# UAlberta Engineering Timetable Tutorial

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# Developers

All materials discussed in this tutorial were developed by Jason Kim, Moaz Abdelmonem, and Zachary Schmidt under the supervision of Dr. David Nobes in the Summer of 2022 at the University of Alberta.

# Purpose

The goal of this presentation is to provide a step-by-step explanation of how to generate the Engineering Timetable webpage. This webpage is meant to lay out the courses in an engineering discipline in a weekly format.

# Background

- The Timetable Generator is a program written in Python that generates an interactive webpage displaying the weekly timetable for a specific Engineering discipline.
- It can either take the form of a script (*main.py*), which requires Python 3.6 or higher to run, or a portable executable (*timetableGenerator.exe)*, which does not require Python. In the current state of the program, the executable can only run on Windows 64-bit machines.
- The source code and more information about the program can be found here: https://github.com/jaskim9824/TimeTableGenerator

# Tasks Outline
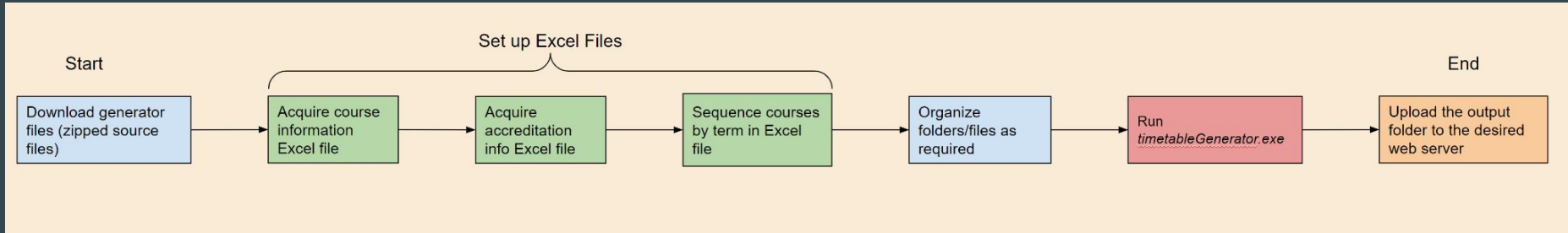


Outline of the process to generate the webpage: First, download the .zip file containing the source files (should contain *timeTableGenerator.exe* along with some folders). Then, acquire/create the Excel files that provide course, sequencing, and accreditation info. Next, organize the files and folders as specified later in this tutorial. Finally, run the executable *timetableGenerator.exe* and the webpage should be generated in the *output* folder.

# Required Files

To begin, you will need three Excel files that the program uses to generate the website. These are:

- An Excel file that contains the course information; can be downloaded by faculty
- An Excel file that contains accreditation information; can be downloaded by faculty
- An Excel file that specifies the sequencing of courses within the discipline. This must be constructed by the user

The naming and location of these files are not relevant, however, the formatting is of utmost importance and will be covered in the following slides.

# Excel File Format

All Excel files must be saved in the .xls format and NOT in the standard .xlsx format.

To save an Excel spreadsheet as a .xls file, enter the save menu, navigate to "save as" and choose the file format as Excel 97-2003 Workbook (*.xls)
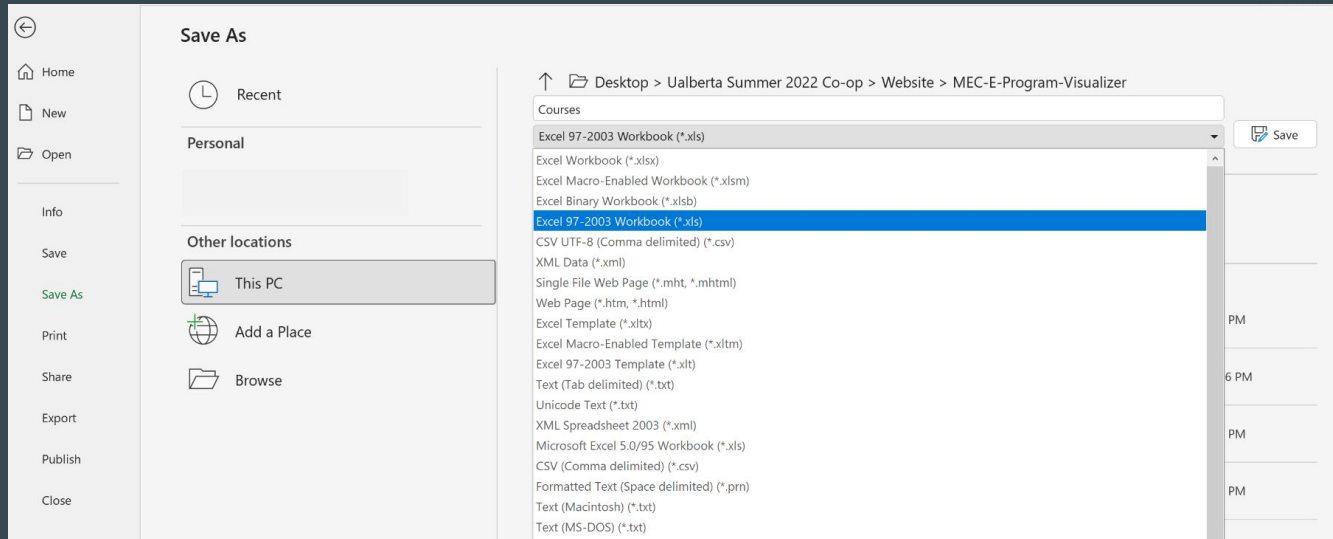


Saving an Excel spreadsheet as a .xls file

# Timetable Excel File Formatting

- The Timetable Excel file provides the information for each individual course on the webpage
- Row 1 of the Excel file must have 44 headers/columns. The columns from left to right should be: Acad Org, Term, Short Desc, Class Nbr, Subject, Catalog, Component, Sect, Class Status, Descr, Crs Status, Facil ID, Place, Pat, Start Date, End Date, Hrs From, Hrs To, Mon, Tues, Wed, Thurs, Fri, Sat, Sun, Name, Instructor, Email, Class Type, Cap Enrl, Tot Enrl, Campus, Location, Notes Nbr, Note Nbr, Note, Rq Group, Descr, Approved Hrs, Duration, Career, Consent, Descr, Max Units
- There should be only one sheet in this Excel file (name is irrelevant) with every course that will be placed on the webpage

# Courses Excel File Example

Below and on the next page is an example of the first few rows of the Timetable Excel file. Not every column has to be filled in. Only Subject, Catalog, Component, Sect, Descr (1st one), Place, Pat, Hrs From, Hrs To, Mon-Sun, Name, Email, Cap Enrl, Tot Enrl, Location, Approved Hrs, Descr (last one), and Max Units are used. The rest can be left blank.

| | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Some fields from | 120 | | | | | | | | | | | | | |
| 2 | Acad Org | Term | Short Desc | Class Nbr | Subject | Catalog | Component | Sect | Class Status | Descr | Crs Status | Facil ID | Place | Pat | Start Date |
| 3 | MECH ENGG | 1810 | Fall 2022 | 30716 | ENG M | 401 | LEC | 800 | S | FINANCIAL MNGM FOR ENGINEERS | A | | | | EMW | 2022-09-01 |
| 4 | MECH ENGG | 1810 | Fall 2022 | 30710 | ENG M | 401 | LEC | 801 | A | FINANCIAL MNGM FOR ENGINEERS | A | | | | ETR | 2022-09-01 |
| 5 | MECH ENGG | 1810 | Fall 2022 | 39224 | ENG M | 401 | LEC | A1 | A | FINANCIAL MNGM FOR ENGINEERS | A | 00001771 | ETLC E1001 | MWF | 2022-09-01 |
| 6 | MECH ENGG | 1810 | Fall 2022 | 34865 | ENG M | 405 | LEC | X01 | A | ENGINEERNG, BUSINESS & SOCIETY | A | 00001772 | ETLC E1008 | W3E | 2022-09-01 |
| 7 | MECH ENGG | 1810 | Fall 2022 | 34883 | ENG M | 501 | LEC | X01 | A | PRODUCTION & OPERATIONS MANGMT | A | 00001779 | ETLC E2001 | T3E | 2022-09-01 |
| 8 | MECH ENGG | 1810 | Fall 2022 | 34883 | ENG M | 501 | LEC | X01 | A | PRODUCTION & OPERATIONS MANGMT | A | 00001779 | ETLC E2001 | T3E | 2022-09-01 |
| 9 | MECH ENGG | 1810 | Fall 2022 | 37532 | ENG M | 508 | LEC | X01 | A | ENERGY AUDIT & MANAGEMENT | A | 00001772 | ETLC E1008 | R3E | 2022-09-01 |
| 10 | MECH ENGG | 1810 | Fall 2022 | 37532 | ENG M | 508 | LEC | X01 | A | ENERGY AUDIT & MANAGEMENT | A | 00001772 | ETLC E1008 | R3E | 2022-09-01 |
| 11 | MECH ENGG | 1810 | Fall 2022 | 37533 | ENG M | 514 | LEC | A1 | A | RELIABILITY ENGINEERING | A | 00001773 | ETLC E1018 | R3 | 2022-09-01 |
| 12 | MECH ENGG | 1810 | Fall 2022 | 37533 | ENG M | 514 | LEC | A1 | A | RELIABILITY ENGINEERING | A | 00001773 | ETLC E1018 | R3 | 2022-09-01 |

| | N | O | P | Q | R | S | T | U | V | W | X | Y | Z | AA | AB |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | | | | |
| 2 | Pat | Start Date | End Date | Hrs From | Hrs To | Mon | Tues | Wed | Thurs | Fri | Sat | Sun | Name | Instructor | Email | Cla |
| 3 | EMW | 2022-09-01 | 2022-12-08 | 18:00 | 19:25 | Y | N | Y | N | N | N | N | | | | E |
| 4 | ETR | 2022-09-01 | 2022-12-08 | 18:00 | 19:25 | N | Y | N | Y | N | N | N | Karapetrovic,Stanislav | 1021994 | sk9@ualberta.ca | E |
| 5 | MWF | 2022-09-01 | 2022-12-08 | 08:00 | 08:50 | Y | N | Y | N | Y | N | N | Gallardo Bobadilla,Roberto | 1099316 | robertog@ualberta.ca | E |
| 6 | W3E | 2022-09-01 | 2022-12-08 | 17:00 | 20:00 | N | N | Y | N | N | N | N | Boire,Michael Peter | 1286461 | boire@ualberta.ca | E |
| 7 | T3E | 2022-09-01 | 2022-12-08 | 17:00 | 20:00 | N | Y | N | N | N | N | N | | | | E |
| 8 | T3E | 2022-09-01 | 2022-12-08 | 17:00 | 20:00 | N | Y | N | N | N | N | N | | | | E |
| 9 | R3E | 2022-09-01 | 2022-12-08 | 17:00 | 20:00 | N | N | N | Y | N | N | N | Kumar,Amit | 1021697 | amitk@ualberta.ca | E |
| 10 | R3E | 2022-09-01 | 2022-12-08 | 17:00 | 20:00 | N | N | N | Y | N | N | N | Kumar,Amit | 1021697 | amitk@ualberta.ca | E |
| 11 | R3 | 2022-09-01 | 2022-12-08 | 14:00 | 16:50 | N | N | N | Y | N | N | N | Tian,Zhigang | 1071103 | ztian@ualberta.ca | E |
| 12 | R3 | 2022-09-01 | 2022-12-08 | 14:00 | 16:50 | N | N | N | Y | N | N | N | Tian,Zhigang | 1071103 | ztian@ualberta.ca | E |

# Courses Excel File Example Cont'd

| | AC | AD | AE | AF | AG | AH | AI | AJ | AK | AL | AM |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | |
| 2 | Class Type | Cap Enrl | Tot Enrl | Campus | Location | Notes Nbr | Note Nbr | Note | Rq Group | Descr | Approved Hrs |
| 3 | E | 250 | 0 | OFF | ONLINE | 1 | | Restricted to 3rd, 4th, 5th year Engineering student | 003156 | All Engg 3/4/5, 2 Mech Trad2, | 3-0-0 |
| 4 | E | 250 | 166 | OFF | ONLINE | 1 | | Restricted to 3rd, 4th, 5th year Engineering student | 003156 | All Engg 3/4/5, 2 Mech Trad2, | 3-0-0 |
| 5 | E | 250 | 35 | MAIN | MAIN | 1 | | Restricted to 3rd, 4th, 5th year Engineering student | 003156 | All Engg 3/4/5, 2 Mech Trad2, | 3-0-0 |
| 6 | E | 50 | 28 | MAIN | MAIN | 1 | | Registration will open on Tues, Mar 22 at 9:00 AM. | 000466 | Eng Yr3,4,5/BSc MAT/MET/PET Y2 | 3-0-0 |
| 7 | E | 75 | 57 | MAIN | MAIN | 1 | | Registration will open on Tues, Mar 22 at 9:00 AM. | 002733 | PR (ENGG 310/ENG M 310), ENGG | 3-0-0 |
| 8 | E | 75 | 57 | MAIN | MAIN | 2 | | Restricted to 4th and 5th year Engineering Undergr | 002733 | PR (ENGG 310/ENG M 310), ENGG | 3-0-0 |
| 9 | E | 50 | 39 | MAIN | MAIN | 1 | | Registration will open on Tues, Mar 22 at 9:00 AM. | 000116 | Engg Yr 4, 5th & Grad Studies | 3-0-0 |
| 10 | E | 50 | 39 | MAIN | MAIN | 2 | | Restricted to 4th and 5th year Engineering Undergr | 000116 | Engg Yr 4, 5th & Grad Studies | 3-0-0 |
| 11 | E | 50 | 9 | MAIN | MAIN | 1 | | Registration will open on Tues, Mar 22 at 9:00 AM. | 002731 | PR STAT 235 & EN or Grad St | 3-0-0 |
| 12 | E | 50 | 9 | MAIN | MAIN | 2 | | Restricted to 4th and 5th year Engineering Undergr | 002731 | PR STAT 235 & EN or Grad St | 3-0-0 |

| | AK | AL | AM | AN | AO | AP | AQ | AR | AS | AT | AU | AV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | | | | | | | | | | | | |
| 2 | Rq Group | Descr | Approved Hrs | Duration | Career | Consent | Descr | Max Units | | | | |
| 3 | 003156 | All Engg 3/4/5, 2 Mech Trad2, | 3-0-0 | EITHER | UGRD | N | The application of the fundamentals of engineering | 3.00 | | | | |
| 4 | 003156 | All Engg 3/4/5, 2 Mech Trad2, | 3-0-0 | EITHER | UGRD | N | The application of the fundamentals of engineering | 3.00 | | | | |
| 5 | 003156 | All Engg 3/4/5, 2 Mech Trad2, | 3-0-0 | EITHER | UGRD | N | The application of the fundamentals of engineering | 3.00 | | | | |
| 6 | 000466 | Eng Yr3,4,5/BSc MAT/MET/PET Y2 | 3-0-0 | EITHER | UGRD | N | The role of engineering and management in achievi | 3.00 | | | | |
| 7 | 002733 | PR (ENGG 310/ENG M 310), ENGG | 3-0-0 | EITHER | GRAD | N | Production and operations management, analysis, a | 3.00 | | | | |
| 8 | 002733 | PR (ENGG 310/ENG M 310), ENGG | 3-0-0 | EITHER | GRAD | N | Production and operations management, analysis, a | 3.00 | | | | |
| 9 | 000116 | Engg Yr 4, 5th & Grad Studies | 3-0-0 | EITHER | GRAD | N | Concepts and value of energy management and co | 3.00 | | | | |
| 10 | 000116 | Engg Yr 4, 5th & Grad Studies | 3-0-0 | EITHER | GRAD | N | Concepts and value of energy management and co | 3.00 | | | | |
| 11 | 002731 | PR STAT 235 & EN or Grad St | 3-0-0 | EITHER | GRAD | N | Concepts of reliability, failure rate, maintainability, a | 3.00 | | | | |
| 12 | 002731 | PR STAT 235 & EN or Grad St | 3-0-0 | EITHER | GRAD | N | Concepts of reliability, failure rate, maintainability, a | 3.00 | | | | |

These four images show the first few rows of a Timetable Excel file. The spreadsheet is very wide so it is split into these four images.

# Sequencing Excel File Formatting

- The sequencing Excel file provides the order in which courses are to be taken in each plan
- Each sheet on the spreadsheet should represent a plan. The name of the sheet will be shown as the radio button for that plan
- On every sheet, the very top row (row 1) should contain the names of the terms, and the cells below should contain the abbreviated course names for the courses taken in that term
- Electives are not used in the timetable but can be entered for the user's clarity:
  - For complementary electives enter "COMP"
  - For Program/Technical electives enter "PROG"
  - For ITS electives enter "ITS"
- Only two special cases arise and will be discussed in the next two slides: 1) course groups and 2) "or" courses

# Formatting Course Groups in Sequencing File

- If a course group can be taken in a given term, you must list the options with each being surrounded by curly braces followed by the course group name in normal parentheses. Curly-braced options are separated by "OR" (uppercase!)
- If one course group has more options than the other (one may have 3 courses in it and the other only has 2), enter the other course group as {(3A)} if the name of the course group was 3A

**Course Group 2A**

- CH E 243 - Engineering Thermodynamics
- MEC E 200 - Introduction to Mechanical Engineering
- MEC E 250 - Engineering Mechanics II

**OR**

**Course Group 2B**

- MEC E 230 - Introduction to Thermo-Fluid Sciences
- MEC E 260 - Mechanical Design I
- MEC E 265 - Engineering Graphics and CAD

University Calendar description of course groups 2A & 2B

| C | D |
|---|---|
| Fall Term 3 | Winter Term 4 |
| CIV E 270 | ECE 209 |
| MATH 209 | MAT E 202 |
| STAT 235 | MATH 201 |
| {CH E 243 (2A)} OR {MEC E 230 (2B)} | {CH E 243 (2A)} OR {MEC E 230 (2B)} |
| {MEC E 200 (2A)} OR {MEC E 260 (2B)} | {MEC E 200 (2A)} OR {MEC E 260 (2B)} |
| {MEC E 250 (2A)} OR {MEC E 265 (2B)} | {MEC E 250 (2A)} OR {MEC E 265 (2B)} |

Sequencing File: course groups 2A & 2B can be taken in Fall Term 3 or Fall Term 4. Groups are in curly braces with groups separated by "OR". Name of course group at end of curly brace entry

# Formatting "or" courses in Sequencing File

- Sometimes, students can select one course out of many options for a single slot in their program. This is frequently ENGM 310 or ENG M 401.
- To handle this, simply separate the courses by "or" (lowercase!)
- If this occurs within a course group, include both options within the same curly braces
- An example of an OR case within a course group is provided below:

| E |
|---|
| Summer Term 5 |
| {MATH 300 (3A)} OR {ENG M 310 or ENG M 401 (3B)} |
| {MEC E 300 (3A)} OR {MEC E 340 (3B)} |
| {MEC E 301 (3A)} OR {MEC E 360 (3B)} |
| {MEC E 331 (3A) } OR {MEC E 362 (3B)} |
| {MEC E 371 (3A)} OR {MEC E 390 (3B)} |
| {MEC E 380 (3A)} OR {COMP (3B)} |

The first row below the term name contains an "or" case within course group 3B. Include both courses in the same curly braces and separate them with "or". Course group name still comes at the end of the entry.

# Sequencing Excel File Example

| | A | B | C | D | E | F | G | H | I |
|---|---|---|---|---|---|---|---|---|---|
| 1 | Fall Term 1 | Winter Term 2 | Fall Term 3 | Winter Term 4 | Summer Term 5 | Fall Term 6 | Winter Term 7 | Summer Term 8 | Fall Term 9 |
| 2 | CHEM 103 | CHEM 105 | ENG M 310 or ENG M 401 | CIV E 270 | CH E 243 | {MATH 300(3A)} OR {MEC E 340(3B)} | {MATH 300(3A)} OR {MEC E 340(3B)} | PROG | CH E 448 OR MEC E 420 |
| 3 | ENGG 100 | ENCMP 100 | ENGG 404 | MEC E 230 | ECE 209 | {MEC E 300(3A)} OR {MEC E 360(3B)} | {MEC E 300(3A)} OR {MEC E 360(3B)} | PROG | ENGG 400 |
| 4 | ENGG 130 | ENGG 160 | MATH 201 | MEC E 260 | MAT E 202 | {MEC E 301(3A)} OR {MEC E 362(3B)} | {MEC E 301(3A)} OR {MEC E 362(3B)} | {MEC E 430 or MEC E 480(4A)} OR {MEC E 403(4B)} | {MEC E 430 or MEC E 480(4A)} OR {MEC E 403(4B)} |
| 5 | ENGL 199 | EN PH 131 | MATH 209 | MEC E 265 | MEC E 200 | {MEC E 331(3A)} OR {MEC E 390(3B)} | {MEC E 331(3A)} OR {MEC E 390(3B)} | {MEC E 463(4A)} OR {MEC E 451(4B)} | {MEC E 463(4A)} OR {MEC E 451(4B)} |
| 6 | MATH 100 | MATH 101 | COMP | STAT 235 | MEC E 250 | {MEC E 371(3A)} OR {PROG(3B)} | {MEC E 371(3A)} OR {PROG(3B)} | {PROG(4A)} OR {MEC E 460(4B)} | {PROG(4A)} OR {MEC E 460(4B)} |
| 7 | PHYS 130 | MATH 102 | ITS | | | {MEC E 380(3A)} OR {(3B)} | {MEC E 380(3A)} OR {(3B)} | | |
| 8 | | | | | | | | | |

Here is a complete sheet for the Alternate Plan in Mechanical Engineering (2022-2023). Some things to note are:

- The first row contains the term names as they will appear on the webpage
- The sheet name is "Alternate Plan", this is the name that will appear on the webpage
- For courses not in course groups and not an "or" case, simply enter the course name
- In cell F6 and G6 there is an example of a course group that has less courses than the matching course group. Course group 3A has 6 courses while course group B has 5 courses. Simply enter {(3B)} for one of the entries to indicate there is no matching course in group 3B
- The matching of courses between course groups is arbitrary (MATH 300 (3A) could be matched with any course in course group 3B)
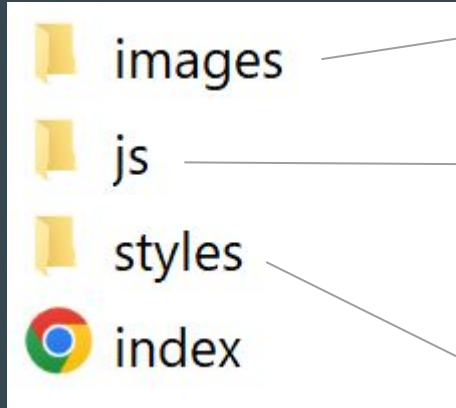
# Template HTML File

- The webpage generator requires a template HTML file as input that provides some basic layout information.
- This file is called *template.html.* Without this file in the proper location, the program will fail to generate the webpage.
- *template.html* must be in the same folder as *timeTableGenerator.exe* when *timeTableGenerator.exe* is run.
- Do NOT make any modifications to this file (edits or renaming), as this will break the layout of the final webpage OR prevent the program from locating it

# File Structure - Before Execution

📁 GUI_images

📁 output

🌐 template

📁 timetableGenerator

The required contents of the directory with timetableGenerator.exe before execution

📁 images

📁 js

📁 styles

The required contents of the *output* subdirectory before execution

🖼️ favicon

🖼️ uofalogo

The required contents of the *images* subdirectory before execution

js folder is empty

#️⃣ styles

The required contents of the *styles* subdirectory before execution

# Output Folder - After Execution

The contents of the *images* subdirectory should not have changed

A file called controller.js should have been created in the *js* subdirectory after execution

The contents of the *styles* subdirectory should not have changed

The contents of the *output* subdirectory after execution. Upload this full structure to the web server.

# Troubleshooting

- If any errors come up or the webpage is not working properly, check that you have all of the required files in their proper locations first
- If issues still persist, the most likely cause is improper formatting of the Excel spreadsheets. Check the following:
  - The three Excel files are all .xls files and not .xlsx files
  - Every course that is in the sequencing Excel file is present in the timetable information Excel file (no course is missing)
  - Course groups are labeled in the sequencing Excel file as specified in this tutorial
  - Course groups and "or" courses are handled appropriately
  - There are no typos in any course names

# Conclusion

After following all of the previous steps, you should have a complete webpage that can be uploaded to a web server.



Complete Mechanical Engineering Timetable Webpage