Overview:
Your career as an undergraduate student has led you through analytical and theoretical courses. In courses like GEOG 2000, GEOG 2110 and GEOG 3000 you investigated surficial processes and landforms, and worked to understand how aspects of Earth’s systems work to build and denude a landscape. In analytical courses, you combined observations with quantitative reasoning to describe and characterize responses and features of the environment. GEOG 4150 builds on these foundations and aims to provide you with a unique experience. This course will challenge you through discussion and examination of the primary literature as well as linking to observations and working with different data sets during the laboratory assignments. Catchment processes are arguably one of the most interesting aspects of Geography, as these processes often influence Human-Environment flows (e.g., policy and planning). Catchment processes play a key role in ecosystem function and health in a variety of environments, understanding these processes is vital to assessing ecosystems. Our understanding of the watershed and processes within it are critical in order to evaluate changes in the landscape and/or changes in the processes themselves as a result of human activity, landscape evolution, and climate change.

Purpose:
In this course you will become part of a collaborative team of researchers whose aim it is to understand aspects of catchment processes. As a group we will explore the principle concepts and theories behind surface processes and its linkages to abiotic and biotic responses. Through laboratory work we will observe and test some of these primary ideas and work to understand the cutting edge aspects of the field of earth surface processes and landforms.

Physical processes and human activities change the landscape and increasingly these factors work in tandem on the Earth’s surface; these interactions are what inspire and drive my research and form the basis for the Winter 2019 offering of GEOG*4150: Catchment Processes. Changing climate, extreme rainfall events, and land use changes influence sediment transport and delivery, and this contributes to water quality degradation. The landscape response to these changes and how catchment processes work under varying conditions are important for us to study.

Learning Outcomes:
Students who have actively engaged with the course can expect the following learning outcomes, which are aligned with the University Learning Outcomes (link) and the Learning Outcomes identified by the Department of Geography, Environment & Geomatics (Link).

1. Analyze the Earth as an integrated human-environment system.
   - Examine and describe dynamic flows, interactions and exchanges at watershed scales and through variable temporal scales
   - Embed these integrated components within Catchment Processes
2. Critically and independently evaluate the primary literature for one of the key themes in Catchment Processes and contextualize the selected topic within Geosciences.
   - Integrate knowledge from previous courses and material used in this course to compose a critical literature review
   - Synthesize established/foundational theories and concepts and situate these within contemporary and modern ideas
3. Collect and analyze Catchment Process data and generate interpretations that demonstrate key Catchment Process concept interrelatedness.
   - Execute data collection
   - Complete data analysis following standard procedures in the Geosciences
   - Draw interpretations from the data analysis and contextualize these within the appropriate literature
- Utilize appropriate visualizations and terminology
4. Investigate complex real world challenges related to Catchment Processes.
   - Define variables contributing to real-life Catchment Processes issues/problems
   - Actively reflect and participate in class discussions
   - Utilize appropriate terminology
5. Develop and improve oral communication skills related to key Catchment Processes concepts.
   - Self-assess initial oral communication skills
   - Establish oral communication skills to improve/enhance
   - Recognize the variety of oral communication opportunities
   - Utilize appropriate terminology
6. Construct and curate skills and attributes expected for individuals working and interacting within the Geosciences.
   - Identify and self-reflect on the skills and attributes of Geoscientists
   - Confidently and effectively communicate using appropriate and concise language and terminology
   - Mobilizing and transcribing knowledge and skills

**Organization:**
Our course will combine lectures, seminars, and labs for a rich and active learning experience. Formally we are scheduled to meet twice a week for ‘lectures’ on Tuesday and Thursday 4-5:20 pm, this time slot will be used for lectures, seminars, and presentations.

Lectures: Tuesday and Thursday, 4 – 5:20 pm
Labs: refer to WebAdvisor for dates/times

*Please stick with your original lab assignment section. Labs begin in week 1, refer to the schedule included below.*

**Textbook:**
There is no official text for this course. If you would like a recommendation I can give you several. We will be doing activities and readings from recent journal articles.

**TA:**
Josie Mielhausen jmielhau@uoguelph.ca
The TA is your primary go-to for questions related to the labs.

**CourseLink:**
Schedules, updates, links, etc. will be posted on our CourseLink page, check this often. Be sure that you check the email associated with your CourseLink account, as this will be the primary way in which I communicate with you outside of class, my ESP has been breaking down in my old age.

**Evaluation Summary:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lab Modules (complete 4/5 total)</td>
<td>40%</td>
</tr>
<tr>
<td>Major Final Project (topic approval, 2 progress reports, presentation, draft review, paper)</td>
<td>30%</td>
</tr>
<tr>
<td>Presentations (2 group presentations)</td>
<td>20%</td>
</tr>
<tr>
<td>Class discussion engagement (throughout the semester, with a focus around presentations)</td>
<td>10%</td>
</tr>
</tbody>
</table>

**Lab Modules (complete 4/5, 40% of the final grade)**
Certainly one of the benefits of our course is its size and thus access to the Physical Geography Teaching Lab space, it is the intent of this course to make use of these resources. However, in an effort to manage schedules and competing course/s requirements, there is a level of choice for you in this section of the course assessment. You are welcome and encouraged to attend all labs, there are 5, but you need to complete the requirements and submit the report for 4 of the labs, two of which must be lab activities that involved data collection (dc). Below is a summary of the lab modules this semester, they are presented in the scheduled order, and each submission is worth 10% of your final grade (4 modules * 10% = Lab Modules are 40% of your final grade). The labs are offered in the indicated weeks, and are typically due 1 week after they are introduced, each report is ~1500-2000 words, plus references, figures, tables.
- Lab Modules (dc indicates that this lab includes data collection, two completed labs must be dc):
  o Infiltration (dc), week 1
  o Hydrograph Separation, week 2
  o Experiment Design: Rainfall Intensity and Denudation (dc), week 3
  o Sediment Yield Legacies, week 4
  o Sweeps and Bursts (Turbulence in a fluvial setting) (dc), week 5

Major Final Project (30% of the final grade, multiple pieces due throughout the semester)
The purpose of this project is to allow you to ‘dig’ into a particular aspect of Catchment Processes. The goal is to produce a high-quality, critical review of the literature related to your chosen topic (list included in the Major Final Project info sheet). Through the semester you will be asked to report on your project progress, in the final two weeks you will present your paper to the class, a chance to get some feedback on your ideas and arguments, before you submit the final written paper on the last day of scheduled classes (by midnight).
- Key Deliverables
  o Topic selection and approval by noon at the end of week 3
  o Progress Report 1 (end of week 5) – perhaps a thesis, rough outline, timeline, selected papers
  o Progress Report 2 (end of week 8) – perhaps an annotated bibliography with ~10+ papers, outline
  o Paper Presentation (week 11 or 12) – 10 minutes total, key concepts and ideas
  o Final Paper (last day of scheduled classes, midnight) – 4500-5000 words

Presentations (20% of the final grade, two group presentations)
Oral communication is an important aspect of Geosciences, and like most things, the more opportunities we have to do it, the better we are at that task. In our course, there are three presentations (two group presentations, and the MFP presentation (mentioned above)). The two group presentations are opportunities to work with a team to lead the class through a particular topic, and subsequent discussion. More information about groups, dates, and topics will be discussed during the first week of class. Each presentation is worth 10% of your final grade, presentation 1 is roughly scheduled for week 4 or 5, and presentation 2 is roughly scheduled for week 8 or 9.

Engagement (10% of the final grade)
Active listening, independent reflection, and respectful discussion of ideas, concepts, challenges, and just plain fun or (and) interesting stories are an important aspect for a positive and inclusive learning environment (or classroom climate). As an instructor I value contributions from everyone and strongly believe that these activities follow the pedagogy related to learning environments and learner-experience. As such this is valued as part of the overall assessment in the course. As a class we will discuss and develop expectations around engagement, this includes (at the very least) a beginning, midway, and end of the term assessment – it isn’t just about talking a lot or talking the most/loudest, or perfect attendance. Please speak to me if you have any concerns about this (or any) aspect of the course.

Course Content
Our course content is organized around several themes in Catchment Processes. Certainly there is room to go beyond these topics and I encourage you to do this through your major project.
Core Themes:
  o Watershed Hydrology – specifically runoff-response processes, and flood routing
  o Sediment Cascades and Budgets – specifically sediment transport and yield
  o Channel Dynamics – stream power, riffle-pool reversals, watercourse restoration
  o Reconstructing Hydroclimate, and Hydrogeomorphic Processes
  o Landscapes on the Edge: New Challenges and Opportunities in Catchment Science
    ▪ Connectivity in Geomorphology
    ▪ Quantifying Landscapes ➔ Geomorphometry
    ▪ Archetypes and Equifinality
**How to succeed in this course**

I believe success is possible in anything you set your mind to, therefore starting this class and each task associated with it with an engaged, positive and excited attitude puts you well on your way to an excellent experience. There are a few other items that will help you to succeed. Come to class prepared to participate. Ask questions; ask the question more than once if needed. Complete your assignments, read them over, read the questions, did you answer and address all the issues? When you are proud of your assignment, hand it in. Talk to me about your assignments, before you submit them and after you get feedback. Discussing issues in class, in the hall, in the lab or where ever, often makes the point and the issue clearer than just considering it once. Learning and comprehending concepts is not done through memorization. Have fun, I always remember fun things, and events that were mediocre or uninteresting I easily forget. If you come with the right attitude I will do my best to make this a fun, interesting and maybe even exciting class – I get excited about catchment processes.

Important resources available to all University of Guelph students:

- **Writing Services** -- [https://www.lib.uoguelph.ca/get-assistance/writing](https://www.lib.uoguelph.ca/get-assistance/writing)
- **Studying/Time Management/Learning Services** -- [https://www.lib.uoguelph.ca/get-assistance/studying](https://www.lib.uoguelph.ca/get-assistance/studying)
- **Research Services** -- [https://www.lib.uoguelph.ca/get-assistance/research-help](https://www.lib.uoguelph.ca/get-assistance/research-help)
- **Well-being** -- [https://www.uoguelph.ca/mentalwellbeing/front-page](https://www.uoguelph.ca/mentalwellbeing/front-page)
W19 Schedule – For reading assignments please go to the appropriate section in CourseLink, for links to PDFs.

<table>
<thead>
<tr>
<th>Week</th>
<th>Topics</th>
<th>Deadlines</th>
</tr>
</thead>
</table>
| 1    | - Outline, organization, schedule  
      - Expectations (yours and mine)  
      - Core themes  
      - CP and PG  
      - Group paper discussions  
      - Watershed Hydrology – review/intro | Thursday – paper discussions |
|      | **Lab 1** Infiltration Experiments – Hutt 011 | **Due in 1 week** |
| 2    | - Watershed hydrology - continue  
      - Runoff Response, Effective runoff  
      - Hydrographs – separation, storm and unit hydrographs | Tuesday – paper discussion on landuse and water balance |
|      | **Lab 2** Hydrograph Separation Techniques – Hutt 020 | **Due in 1 week** |
| 3    | - Conclude catchment hydrology  
      - Impacts of landuse change on the water balance (group discussion)  
      - Sediment transport processes  
      - Reach to catchment scale budgeting  
      - Learning Services – Lit Reviews – what is it all about? (Thursday) | |
|      | **Lab 3** Rainfall Intensity & Denudation – Hutt 020 | **Due in 1 week** |
| 4    | - Sediment cascades, denudation rates  
      - Headwater vs lowland sediment mobilization  
      - First Group Presentations (1 day) | |
|      | **Lab 4** Legacy Effects: Time Series Analysis – Hutt 020 | **Due in 1 week** |
| 5    | - Disrupting sediment transfer processes (dams and the case for dam removal – but not before someone gets some samples!)  
      - First Group Presentations (1 day) | MFP Progress Report 1 due |
|      | **Lab 5** Turbulence in Fluvial Environments – Hutt 020 | **Due in 1 week** |
| 6    | - Channel morphology  
      - Hydraulic signatures in geomorphic units  
      - Riffle-pools – wtf – how is this possible??  
      - Presentations – the good, the bad, the ugly… Learning Services Visit | Tuesday class visit from learning services |
|      | **Reading Week – no class or labs -- -- Reading Week** | |
| 7    | - Watercourse restoration and design – introduction  
      - Evolution of natural channel design  
      - Ecohydrology – Field of Dreams  
      - Hydraulic signatures in geomorphic units  
      - RiverSmart Communities | |
| 8    | - Beyond the paraglacial – legacy landscapes  
      - Reconstructing hydroclimate & hydrogeomorphic change  
      - Landscapes on the Edge: Opportunities in CP  
      - Second Group Presentations (1 day) | MFP Progress Report 2 due |
| 9    | - Second Group Presentations | |
| 10   | - And then it all falls apart – Badass Geomorphology  
      - Watercourse restoration design  
      - The digital age and out of this world CP | |
| 11-12| - Major Project Presentations  
      - Last Class – debrief – following up on transcript translations | *Submit your presentation online by 10 pm night before  
                                                                  *Submit participation self-evaluation |

The lecture/topic schedule is subject to change depending on the pace of the class and the semester; your understanding in this is appreciated.
E-mail Communication
As per university regulations, all students are required to check their <uoguelph.ca> e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement
When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. See the undergraduate calendar for information on regulations and procedures for Academic Consideration.

Drop Date
The last date to drop one-semester courses, without academic penalty, is March 8, 2019. For regulations and procedures for Dropping Courses, see the Undergraduate Calendar.

Copies of out-of-class assignments
Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility
The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment. Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Centre for Students with Disabilities (soon to be re-named Student Accessibility Services) as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email sas@uoguelph.ca or see the Centre for Students with Disabilities website.

Academic Misconduct
The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community – faculty, staff, and students – to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University’s policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor. The Academic Misconduct Policy is detailed in the Undergraduate Calendar.

Recording of Materials
Presentations which are made in relation to course work—including lectures—cannot be recorded or copied without the permission of the presenter, whether the instructor, a classmate or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources
The Academic Calendars are the source of information about the University of Guelph’s procedures, policies and regulations which apply to undergraduate, graduate and diploma programs.