Geog 415-001 Hydrogeography

Autumn 2018

*Draft: subject to change except for the required textbook*

Mode of delivery
Fact-to-face

Time and location
Mo 13:00-15:40, LUB S165

Instructor
Name: Dr. Woonsup Choi
Office hours: Tu 11:00-12:00 and We 15:00-16:00 or by appointment
Office phone: 414-229-2671
Geography phone: 414-229-4866
E-mail: choiw@uwm.edu
***E-mail is the best way to reach me for private matters during work hours. Your emails will be responded within two working days under a normal condition***

Course content
This course is an introductory course in hydrology and water resources as part of broader physical geography. This course

• introduces major concepts in the field, such as the hydrological cycle, water budget, precipitation, evapotranspiration, runoff, soil moisture, groundwater, water quality and integrated water resources management. The concepts are related to other disciplines such as geosciences (via groundwater), atmospheric sciences (via clouds and precipitation) and urban/regional planning (via water supply and management).
• relates theories in the subject to field observation and models. After building a theoretical background, students are introduced to models that embody the theories and come to understand how theories work in mathematical forms. Students learn the basics of field observation for water quality as well.
• illustrates the generation and testing of water data such as rainfall, snowfall, discharge, soil moisture and water quality. It covers how the data are generated and what are their weaknesses.

The course will be mostly in the form of lecture and complemented by reading, discussion and computer labs.
Learning outcome

Students are expected to obtain descriptive and quantitative knowledge of introductory hydrology in context of human-nature interaction by the end of the course. Specifically, students are expected to be able to

1. Explain (a) how water is related with other Earth systems (e.g., atmosphere, lithosphere, and biosphere); and (b) how water is related with the human activity (e.g., land use)
2. Compute basic metrics in hydrology
3. Analyze hydrological data and compare among basins, time periods, and conditions

Prerequisite

Geog 120 or 125 AND Geog 215; or graduate standing

Course materials

Required textbook:

Supplementary material:
- Selected chapters from Hydroclimatology: Perspectives and Applications (2009) by M.L. Shelton, Cambridge University Press – available on D2L-Content
- GIS and modeling software installed on the classroom PC
- Articles for reading presentations – available on D2L-Content

Time commitment for the course

Credit hours: 3
- Time in classroom: 2.5hrs*15 = 37.5hrs
- Time for completing assignments: 5hrs*5 = 25hrs
- Time to study for exams: 3hrs*3 = 9hrs
- Time for preparation and study: 4hrs*15 = 60hrs
- Time for read and teach: 4hrs
- Time for undergraduate project: 15hrs
- Time to take Exam 3: 2hrs
Total hours for undergraduates: 152.5hrs
- Time to prepare for article review: 5hrs*2 = 10hrs
- Time for graduate project: 30 hrs
Total hours for graduates: 177.5 hrs

Requirements

- Exam: three exams will be given during the semester. They are not cumulative. Exam 3 will be given according to the University final exam schedule.
• Assignment: five assignments will be given to provide students with opportunities to apply concepts and practice skills. I will provide basic instruction for each assignment during the class.

• Reading presentation: Each graduate student will have to read two articles and present in class for discussion for about 20 minutes. One should give presentations in separate weeks. Send me your choice via email.

• Undergraduate project: undergraduate students will have to identify a water resource problem/question and find a solution via literature review, data analysis, and/or fieldwork. For example, “how extensive and severe was the drought in Wisconsin in 2012?” The project must be presented in class at the end of the semester, in terms of problem statement, methods, and results.

• Graduate term paper: A term paper consists of a proposal, a preliminary report, a presentation, and a final paper, each of which has a different deadline and is graded separately. Each graduate student must make an appointment with the UWM Writing Center after submitting the proposal and before submitting the final paper to discuss their term paper. The grading rubric will be posted on D2L.

Evaluation

Final grades will be made based on the accumulated total points throughout the course.

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<thead>
<tr>
<th></th>
<th>U</th>
<th>G</th>
<th>Grading scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exams</td>
<td>180</td>
<td>210</td>
<td>A: over 90%, A-: over 87%,</td>
</tr>
<tr>
<td>Assignments</td>
<td>200</td>
<td>200</td>
<td>B+: over 83%, B: over 80%,</td>
</tr>
<tr>
<td>Reading Presentation</td>
<td>20</td>
<td>90</td>
<td>B-: over 77%, C+: over 73%,</td>
</tr>
<tr>
<td>Term paper</td>
<td>(40)</td>
<td>100 (proposal: 10, preliminary report: 20, presentation: 20, paper: 50)</td>
<td>C: over 70%, C-: over 67%,</td>
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<tr>
<td>TOTAL</td>
<td>400</td>
<td>600</td>
<td>D+: over 64%, D: over 62%,</td>
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</table>

Other course policy

• Units of data: All units of data used in students’ work must be in SI, except for unavoidable situations

• Academic Integrity: Plagiarism will not be tolerated in this class and students involved will receive a zero grade. Severer cases will be submitted to the University for further scrutiny. The scope and disciplines of student academic misconducts are specified in Chapter UWS 14 and UWM implementation provisions (Faculty Document 1686) and http://www4.uwm.edu/secu/SyllabusLinks.pdf; UWM Disciplinary Guidelines can be found in the Office of the Dean of Students, Mellencamp Hall, Rm118.

• Class Etiquette: I expect that you will conduct yourself in class in the same manner that you yourself would like to be treated. Class disruptions will not be tolerated as it erodes the educational environment for everyone. Laptop users are to be seated in back rows of the classroom so that other students are less distracted.

• Finality of Grade: All grades, once released on D2L or PAWS, are final except in cases of clerical error.

• Late penalty: 20% deduction of your score you would receive with an on-time submission.
No score after seven full days from the deadline.

- **Special Accommodation:** Any student who feels he or she may need an accommodation based on the impact of disability, religion, or other civic duty should contact Instructor privately as early as possible to discuss his or her specific needs. A student should notify Instructor, within the first three weeks of the beginning of class, of the specific days or dates on which he or she will request relief from an examination or academic requirement for a religious observance. The student notification will be kept confidential.

- **Other Notice:**
  - Make-ups will be allowed at the discretion of Instructor when a pre-approval has been obtained or in case of emergency with written proof.
  - Other unspecified matters will be handled according to the University policies listed on [http://www4.uwm.edu/secu/SyllabusLinks.pdf](http://www4.uwm.edu/secu/SyllabusLinks.pdf).
  - If you are having any trouble in class, please see Instructor as soon as possible.
  - Incomplete grades may be given according to the University policy ([http://www4.uwm.edu/secu/docs/other/S_31_INCOMPLETE_GRADES.pdf](http://www4.uwm.edu/secu/docs/other/S_31_INCOMPLETE_GRADES.pdf)).

### Schedule (subject to minor changes)

<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Class content</th>
<th>Chapter</th>
<th>Assignment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3-Sep</td>
<td>Course introduction</td>
<td>D1</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8-Sep</td>
<td>Precipitation</td>
<td>D2</td>
<td>#1 handed out</td>
</tr>
<tr>
<td>3</td>
<td>10-Sep</td>
<td>Precipitation</td>
<td>D2</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>15-Sep</td>
<td>Evaporation</td>
<td>D3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>17-Sep</td>
<td>Storage</td>
<td>D4</td>
<td>#1 due</td>
</tr>
<tr>
<td>4</td>
<td>22-Sep</td>
<td>Runoff</td>
<td>D5</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>24-Sep</td>
<td>Runoff</td>
<td>D5</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>29-Sep</td>
<td>Spatial variations of water</td>
<td>S7</td>
<td>#2 handed out</td>
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<tr>
<td>6</td>
<td>1-Oct</td>
<td>Spatial variations of water</td>
<td>S7</td>
<td></td>
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<tr>
<td>6</td>
<td>6-Oct</td>
<td>Review for exam</td>
<td></td>
<td></td>
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<tr>
<td>7</td>
<td>8-Oct</td>
<td>EXAM 1</td>
<td></td>
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<tr>
<td>7</td>
<td>13-Oct</td>
<td>Groundwater</td>
<td></td>
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<tr>
<td>8</td>
<td>15-Oct</td>
<td>Temporal variations of water</td>
<td>S8</td>
<td>#2 due</td>
</tr>
<tr>
<td>8</td>
<td>20-Oct</td>
<td>Temporal variations of water</td>
<td>S8</td>
<td>#3 handed out</td>
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<tr>
<td>9</td>
<td>22-Oct</td>
<td>Human activity and hydrogeography</td>
<td>D7</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>27-Oct</td>
<td>Human activity and hydrogeography</td>
<td>D7</td>
<td>#3 due</td>
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<tr>
<td>9</td>
<td>29-Oct</td>
<td>Human activity and hydrogeography</td>
<td></td>
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<tr>
<td></td>
<td></td>
<td><strong>Term paper proposal due</strong></td>
<td>D8</td>
<td></td>
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<tr>
<td>10</td>
<td>3-Nov</td>
<td>Review for exam</td>
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<tr>
<td>11</td>
<td>5-Nov</td>
<td>EXAM 2</td>
<td></td>
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<tr>
<td>11</td>
<td>10-Nov</td>
<td>Flood</td>
<td>S9</td>
<td>#4 handed out</td>
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<tr>
<td>12</td>
<td>12-Nov</td>
<td>Flood</td>
<td>S9</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>17-Nov</td>
<td>Drought</td>
<td>S10</td>
<td></td>
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<tr>
<td>13</td>
<td>19-Nov</td>
<td>Data collection and analysis</td>
<td>D6</td>
<td>#4 due</td>
</tr>
<tr>
<td>13</td>
<td>24-Nov</td>
<td>Data collection and analysis</td>
<td>D6</td>
<td></td>
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<tr>
<td>13</td>
<td>26-Nov</td>
<td><strong>(Thanksgiving break)</strong></td>
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<tr>
<td>14</td>
<td>1-Dec</td>
<td>Hydrological modelling</td>
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<td><strong>Term paper preliminary report due</strong></td>
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Reading list

*Available on D2L-Content

**Week 2: hydrology as science**

**Week 3: evapotranspiration**

**Week 4: storage and runoff**

**Week 5: spatial variation of water**

**Week 8: temporal variation of water**

**Week 9: human activity and hydrogeography**


**Week 11: flood**


**Week 12: drought**


**Week 13: data collection and analysis**


**Week 14: hydrological modeling**
