

Educating the Next Generation of Waterpower Professionals

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On August 31, the OWA announced a new partnership with the University of Toronto (UofT) to develop a curriculum tailored for waterpower professionals of all backgrounds. Housed within the Faculty of Applied Science and Engineering, the vision is to deliver a Masters of Engineering to initiate newcomers to the industry and to provide a refresher to seasoned practitioners. The proposed multi-disciplinary curriculum would focus on waterpower from design and planning, to operations and market participation, to refurbishments and decommissioning, as well as making broader connections.

The program development comes at a time of transformation for

industry. Succession planning is a key concern, as many professionals reach retirement age. But moreover, the role of waterpower in the electricity supply is shifting in order to provide flexible generation and energy storage. Further, many crucial industry challenges – such as dam safety and inter-basin water transfer – transcend engineering and other disciplines. Meanwhile there is an evident lack of interdisciplinary education, especially in Ontario, that is centered on waterpower.

The educational landscape for the industry includes many crash courses offered by companies and conferences, and a handful of full courses at universities.

Of note in Canada, UofT offers a course on hydroelectric machines taught by Bryan Karney; and Montréal's École de Technologie Supérieure has an enriching course on power station design and components taught by Michel Sabourin. Globally, there are three fully developed Masters' programs specializing in waterpower, all located in Europe: NTNU, TU Graz and Delft. These other programs are models for the UofT-OWA program, making it, once launched, the first of its kind in North America.

A preliminary vision was presented to the OWA membership via a webinar on September 2, where it received enthusiastic support and many constructive ideas

from those in attendance. Soon after, the OWA put together an Advisory Committee with experienced professionals from a diversity of member organizations, including OPG, Stantec, Mavel, Chant Construction, TBSi, Regional Power and H2O Power. Together, the team is shaping the curriculum, with an eye to the strategic roll out of the course offerings in the near and long term.

Hydro 101

The first priority is to establish the foundational course: Hydro 101. The consensus is that this course would serve students from any discipline in order to give a common framework and language. The hope is that legal experts and environmental scientists can learn the basics of waterpower and understand where their discipline fits in.

The design of Hydro 101 is about breadth rather than depth. So far, the course covers the basics of site layout and components, how to run a facility, key financial considerations and electricity markets. The message is that each power station is unique, and responds to nature, the grid demands, and community needs. With a field trip and a course

project, Hydro 101 is shaping up to be very enriching indeed.

Technical Emphasis

In the near term, the goal is to set up an MEng with a Technical Emphasis in Waterpower. This is akin to getting a Bachelors with a Minor. To be awarded this designation, students would take four courses on the topic of waterpower. Naturally, Hydro 101 will be the cornerstone of the Emphasis.

As for the other three courses, there are several possibilities offered at UofT that could fit the bill; covering hydrology, turbomachinery, electrical networks, and infrastructure resiliency. However, the Committee feels a dedicated course on refurbishment and rehabilitation is also a high priority. The plan is to develop such a course from scratch.

MEng students can round out their degree with a wide array of other courses, or other Emphases. There is a range of concentrations along the engineering disciplines such as geomechanics, environmental engineering or construction management. Or students can develop their professional competencies with the ELITE emphasis: Entrepreneurship, Leadership, Innovation and

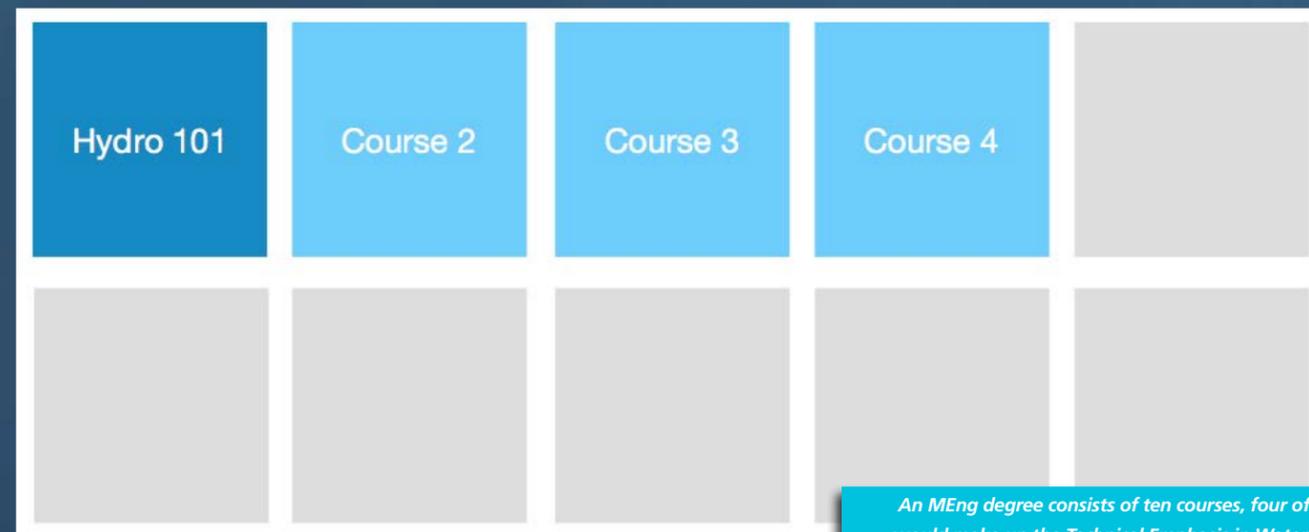
Technology in Engineering. Through these programs students can develop the business and management skills from instructors with years of industry experience.

Looking Forward

Hydro 101 and the Technical Emphasis are slated to be up and running September 2021, with the course on refurbishments targeted for January 2022. This will be the bedrock of the program, but the breadth of offerings is expected to grow and develop over subsequent years. "You could have a whole course on x" seems to be the Committee's catchphrase; there's certainly no shortage of wisdom to be imparted to students and prospective practitioners. Long term, the hope is to have a full Masters program dedicated to hydropower - mirroring our Europeans counterparts.

Applications for an M.Eng. are now open for September 2021. Apply here: <https://civmin.utoronto.ca/home/programs/graduate-programs/apply-to-graduate-programs/>

If you wish to learn more about the other Technical Emphases: <https://civmin.utoronto.ca/home/programs/graduate-programs/degree-emphasis/>



An MEng degree consists of ten courses, four of which would make up the Technical Emphasis in Waterpower.