

York University Faculty of Environmental and Urban Change With the University of Iceland Faculty of Life and Environmental Sciences

Winter 2024: Ecological Footprint Informatics (6599B) (DRAFT)

At York: Enroll as ENVS 6599B Individual Directed Study for 3 credits At University of Iceland: Enroll through Professor Brynhildur Davíðsdóttir

Overall purpose and intended outcomes

This small-group course develops computational analytical skills that are used to produce the National Ecological Footprint and Biocapacity accounts, and which are also transferable to other data-intensive initiatives. These accounts quantify how much of the planet's regenerative capacity is needed, and is available, to sustain humans with food, fibers, wood products, areas for settlements, and the sequestration of anthropogenic carbon emissions.

By the end of the course, you should be able to: 1) understand different types of data and techniques for optimizing their storage and retrieval and integrity; 2) develop MySQL queries and scripts using MySQL Workbench to upload data and to transform and retrieve data; 3) understand data-cleaning techniques and apply them using data-cleaning scripts in R Studio; 4) use MS Excel software to communicate data from the National Ecological Footprint and Biocapacity accounts; 5) understand and codify scholarly literature about the same accounts and their related concepts.

Time and location of course meetings

We will meet online using Zoom, on Tuesdays, starting at 9:30AM Eastern Time = 2:30PM GMT. If this day and time conflicts with a student's courses, we will try to reschedule it. Each session will generally last up to three hours, which will include two ten-minute breaks.

Prerequisites and co-requisites

This course usually requires the prior completion of Ecological Footprint Applications which focusses on the concept and application of Ecological Footprint and Biocapacity accounting.

Course Director

Eric Miller ewmiller@yorku.ca please include 6599 in the subject line of all course emails

Office hours

You may schedule appointments with me through the course website's automated system.

Course website <u>h4x.ca/efi/</u>

This restricted-access website contains the most updated schedule of course meetings and materials, including supporting slides, videos, data, and hyperlinks to all external material and readings (through the library proxy), guidelines used to grade the assignments, and a class list with emails. The website allows you to post comments and to reply to other comments. You are expected to access the website throughout the term.

Software and hardware

You may use a Windows-based or Mac computer; if you have a choice, a Windows-based system is preferred. I highly recommend that you use a second monitor to extend your virtual desktop. This course requires that you install specific software (at no additional cost) on your computer, including the latest version of the Microsoft Office suite which includes Excel.

Organization of the course

Generally the first hour will review the data assignment from the prior week. The second hour will introduce new material that will prepare everyone for the next data assignment, due before the next session. A detailed agenda of each meeting is provided on the course website.

Schedule of topics and learning outcomes

Details that follow are subject to change; the course website will have a more current list of topics, learning outcomes, and requisite materials and readings.

Jan 9: Setup and process for coding literature

: Setup of infrastructure and introduction to process for querying and coding scholarly literature

Jan 16: Data types and provenance

: Common data types and files that store them, and how to build a database with data

Jan 23: Data integrity

: Approaches to manage data and its transformations using Structured Query Language

Jan 30: Scripts & Repositories

: Creating and understanding systems of queries and the roles and relevance of repositories

Feb 6: Excel

: Using MS Excel to develop workbooks and use formulas to transform data

Feb 13: NEFBA exploration

: Engaging with data in the accounts in preparation for developing a data-related story

(No session on February 20 because this is the York University winter-term reading week)

Feb 27: 2ata visualizations

: Communicating data through various types of charts and visuals

Mar 5: Data cleaning

: Transforming data to conform to a statistical model to manage outliers and missing values

Mar 12: Quality assurance

: Developing queries to assure that final data reflects only the intended data and manipulations

Mar 19: NFBA Production and Data scoring

: Using software to generate the accounts and scoring the quality of results

Mar 26: Data in an organizational and societal context

: Problematizing data, and information, and it uses and misuses

(No session on April 2 because this is the University of Iceland Easter break)

Apr 9: Data story show and tell

: Presentation of draft messages and visuals related to data stories being developed

Assignments and Evaluation

50% **Completing 10 computational assignments**

Assignments are problems that can be answered using specialized software to demonstrate computational skills that you will have developed. The problems will be assigned at the end of a session and will generally be due before the next one starts.

25% **Coding scholarly literature** as a contribution to literature review paper You will work on rotating teams to read and codify literature about the ecological footprint, as your contribution to a multi-authored inventory of the footprint literature that is planned to be used for an academic paper. Literature is identified through the course website and provided as a hyperlink through the Library proxy.

25% Producing a web-posted data story

You will write a succinct blog-style post about an interesting data point (or series) within the most recent edition of the National Ecological Footprint and Biocapacity Accounts. This post will aim to be included with the release of the next edition of the accounts.

Grading system

Students at York: MES courses at York/EUC use a Pass (P) or Unsatisfactory (U) grading system in order to encourage interdisciplinary exploration and creativity. York transcripts show grades of Pass (P), Withdrawn (W), or Unsatisfactory (U). A Pass grade is equivalent to a B- letter grade or better, which is equivalent to 70%; anything less is Unsatisfactory. Your MES dossier will contain a written evaluation of your performance in this course. Or if you are a York student not in the MES program, your grade will be sent to the registrar as a usual graduate grade. Equivalents between letters and percentages will reflect those identified in the MES handbook.

Students at University of Iceland: a percentage grade and qualitative assessment will be transmitted to your program liaison Brynhildur Davíðsdóttir, who will use this information to generate your final grade in this course.

Academic honesty

Everyone in this course is subject to policies regarding academic honesty. York students are subject to policies regarding academic honesty as set out by the Senate of York University and

by the Faculty of Environmental and Urban Change. Students are strongly encouraged to read the Senate Policy on Academic Honesty, a copy of which can be found on the York University website (http://www.yorku.ca/academicintegrity/students/policy.htm). York is committed to maintaining the highest standards of academic integrity. Please be advised that conduct that violates the ethical or legal standards of the University community may result in serious consequences. For more information, please contact the Director of Student and Academic Services and/or the Writing Program Coordinator in the Faculty. University of Iceland has equivalent policies on academic honesty that apply to students at that university.

Access/Disability

Universities provide services for students with disabilities, including physical, medical, learning and psychiatric disabilities, which may need accommodation related to teaching and evaluation methods/materials. If this applies to you, it is your responsibility to register with disability services as early as possible to ensure that appropriate academic accommodation can be provided with advance notice. You are encouraged to schedule a time early in the term to meet with each professor to discuss your accommodation needs. Failure to make these arrangements may jeopardize your opportunity to receive academic accommodations.

Intellectual property notice

All materials prepared for this course are the intellectual property of the Course Director or otherwise stated. Course materials should only be used by students enrolled in this course. This can include but is not limited to the following material: lecture notes, handouts and recordings; assignment handouts and instructions; spoken and written presentations; audio and video recordings; PowerPoint slides; and questions and/or solution sets for assignments, quizzes, tests and final exams. As a student in this course, you may not publish, post on an Internet site, sell, or otherwise distribute any of this work without the instructor's express permission. Unauthorized or commercial use of these materials is strictly prohibited. Third party copyrighted materials (such as book chapters, journal articles, music, videos, etc.) have either been licensed for use in this course, or fall under an exception or limitation in Canadian copyright law. Copying this material for distribution (e.g. uploading material to a commercial third-party website, or online sharing of course material with people outside of the course) may lead to a charge of misconduct under York's Code of Student Rights and Responsibilities and the Senate Policy on Academic Honesty. In addition, you may face legal consequences for any violation of copyright law.