Data Visualization

Spring 2020

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Team members:

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GitHub: https://github.com/ichwin/DataViz

Project name:

The term "**four-year plan**" is a suggested table provided by the college department. It guides students to register for a constant load of courses to help the students finish the program (usually undergraduate) in time. It can also give the academic advisor a clue of what is the progress the student has been made during a consoling session.

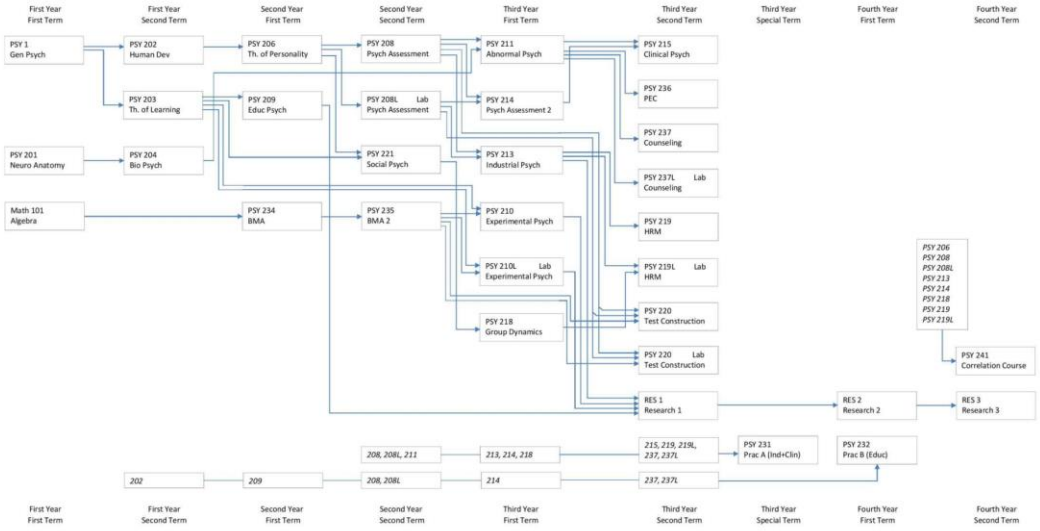
Some typical features of a "four-year plan" include:

1. All the program required core courses listed.
2. All their prerequisite course listed.
3. Ensured that for all semesters (at least for the first three academic years), there will be one free-elective course per semester, aiming to not make the general hardship too severe and balance.
4. Ensured that the cumulative course difficulty each semester grows gradually, leaving the students enough room to make the high school to college transition smoothly.

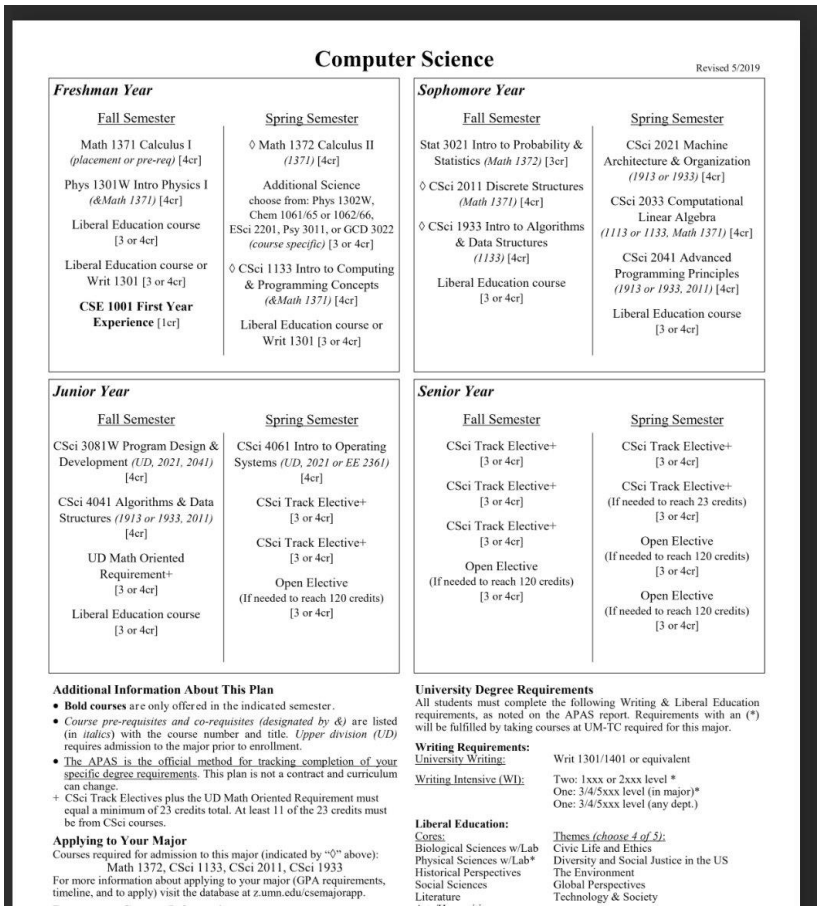
The plan may not be always followed. The course registration has always been competitive, and people who have registered for the desired course could drop it for various reasons, rendering the plan not being followed. Our project here is to make a dynamic data visualization of the four-year plan. Upon user preference, the four-year plan will have to be customizable and adjustable.

Good examples:

1. General Psychology undergraduate program of UCSD:



2. Computer Science undergraduate program of UMN:



Computer Science

Revised 5/2019

Freshman Year

Fall Semester	Spring Semester
Math 1371 Calculus I *(placement or pre-req)* [4cr]	◊ Math 1372 Calculus II *(1371)* [4cr]
Phys 1301W Intro Physics I *(&Math 1371)* [4cr]	Additional Science choose from: Phys 1302W, Chem 1061/65 or 1062/66, ESci 2201, Psy 3011, or GCD 3022 *(course specific)* [3 or 4cr]
Liberal Education course [3 or 4cr]	◊ CSci 1133 Intro to Computing & Programming Concepts *(&Math 1371)* [4cr]
Liberal Education course or Writ 1301 [3 or 4cr]	Liberal Education course or Writ 1301 [3 or 4cr]
CSE 1001 First Year Experience [1cr]	

Sophomore Year

Fall Semester	Spring Semester
Stat 3021 Intro to Probability & Statistics *(Math 1372)* [3cr]	CSci 2021 Machine Architecture & Organization *(1913 or 1933)* [4cr]
◊ CSci 2011 Discrete Structures *(Math 1371)* [4cr]	CSci 2033 Computational Linear Algebra *(1113 or 1133, Math 1371)* [4cr]
◊ CSci 1933 Intro to Algorithms & Data Structures *(1133)* [4cr]	CSci 2041 Advanced Programming Principles *(1913 or 1933, 2011)* [4cr]
Liberal Education course [3 or 4cr]	Liberal Education course [3 or 4cr]

Junior Year

Fall Semester	Spring Semester
CSci 3081W Program Design & Development *(UD, 2021, 2041)* [4cr]	CSci 4061 Intro to Operating Systems *(UD, 2021 or EE 2361)* [4cr]
CSci 4041 Algorithms & Data Structures *(1913 or 1933, 2011)* [4cr]	CSci Track Elective+ [3 or 4cr]
UD Math Oriented Requirement+ [3 or 4cr]	CSci Track Elective+ [3 or 4cr]
Liberal Education course [3 or 4cr]	Open Elective (If needed to reach 120 credits) [3 or 4cr]

Senior Year

Fall Semester	Spring Semester
CSci Track Elective+ [3 or 4cr]	CSci Track Elective+ [3 or 4cr]
CSci Track Elective+ [3 or 4cr]	CSci Track Elective+ (If needed to reach 23 credits) [3 or 4cr]
CSci Track Elective+ [3 or 4cr]	Open Elective (If needed to reach 120 credits) [3 or 4cr]
Open Elective (If needed to reach 120 credits) [3 or 4cr]	Open Elective (If needed to reach 120 credits) [3 or 4cr]

Additional Information About This Plan

- **Bold courses** are only offered in the indicated semester.
- *Course pre-requisites and co-requisites (designated by &)* are listed (in *italics*) with the course number and title. *Upper division (UD)* requires admission to the major prior to enrollment.
- The APAS is the official method for tracking completion of your specific degree requirements. This plan is not a contract and curriculum can change.

+ CSci Track Electives plus the UD Math Oriented Requirement must equal a minimum of 23 credits total. At least 11 of the 23 credits must be from CSci courses.

Applying to Your Major

Courses required for admission to this major (indicated by "◊" above):
Math 1372, CSci 1133, CSci 2011, CSci 1933

For more information about applying to your major (GPA requirements, timeline, and to apply) visit the database at z.umn.edu/csemajorapp.

University Degree Requirements

All students must complete the following Writing & Liberal Education requirements, as noted on the APAS report. Requirements with an (*) will be fulfilled by taking courses at UM-TC required for this major.

Writing Requirements:

University Writing:	Writ 1301/1401 or equivalent
Writing Intensive (WI):	Two: 1xxx or 2xxx level * One: 3/4/5xxx level (in major)* One: 3/4/5xxx level (any dept.)

Liberal Education:

Cores:	Themes *(choose 4 of 5)*:
Biological Sciences w/Lab	Civic Life and Ethics
Physical Sciences w/Lab*	Diversity and Social Justice in the US
Historical Perspectives	The Environment
Social Sciences	Global Perspectives
Literature	Technology & Society

Features that our “four-year plan” application will possess:

1. Import the existing course listed from the academic catalog in case any course was canceled. (supposedly work similarly like web crawler or parser)
2. Filter out the unavailable courses based on what courses are offered the current semester.

If two or more courses have a time conflict, visualize it.

1. Can adjust the distribution of cumulative difficulty by semester accordingly based on “strategy” to earn grades. For example, the maximum difficulty (increased core/elective course ratio) for easier senior year, or vise versa; graduate school applying strategy: minimum difficulty for best grade possible except for the last semester (by when the graduate school has already received the application); GPA rescuing strategy: minimum difficulty regardless of plan…
2. Can adjust the course load by semester accordingly based on “strategy” to complete the program. For example, maximum course load to quicken graduation; apply for grad school strategy: increased priority to graduate in summer, avoid graduation in Spring…
3. It can employ certain special rules defined by the user. Such as: “blacklisting” certain course; listing certain courses as “must”, manually increase the preference level of certain course to prepare for a potential major transferring…

The data visualization will be implemented using python as backend, Flask library for a web-based front end, GraphViz for data visualization after suggested by the instructor.