


**University of Toronto  
Engineering**



---

---

---

---

---

---


---

---

**When there aren't enough hours in the academic day**

---

Tom Nault B.Sc., M.Ed.  
Associate Registrar, Director of Academic Scheduling and Admissions



---

---

---

---

---

---


---

---

**Make up of the room**

**How many people here are responsible for scheduling?**

**Have never scheduled before?**



---

---

---

---

---

---

---

---

## Agenda

Background-University of Toronto  
Background-Faculty of Engineering  
Current scheduling processes  
Challenges Faced  
The Task Force  
Recommendations  
Discussion



---

---

---

---

---

---

---

---

## University of Toronto

Largest university in Canada  
3 campuses  
Highly decentralized  
Over 79,000 students (57,000 undergraduates)  
15 Faculties on the St. George campus



---

---

---

---

---

---

---

---

## Faculty of Applied Science and Engineering

Largest engineering faculty in Canada  
5,000 undergraduate students  
9 Programs, 5 Engineering Minors  
Offer over 200+ courses per term  
Translates to 270 lecture sections, 500 tutorial sections  
and 200 practical sections per term  
Over 600 instructor per any given academic year  
Use of close to 100 rooms, many are specialized lab  
rooms



---

---

---

---

---

---

---

---

### Current Process

- Information is sent to the Registrar's Office from Departments
- Information is exchange mainly by Excel spreadsheets and emails
- Scheduling is rolled over year to year
- Curriculum changes are incorporated into the rolled over schedule
- Do not use a patterning or slot scheduling system
  - *Course times are essentially random*
- Occasionally, a program for a given year of study will be torn apart and rescheduled from scratch
  - *Process is very labour intensive*
- Schedule is loaded to the Institutional SIS and the Room Booking System
- Changes made after these initial uploads need to be managed in 3 systems



---

---

---

---

---

---

---

---

### Preregistration Process

The Faculty utilizes a pre-registration process to help determine course demand for the next academic year.

- Process is used to determine which options students will be joining
- Used to get an idea of students will be participating in our internship program
  - *About 50% of our students completing 3<sup>rd</sup> year complete a 12-16 month*
- Students with course choices are supposed to enter them in this system
  - *Participation rate for students who need to complete the process is about 80%*
- Allows departments to see potential demand and make adjustments to section sizes and numbers



---

---

---

---

---

---

---

---

### Campus Coordination

Though we are a decentralized institution, coordination among divisions is required

- Office of Space Management manages all rooms on campus
- Each Faculty has primary rooms designated for their use
- Large rooms (generally over 200 seats) are controlled centrally by OSM
- If you are short a room, you can ask another Faculty to 'borrow' a room
  - *Maintaining good relationships is critical*
- Our students are required to take electives in the Humanities and Social Sciences
  - *Can do this on any campus*
- Scheduling processes differ Faculties are different



---

---

---

---

---

---

---

---

## Curriculum

The Faculty has curricula that are at both extremes of the spectrum, some are very defined with no flexibility and other with a very large amount of flexibility

- First and Second year curricula are restrictive with no course choice except for maybe a Humanities or Social Science Elective in Second Year
- Third and Fourth year curricula have a varying amount of flexibility
  - *Generally speaking the larger the program, the more flexibility the students have*
- Electrical and Computer Engineering students have an enormous amount of flexibility in their 3<sup>rd</sup> and 4<sup>th</sup> years. They have a flexible curriculum...stay tuned for more details
- Engineering minors a total of 5 minors that students can complete by aligning their technical electives with the requirements of the minor
  - *Some minors are easier for some programs to complete than others*




---

---

---

---

---

---

---

---

## ECE Flexible curriculum

ECE students do not have a set curriculum in their 3<sup>rd</sup> and 4<sup>th</sup> years, they need to complete a number of courses to get the needed depth and breadth.

- Similar in concept to what many Arts and Science degrees look like
- Students use a special software program to select their courses
  - *Based on their course selections students will either graduate as a CE or EE*
  - *Some get to choose which program they will graduate from!*




---

---

---

---

---

---

---

---

## ECE Curriculum chart

3F	Technical Elective	Other Science/Math	Area Kernel	Area Kernel	Complementary Studies
3S	Engineering Economics	Depth	Area Kernel	Area Kernel	Complementary Studies
4F	Technical Elective	Depth	Depth	4th Year Design Project	Humanities & Social Science
4S	Free Elective	Technical Elective	Depth	4th Year Design Project	Humanities & Social Science

Simplified estimate of course combination is 3F

44C4= 135,751

This is likely a high estimate as it does not factor in prerequisites or the other requirements the software checks for.

However, it shows you that the ECE curriculum can be a schedulers nightmare

Lukcily, students tend to follow one of about 10 or so paths




---

---

---

---

---

---

---

---

### Challenges

#### Sometimes smaller isn't better

- There seems to be a feeling that since we are a small Faculty (at least by UoT standards) that deadlines are flexible
- This causes issues as we are committed to getting results to other campus players by set dates
- Department staff responsible for scheduling have a lot of competing demands on their time



---

---

---

---

---

---

---

---

### Challenges

#### Scheduling is not strategic

- Using a rollover approach as our main scheduling approach is not effective
- Not able to optimize schedules on a yearly basis
- Overtime schedules for programs and years of study get 'ugly' after a few years
- Not utilizing preregistration data to its fullest
- Each component of a course is 'randomly' scheduled, this results in class times for classes being scattered across the day



---

---

---

---

---

---

---

---

### Challenges

#### Instructor timetables tend not to be considered

- With the 'random' assignment of times, professors can have teaching responsibilities 5 days per week at various times
- Many instructors are involved with their lab and tutorial sections; these then need to be conflict free
- Can be challenging for instructors to book other requirements around their teaching schedule



---

---

---

---

---

---

---

---

### Challenges

#### Current software does not meet our needs

- Data entry is time intensive
- Requires a lot of manual interventions
- Lacks features to meet our objectives
- Difficult to represent our data properly
- Sectioning students into lectures, labs and tutorials is tedious



---

---

---

---

---

---

---

---

### Challenges

#### Institutional memory is lacking

- Large turnover in scheduling and department staff in the past 5 years
- No formal policies
- Little useful information written down
- A lot of effort is required to make changes, i.e. reinventing the wheel



---

---

---

---

---

---

---

---

### Challenges

#### Not enough hours in the day

- Currently courses are only scheduled to 9-5
- Very few evening courses offered
- No summer courses offered, a few recent exceptions to this
- Students can have 25-35 hours of scheduled class time per week
- No policies or guidelines on the number of consecutive hours of class a student may have
- Requests for cohorts of students to have a common free time
- Always try to give students a lunch break



---

---

---

---

---

---

---

---

## Challenges

### Commuter campus

- Many of our students commute to school
- Student commute from all over the GTA
- Some commute up to two hours each way
- Not many students stay in residence beyond first year
- Many courses have group work components, due to the busy days students tend to meet in the evenings
- This means scheduling courses in the evening are not ideal

---

---

---

---

---

---

---

---

## Challenges

### A very complex curriculum

- As seen with the ECE example, we have a very complex curriculum
- The complexity varies greatly between programs and year of study
- The first and second years are not challenging to schedule
- Third and Fourth year can be challenging
- Many third and fourth year programs have many options and many courses can fulfill many requirements (i.e. not as simple as select one of course A, B, C)
- A desire to make the curriculum more flexible for the students
- Have to ensure that students meet accreditation requirements

---

---

---

---

---

---

---

---

## Solution

### Conduct a scheduling review

- Task force struck by the Faculty Curriculum Committee
- Membership of the group included Faculty members, Admin staff and Students
- Given a wide ranging mandate
  - *Perhaps a bit to wide ranging*
- Asked to produce a preliminary report within 6 months and a final report within a year
- Consulted with a range of people who have an interest in scheduling within the Faculty
- Conducted a student focus group

---

---

---

---

---

---

---

---

### Why a scheduling review?

#### Consultation is key

- To help ensure buy-in of the final recommendations we had to ensure that the recommendations were generally agreed upon by a wide audience
- Wanted to ensure that the different voices in the Faculty were heard
- Realized that change can be scary
- Wanted to ensure people saw scheduling as more than just a technical problem
- Let us see a problem or a concern from multiple angles



---

---

---

---

---

---

---

---

### Validity of recommendations

#### Checked in part way through the process

- An in-progress report issued to the Curriculum Committee in October
  - *Was used to see if there were any glaring issues before we got too far down the wrong road*
- Conducted a survey with the Associate Chairs Undergraduate and department admin staff to check against key recommendations
  - *Used to see if anything we were proposing would cause big issues for departments*
- Draft version of the report circulated to departments for review
  - *One last check-in to see if there were any show stoppers before the report went on for approval to the Curriculum Committee and to Faculty Council*



---

---

---

---

---

---

---

---

### Student Focus Group

#### Allowed us to learn of specific student concerns

- Tried to have a group that was representative of all programs and years of study
- Used the group to determine specific student concerns
- Used the group to check for acceptance of recommendations
- Tried to understand what an ideal day would look like from the point of view of a student
- Make sure we didn't miss something obvious



---

---

---

---

---

---

---

---



### Results of Student Focus Group

#### Overriding theme-make it hard to skip class

- Prefer not to start day at 9am, really don't want to start at 8am
- Lunch break is appreciated and should be given everyday of the week
- Do not want to be on campus for only an hour or two of class
- Would rather have jam packed days then days with lots of gaps
- Don't really want evening classes, maybe as an option for electives or minors
  - *Many use evenings for group work projects*
- More lectures in the mornings, and not in the afternoon
  - *Start to get tired in afternoon and hard to take in lectures*
- Do not want many three hours lectures, one hour at a time is best



---

---

---

---

---

---

---

---

### Key Recommendations

#### Back to basics

- Confirm which department will report on each course
- Tell the departments specifically what they must report on
- Specify who is responsible for the scheduling
  - *The department chair, though this will most likely be delegated to an admin staff*



---

---

---

---

---

---

---

---

### Key Recommendations

#### Adoption of a scheduling policy

- Allows for a minimal amount of institutional memory
- Lays out what information needs to be collected each year
- Specify who is responsible for the scheduling
  - *The department chair, though this will most likely be delegated to an admin staff*
- Outline expectations for instructor non-teaching times
- Outlines expectations for student schedules



---

---

---

---

---

---

---

---

### Key Recommendations

#### Making better use of time

- Move to a slot or patterned scheduling system
- Investigate courses that can be offered in the evening
  - *Non required courses should be offered in the evening*
- Investigate courses that can be offered in the summer
  - *Courses may be offered in an alternate format*



---

---

---

---

---

---

---

---

### Key Recommendations

#### Pre-registration

- Redevelop the pre-registration system
- Make it more user friendly
- Make it easier to administer
- Allow students to select any course they want
  - *Improve methods for students to ensure they are on track to meet their degree requirements*



---

---

---

---

---

---

---

---

### Key Recommendations

#### Deadlines

- Develop clear deadlines for the full academic year
- Hold departments accountable for meeting deadlines
- Ensure Registrar's Office meets deadlines
- Better communicate why deadlines are important and the impact that missing deadlines has



---

---

---

---

---

---

---

---

### Key Recommendations

#### Resolution of conflicts

- Have a clearly defined process for how conflicts (differences of opinions) between the Registrar's Office and Departments will be managed
- Ensure that the proper processes are followed
- Where possible try to resolve informally
- If needed escalate to the Department Chair and if that fails the Vice-Dean Undergraduate



---

---

---

---

---

---

---

---

### Key Recommendations

#### Scheduling Software

- New scheduling software be invested in
- Care was taken to ensure that the task force was not focused on replacing the software
- It was more important to focus on other systemic changes that need to be made
- These changes helped to form the requirements that the new scheduling software will need to meet
- Initial funding for new software was approved by the Dean



---

---

---

---

---

---

---

---

### Discussion

What are some of the challenges faced on your campus?

- How did you overcome these challenges?
- Has your room inventory kept pace with enrolment growth?
- How long is your academic day?
- Do you offer a comprehensive summer program?
- Does your campus understand the role the Academic Scheduling plays on your campus?



---

---

---

---

---

---

---

---

Link to full text version of the report

<http://uoft.me/engschedreport>



---

---

---

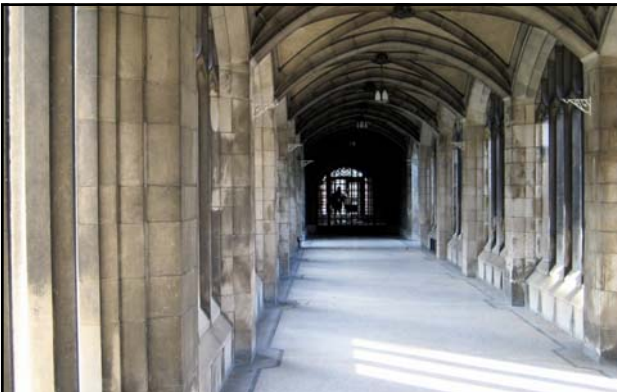
---

---

---

---

---



---

---

---

---

---

---

---

---

Thanks!

Questions?  
Email: [tom@ecf.utoronto.ca](mailto:tom@ecf.utoronto.ca)



---

---

---

---

---

---

---

---