ENSC 445/545 Watershed Analysis

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**Instructor**: Dr. Tim Covino

**Class times**: T 14:00 – 15:15; Th 14:00 – 15:15

**Office hours**: W 14:00 - 15:15; or by appointment

**Website**: <https://tpcovino.github.io/Git_home/watershed_analysis/index.html>

**Course overview and objectives**: (1) provide theoretical understanding and practical experience with the most common analysis and modeling techniques relevant to watershed hydrology; and (2) provide training in analyzing, simulating, and presenting scientific data in written and oral formats.

**Approach**: This class will be largely hands-on, and students will be conducting watershed analyses and modeling exercises. We will follow a typical weekly format of Tuesday in-class lecture and activities, Thursday hands-on computational work, and time spent working through online modules outside of class. The online modules are required and are intended to prepare students for the in-class work during lab on Thursday. Accordingly, this class will follow a semi-flipped format that includes in-class lecture, online modules, and in-class work sessions.

**Course structure**: Tuesday lectures will provide theoretical understanding and Thursday computing labs will be focused on skill development in watershed analysis and modeling.

**Tentative schedule, subject to change**:

Week 1: Introduction, overview and technical skills.

Week 2: Watershed boundaries, delineation and terrain analysis.

Week 3: Hydrologic processes, climate and water balance. Trend detection and analysis, non-parametric approaches.

Week 4: Statistical vs process-based models and their implementation.

Week 5: Surface water: Rating curves, hydrographs, frequency analysis and modeling approaches.

Week 6: Precipitation variability, interpolation schemes and data sources.

Week 7: Evapotranspiration, physical processes, and modeling approaches.

Week 8: Spring break.

Week 9: Term project overview, project brainstorm, identify data/models necessary to complete project.

Week 10: Groundwater, physical processes, data availability, and modeling approaches.

Week 11: Erosional processes and modeling.

Week 12: Water quality: analysis and prediction.

Week 13: Land cover change, remote sensing, and implications for watershed hydrology.

Week 14: Writing as rewriting.

Week 15: Compelling presentations.

Week 16: Final presentations.

**Grading**: Online module assignments: 25% Weekly lab assignments: 50% Final presentation: 10% Final report: 15%