

PLEASE READ SLOWLY AND VERY CAREFULLY

UTSC 2022/23: Department of Physical and Environmental Sciences EESC07F GROUNDWATER - Fall Term 2022

Prerequisites: EESA06H3 and a minimum of 1.0 full credit in B-level EES courses. These prerequisites are **STRICTLY** enforced and will eventually be checked. Note that these are **PRE**-requisites; they are not **CO**-requisites.

Ken Howard EV-348 (416 287-7233) ken.howard@utoronto.ca (Note re: email...see below. * !!)
<http://www.utsc.utoronto.ca/~gwater/index.html>

Your T. A. is Aisha Javed - aisha.javed@mail.utoronto.ca (Note re: email...see below. * !!)

COURSE CONTENT

The course will begin with the scientific theory of groundwater flow and aquifer storage and will be followed with a brief review of typical hydrogeological environments. Subsequently during the term, we will examine a wide range of global groundwater issues. Possible examples include transboundary aquifers, urban groundwater, groundwater in Africa, and climate change impacts on groundwater.

The course website can be found at <http://www.utsc.utoronto.ca/~gwater/EESC07/index.html> Most, if not all, the material you need will be found here. All assigned readings are examinable. Material is protected by copyright. i.e., it is made available **ONLY** for **PERSONAL USE**. Under **no** circumstances should you print, re-post or redistribute lecture material, assignments, assignment solutions, and readings in any way e.g. via social media. These days, the potential penalties are severe (see academic offences below). The course website is password protected. The login and password will be provided to you via e-mail at the beginning of term (likely September 12, if not before). Quercus will only be used for submission of your term assignment (see below).

TEACHING METHOD

The course will comprise 10 or 11 classes starting **SHARP at 7.10 pm in MW160 (on Mondays) (please don't arrive late as this disturbs everyone – especially me!)**. I will be overseas at a conference from October 23 to November 1 and will miss classes on October 24 and 31. Material for these two classes will be posted in the form of audio/visual PowerPoints. There will not be a class November 7 since your **term assignment will be due November 11!** Numerous readings will also be provided, especially in the latter weeks when the focus will be on global issues. I will also be providing several practice assignments to help you better understand some of the equations and groundwater evaluation methods. Solutions will be provided.

OFFICE HOURS

My office hours are on Mondays from 2 to 4 in EV-348. There will be no office hours October 24, 31 and November 7. Additional office hours will be provided prior to your final exam. Aisha Javed does not have office hours at this time, but these may be arranged if there seems to be a demand.

*** Please DO NOT ask questions to either me or to Aisha via e-mail that need answers > 5 words. Answering e-mail queries is very time consuming, is often ineffective and demands typing skills that I, speaking personally, do not have.**

BIBLIOGRAPHY

You will **not** need a course text (materials will be supplied). For those who like to have a book on hand, I recommend Applied Hydrogeology by Fetter, C.W. (MacMillan) (all editions), Freeze, A. and Cherry, J., 1979 - Groundwater (Prentice-Hall) (available this year on line for free at <http://hydrogeologistswithoutborders.org/wordpress/original-groundwater-by-freeze-and-cherry-1979-now-available-online/> (highly recommended.....very useful!!!) and Domenico, P. and Schwartz, F., 1990 - Chemical and Physical Hydrogeology (Wiley).

MARKS DISTRIBUTION

Right now, I'm planning to distribute your mark as follows:

Mid-Term Exam beginning 7.30 pm Monday October 17th (date to be confirmed) (1.5 hours) (multiple-choice, true-false, fill-in-the blanks, short answers plus essay-style questions – **NO AIDS**) 20%.

Term Assignment due **Friday November 11th, 5pm:**

- Professional-style Report (20%) and
- PowerPoint (including audio-visuals – you need to be seen and heard!) (20%)

Final Exam (in-person, on or after December 8) (3 hours) (multiple-choice, true-false, fill-in-the blanks, short answers plus essay-style questions – **NO AIDS**) 40%.

There will be no “make-up” exams. If there any changes to this schedule and mark allocation I will try to provide them in the first few weeks of term.

TERM ASSIGNMENT

Your term assignment is a very important course component and carries 40% of your marks. It includes a formal report plus PowerPoint presentation. The final deadline for submission is Friday November 11th 5pm. However, you can deliver it during September or October should you wish. November 11th, 5pm is a strict deadline. No extensions will be allowed. **Late assignments will not be accepted** (even with medical certificates – so plan accordingly for unexpected events – give yourself plenty of time).

For the Report, you will each be assigned a location. It could be a country, a city, a State/Province, or even a geographical region. You will need to provide (in pdf) a fully referenced and complete hydrogeological report (note: a **PROFESSIONAL-STYLE REPORT.... this is not an ESSAY**) for that location (i.e. with title pages, list of contents, list of figures etc...). The length of the report is not important but it's hard to think you could say much of significance in less than 15 pages. You can use websites as reference material but remember, there is also a LOT of nonsense distributed on the web and it is often unreliable as a rigorous and permanent source of scientific information. I recommend that you get into the published (peer reviewed) science literature if you want to get a high mark. You can cut and paste figures from the material you access (properly referenced of course!) BUT, be warned..... copying chunks of material (even sentences) from existing texts and reports is **plagiarism** and strictly disallowed. Plagiarism will lead to a failing grade for the course element and for the course as a whole.

All reports must include a full description of the location and climate. You will also need a description of the geology and the aquifers available. **The objective of the report** is to provide a review of the available groundwater resources e.g. the aquifers, their potential yields etc. Often, these resources will be constrained by various issues. Such issues may include water quality problems due to contamination

or seawater intrusion, and problems of groundwater availability due to droughts or over-exploitation. Land subsidence or transboundary issues may also be a concern. In some locations you may find that the constraints have been resolved to varying extents by artificial recharge (managed aquifer recharge), water treatment or careful groundwater management including cutbacks on pumping. Feel free to describe these, as appropriate. Although your focus will be on groundwater resources, your report will not be complete without some consideration of the available surface water (from rivers, lakes, reservoirs etc.). In some cases, you will find surface water is the primary source of water supply while groundwater is a supplementary, alternative source. In other cases, ground and surface water may be used conjunctively. Please make sure that the relative importance of ground and surface water is explained for your location, including any changes in the relative importance that may have taken place over time. Also make sure that your report is fully referenced. In total, your report is worth 25% of your final mark. The mark will be based on a combination of scientific content/rigour, organisation, grammar, expression, clarity and overall presentation.

To supplement your report, you will also need to provide a PowerPoint summary presentation with personal audio and video (**i.e. YOU should be both seen and heard!**). The PowerPoint should not exceed 20 minutes in length and would typically include ~15 or so slides. Your PowerPoint is worth 20% of your final mark.

Details of where submissions must be made (probably via Quercus) will be provided at a later date.

ACADEMIC OFFENCES – VERY IMPORTANT

I need to remind you that plagiarism (cheating!) is **a very serious academic offence with dire consequences that may have severe implications for your future**. I have zero tolerance for cheating and students caught will have to explain themselves to the Dean. **You have been warned!**

Remember, it is an offence if a student knowingly represents as one's own any idea or expression of an idea or work of another in any academic examination or term test or in connection with any other form of academic work (e.g. an assignment).

Neither will I tolerate those who contravene copyright issues e.g. by distributing course materials in any way or form to others (both within and outside the University).

If you have a question about what constitutes an “academic offence” in this course, then **ask me** before risking your future! You can avoid committing plagiarism by doing marked assignments, quizzes, and exams entirely **ON YOUR OWN** without consulting colleagues and without accessing materials and aids which have not been approved for such purposes.