# Syllabus

**Course:** R Programming for Natural and Social Science - Fall 2020

**Instructor**

Dr. Travis Gallo
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**Location:** Online

**Times:** Tuesdays and Thursday, 10:30-11:45am

**Office Hours:** Monday 9-10am (subject to change)
**Location:** Online

**Required Texts:** There is no required text book for this class.

**Course Description**

An introduction to data management, manipulation, and analysis, with an emphasis on problems in environmental science (both natural and social science examples). Class consists of short introductions to new concepts followed by hands on computing exercises using R, but the concepts apply to programming languages and databases more generally. No background in computing is required.

**Purpose of Course**

In this course you will learn all of the fundamental aspects of computer programming that are necessary for conducting environmental science research. By the end of the course you will be able to use these tools to import data into R, perform analysis on that data, and export the results to graphs, text files, and databases. By learning how to get the computer to do your work for you, you will be able to do more science faster.

**Course Objectives and Goals**

Students completing this course will be able to:

- Create well structured databases
- Extract information from databases
- Write computer programs in R
- Automate data analysis

- Apply these tools to address research questions
- Apply general data management and analysis concepts to other programming languages and database management systems

**Grading Policies**

Grading for this course is based on 13 equally weighted assignments.

Exercises in assignments will be graded as follows:

- Produces the correct answer using the requested approach: 100%
- Generally uses the right approach, but a minor mistake results in an incorrect answer: 90%
- Attempts to solve the problem and makes some progress using the core concept: 50%
- Answer demonstrates a lack of understanding of the core concept: 0%

**Grading scale**

- **A 93-100**
- **A- 90-92.9**
- **B+ 87-89.9**
- **B 83-86.9**
- **B- 80-82.9**
- **C+ 77-79.9**
- **C 73-76.9**
- **C- 70-72.9**
- **D+ 67-69.9**
- **D 60-66.9**
- **E <60**

**Tentative Schedule:**

| Week | Topic |
| --- | --- |
| 1 | Introduction to R and RStudio |
| 2 | Data Types – Vector, Matrix, Databases, Lists |
| 3 | Data Types – Numerical vs. Categorical |
| 4 | Indexing |
| 5 | Operators and Functions |
| 6 | Loops |
| 7 | Importing and Exporting Data |
| 8 | Working with Data |
| 9 | Tidyverse |
| 10 | Working with Data |
| 11 | Introduction to Project |

| 12 | Data Visualization |
|----|--------------------|
| 13 | Data Visualization |
| 14 | Advanced Topics: rspatial |
| 15 | Project Presentations |

**Disability Statement**: If you are a student with a disability and you need academic accommodations, please see the instructor  and contact the Office of Disability Resources at 703-993-2474. All academic accommodations must be arranged through that office.

**Honor Code Statement**: George Mason University has an Honor Code, which requires all members of this community to maintain the highest standards of academic honesty and integrity. Cheating, plagiarism, lying, and stealing are prohibited by the code. The instructor will make it clear when working together in lab is acceptable and when independent work is required. If you are uncertain, ask the instructor. It is the responsibility of all members of the community, both students and teachers, to report violations of the code.

**Enrollment Statement**: Students are responsible for verifying their enrollment in this class. Schedule adjustments must be made by the deadlines posted in the Schedule of Classes.