be handled according to the Student Disciplinary Policy (available at https://dos.uic.edu/docs/Student%20Disciplinary%20Policy%2017-18%20(FINAL).pdf).