

OPIM 5641

Business Decision Modeling

# **Syllabus - Fall 2021**

**Excluding materials for purchase, syllabus information may be subject to change. A link to the most up-to-date syllabus is available on the course’s page in HuskyCT.**

## **Course and Instructor Information**

**Course Title:** OPIM 5641: Business Decision Modeling

**Credits:** 3

**Format:** In-Person

**Prerequisites:** None.

**Professor:** Carlos Cardonha

* Email: [carlos.cardonha@uconn.edu](mailto:carlos.cardonha@uconn.edu)
* WebEx: <https://uconn-cmr.webex.com/meet/chc19036>
* Office hours (online or in the classroom): Mondays 16h45-17h45

**Grader:** Hunter Bowden

* Email: [hunter.bowden@uconn.edu](mailto:carlos.cardonha@uconn.edu) (Please put 5641 somewhere in the subject so I get an alert)
* Cell: 860-754-8988
* WebEx (for office hours): <https://uconn-cmr.webex.com/meet/hib19003>
* Office hours: Wednesdays 17h30-18h30 plus scheduled via email

**Office Hours/Availability:** Please check announcements via HuskyCT for exceptional and permanent changes in the office hours. I will respond to email questions within 24 hours (except weekends and holidays). I will also monitor the discussion board at least once per day for questions (except weekends and holidays). **I will not reply to emails re: assignments/group project work 24 hours before the due date**. If you want to request an individual (online) meeting, send me an email, and I will do my best to accommodate it.

## **Course Materials**

**Main Textbook:**

1. **Optional:** “Business Analytics: The Art of Modeling With Spreadsheets, 5th Edition” - Stephen G. Powell, Kenneth R. Baker - ISBN: 978-1-119-29842-7
   1. *Although this book uses Excel and Solver,* ***we will solve all examples using Python instead. I will not follow the book, so it is not required*** *(but it is useful if you need more background on optimization topics).*
2. Jeffrey Cantor’s Pyomo Cookbook (free)
   1. <https://jckantor.github.io/ND-Pyomo-Cookbook/>
3. Datacamp link: [OPIM 5641](https://www.datacamp.com/groups/shared_links/f73f839faff23efc225464c2255589a0faaac497448a53d4ae3157fdf6001d9a)

*Additional course readings and media are available within HuskyCT. In addition, many books are available free of charge from the UConn Library - lib.uconn.edu.*

**Strongly Recommended Materials:**

1. Second Monitor, or tablet, desktop, laptop, etc.
   1. A second screen will help you to watch the videos and code at the same time. You will waste A LOT of time if you don’t get a large, second screen.

## **Software/Technical Requirements (with Accessibility and Privacy Information)**

The software/technical requirements for this course include:

* A notebook for class activities and assignments
* HuskyCT/Blackboard ([HuskyCT/ Blackboard Accessibility Statement](http://www.blackboard.com/Platforms/Learn/Resources/Accessibility.aspx), [HuskyCT/ Blackboard Privacy Policy](http://www.blackboard.com/footer/privacy-policy.aspx))
* [Adobe Acrobat Reader](http://www.adobe.com/products/acrobat/readstep2.html) ([Adobe Reader Accessibility Statement](http://www.adobe.com/accessibility/products/reader.html), [Adobe Reader Privacy Policy](http://www.adobe.com/privacy.html))
* Google Apps ([Google Apps Accessibility](https://www.google.com/accessibility/), [Google for Education Privacy Policy](https://www.google.com/edu/trust/))
* Microsoft Office (free to UConn students through [uconn.onthehub.com](https://uconn.onthehub.com)) ([Microsoft Accessibility Statement](http://www.microsoft.com/enable/microsoft/mission.aspx), [Microsoft Privacy Statement](https://privacy.microsoft.com/en-us/privacystatement/))
* Dedicated access to high-speed internet (minimum of 1.5 Mbps, 4 Mbps or higher is recommended).

## **Course Description**

Discusses business modeling and decision analysis. Covers topics such as optimization, simulation, and sensitivity analysis to model and solve complex business problems. The course will emphasize the representation of business decision problems as optimization problems and the use of specialized software to solve and analyze problems, input data, and retrieve results.

*This course will be taught entirely using Python!*

## **Course Objectives**

By the end of the semester, students should be able to:

1. Describe and analyze data using Python.
2. Translate business problems into mathematical models (objective functions, decision variables, constraints.)
3. Solve linear programming (allocation, covering, blending, network, integer) and nonlinear programming problems using Python.
4. Perform sensitivity analysis and calculate shadow prices for binding constraints.

## **Course Outline**

Module 1: Python Bootcamp/Exploratory Data Analysis

Module 2: Mathematics for Linear Programming (Graphical Method, Simplex Algorithm)

Module 3: Linear Programming Models (Allocation, Covering, Blending)

Module 4: Nonlinear Optimization

Module 5: Network Optimization

Module 6: Integer Optimization

## **Course Requirements and Grading**

**Summary of Course Grading:**

| Course Components | Weight |
| --- | --- |
| Individual Assignments | 15% |
| Student Feedback/Surveys | 10% |
| Group Projects | 75% |

Students will be broken up into groups, which will work together on the projects.

**Individual Assignments**

Each module typically has one individual assignment worth 100 points. These assignments are graded based on accuracy.

**Group Projects**

Your group project is your chance to apply what you have learned in class to an interesting real-world problem that you would be proud to talk about in a job interview. You will follow the same general flow for each project: data gathering, literature review, data preparation, modeling, analysis, conclusion, works cited/references. To keep things streamlined, ALL of your materials (code and text/narrative) can just be stored in a Colab notebook. Make sure your code is neat and organized (with lots of headers and comments).

**Student Feedback/Surveys:**

This element will reflect student’s engagement in the course; aspects of engagement include actively participating in the discussion board (i.e., asking and **answering** questions), actively participating in the group projects, and meeting the deadlines for all graded assignments. In addition, students will peer-review the level of contribution of the other group members in the projects.

**Grading Scale (per the Registrar):**

**Graduate**

* The letter “A” represents work of distinction.
* The letter “B” represents work of good quality, such as is expected of any successful graduate student.
* The letter “C” represents work below the standard expected of graduate students in their area of study.
* The letter “D” represents work of unsatisfactory quality.
* The letters “F” and “U” signify failure in the course and necessitate a recommendation by the advisory committee to the Graduate School as to whether or not the student shall be permitted to continue graduate study.

Plus and minus values may be assigned to all but failing grades, are entered on the permanent record, and are computed into the student’s grade point average.

**Due Dates and Late Policy**

**All course due dates are identified in the Course Schedule,** available in HuskyCT. Deadlines are based on Eastern Time; please adjust your submission times accordingly if you are in a different time zone. **The instructor reserves the right to change dates accordingly as the semester progresses. All changes will be communicated in advance.**

I do not accept late project submissions; if you have an emergency, please contact the professor as soon as possible. For individual homework assignments, the students may submit up to 24 hours after the due date, but the maximum grade will be capped at 80% of the maximum.

**Feedback and Grades**

I will make every effort to provide feedback and grades within 7 to 10 days for homework assignments and within 14 days for group projects. To keep track of your performance in the course, refer to My Grades in HuskyCT.

**Weekly Time Commitment**

For a three-credit in-person course, [University policy](http://policy.uconn.edu/?p=2520) stipulates that for every 1 hour in class there is a minimum of 2 hours of student work out of class. Therefore, you should expect to dedicate **9 - 12 hours a week to this course**. This expectation is based on the various course activities, assignments, assessments, and the University of Connecticut’s policy regarding credit hours. More information related to hours per week per credit can be accessed at the [Online Student website](https://onlinestudent.uconn.edu/learn-more/#collapsepanel-269-1-0-07).

## **Student Responsibilities and Resources**

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important [standards, policies, and resources](https://onlinestudent.uconn.edu/learn--more/#POL), which include:

* The Student Code
  + Academic Integrity
  + Resources on Avoiding Cheating and Plagiarism
* Copyrighted Materials
* Credit Hours and Workload
* Netiquette and Communication
* Adding or Dropping a Course
* Academic Calendar
* Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
* Sexual Assault Reporting Policy

## **Students with Disabilities**

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately to discuss options. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or<http://csd.uconn.edu/>.

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government.” (Retrieved March 24, 2013 from [Blackboard's website](http://www.blackboard.com/platforms/learn/resources/accessibility.aspx))

For information on managing your privacy at the University of Connecticut, visit the [University’s Privacy page](https://privacy.uconn.edu/).

**NOTE:** This course has NOT been designed for use with mobile devices.

## **Help**

[Technical and Academic Help](https://onlinestudent.uconn.edu/frequently-asked-questions/) provides a guide to technical and academic assistance.

This course is completely facilitated online using the learning management platform, [HuskyCT](http://huskyct.uconn.edu/). If you have difficulty accessing HuskyCT, you have access to support options available during regular business hours through the [Help Center](http://helpcenter.uconn.edu/). You also have [24x7 Course Support](http://www.ecampus24x7.uconn.edu/), including access to live chat, phone, and support documents.

## **Library**

The MSBAPM program has a liaison at the library who can help you with your research skills. Please refer here <https://guides.lib.uconn.edu/bapm> for information on useful research resources (databases, citation formats, contact information for our dedicated librarian, etc.)

## **Minimum Technical Skills**

To be successful in this course, you will need the following technical skills:

* Use electronic mail with attachments.
* Download and upload files using Google Drive
* Save files in commonly-used word processing and spreadsheet program formats.
* Copy and paste text, graphics, or hyperlinks.
* Work within two or more browser windows simultaneously.
* Open and access PDF files.
* Ideally (optional, but strongly recommended), use a second screen.

University students are expected to demonstrate competency in Computer Technology. Explore the [Computer Technology Competencies](http://geoc.uconn.edu/computer-technology-competency/) page for more information..

## **Evaluation of the Course**

Students will be provided an opportunity to evaluate instruction in this course using the University's standard procedures administered by the[Office of Institutional Research and Effectiveness](http://www.oire.uconn.edu/) (OIRE).

Additional informal formative surveys may also be administered within the course as an optional evaluation tool.