

EOAS micro-credential / certificate programs

1. What we have done already
 - a. Erik: Professional course base Meng
 - b. ATSC: Diploma in meteorology

2. What we want to do
 - a. Resources....

M.eng. Geological Engineering

This came into force in the 1970s. It is a professional masters degree - students doing a course-based masters. They graduate ~ 40 geo. Eng. per year, mostly go right into industry - consulting. It's a 1 year focused. ~ half of the revenues come back to the department. UBC / province has caps on domestic tuition. Not on international students. Significant financial 'up-side' on international students, break even on domestic students. About 75% of our students are domestic. Mining Eng. take a much larger share of international students. At present industry people will periodically act as sessionals, but generally there are few contributions from industry people. But they are interesting in being more involved.

The graduate courses in this program are well subscribed - 15 - 30 enrollments (many are actually MEng students crossing over from Civil and Mining). A handful of them (5-10) also tend to enroll in our 4th year/grad cross-listed courses.

They do 'zero marketing' for the program.

Some challenges:

- Quality control. Program doesn't always attract "top" students. Some folks are seeking credentials because they can't get promotions the old fashioned way.
- Very little admin support. Selection of courses, day to day guidance falls largely to profs.
- MEng graduating papers and directed studies are like mini theses that are time consuming to supervise.
- Not clear where financial benefits flow for all the effort.
- Not all grad course styles are conducive to online or modular/short format (e.g. literature discussions, field trips).
- Competition from other programs who are ahead of us in this mode of delivery (e.g. Arizona).
- How to mesh our program effectively with Civil, Mining MEng and certificate programs.

Many people who are interested in certificate programs would be interested in on-line courses - to make it easier to work full time.

How to bring different learners together: examples and ideas.

- Oldenburg's group does a lot of courses to train professionals in the use of software / inversion tools to get better results. Generate open sources resources available broadly. E.g. how to invert magnetic data - short course. They provide code and take

them through data sets with hands on exercises. People learn about the methods and applications to their own problems. Typically this would run over a couple of days. Has mostly been taught by grad students and PDFs from GIF. The courses are typically free - but targeted to sponsoring companies.

- CODES - would run a distributed program based on 2 week block course modules.
- MDRU short-courses run with external lecturers - e.g. bring in an expert on machine learning to lead a course.
- <https://www.utas.edu.au/codes/masters-short-courses>: It's an M.Sc. level course, but a lot of the material is at a sr. undergrad level.

How:

- On-line teaching can target international participants.
- Modularize different size 'chunks' of course sizes - blocks of modules can be mixed and matched.
- MDRU future model. It would be good to 'formalize' the offerings to give credentials / certificates. Re-package / re-utilize existing material, and add some additional material led by industry professionals, and add some some practical field-based training and a co-op program with placements. Focusing on research that is done - promoting new techniques and stimulating application of those methods.
- How to balance the desire for open source materials readily available to lift up the field and do good. But then also need a longer-term revenue model. Perhaps you can monetize the credential.
- Don't want separate tracks for research students and industry people. We want people to come out of the program with good skills, and subject to an evaluation.
- Focus on inter-disciplinary projects - people to communicate across boundaries - courses that are problem-driven.
- Asynchronous components are helpful
- For reach more international students, Brett Gilley could provide ideas about working with students from different cultural backgrounds.
- Regarding online courses: Sample of hybrid online (first-year) course with short (3 minute) video snippets, see: <https://www.eoas.ubc.ca/courses/eosc114/storms-oe/day1/eosc114-oe-storms-day1.html>
- Example Engineers and Geoscientists BC course: Characterization and Management of Metal Leaching and Acid Rock Drainage. 1 day course, \$523
<https://www.egbc.ca/Events/Events/2021/21FEB CAM> (What are funds "for"?)

Why are we doing this?

- Upgrading skills for students / employees who are coming out of developing countries.
- help the community
- help our undergrad network
- it is a pipeline to build connections with industry
- Stakeholder meetings have been very productive in letting us.

Environment Certificate Program:

- Probably a large audience.

- Could aim to provide short courses to help candidates achieve Environment Professional (EP) certification, such as the ECO program.
- <https://www.eco.ca/ep-designation/>
- Could span almost all branches of our department.

ATSC Certificate Program:

From email, R. Stull, 2019

The Atmospheric Science professors met today (1 Aug 2019) to discuss OLAF, Diploma programs, Certificate programs, and new online courses. The marketing info provided by the OLAF team was invaluable, and helped us reach the following decisions. Thanks team.

1) We will eliminate the existing Diploma of Meteorology program.

2) We will consider creating a Certificate of Meteorology focused on the big societal issues related to over population, for which practicing meteorologists would likely want retraining:

Issues:

- air quality (ATSC has strength in this area)
- renewable energy (the ATSC 313 course with Skylight funding)
- climate change (a new prof was hired in this area)

Tools:

- big data (stats, machine learning, python programming)
- GIS & remote sensing

3) The ATSC faculty felt it was too early to go fully online with a certificate program. Some concerns were:

- how would online-course creation & teaching count towards tenure of new faculty?
- does OLAF funding allow for a mix of online, blended, and traditional courses?
- in any one course, what is the right balance between online and face-to-face meetings?
- if answers escape into the internet, how can cheating be reduced without imposing a burdensome workload on the prof?
- will OLAF fund creation of online micro modules, which could be combined into different courses.
- can upper-level courses be created with sufficient quantitative rigor online? This is a big issue.

4) Bottom line, the ATSC faculty wants to wait and see whether we can make our first new online upper-level course work successfully. If successful, then I think there will be much greater buy-in for adding more online upper-level courses.

5) The ATSC faculty gave solid endorsement to go ahead and create ATSC 313 Renewable Energy Meteorology, regardless of whether it is part of OLAF or whether it is required for ATSC majors or for a Certificate program. The course already has Science Skylight funding, and course-content creators have been hired. The new-course proposal is making its way through EOAS and Fac. of Sci. committees.

We are aiming for a first offering of ATSC 313 in Fall 2020 or Spr 2021. That is why we request a delay in the full OLAF proposal. We first need to see if ATSC 313 can be successful.

Cheers,
-Roland

P.S. We invite Simon Bates to come to an EOAS dept faculty meeting to give a presentation to share his vision of the future of online courses at UBC. This would help a lot of entrenched profs to realize that change is in the air.