# GIS in R (Fall 2024): Schedule

*Note: Some elements may be modified to best meet the needs of our students.*

## Week 1 (21 -27 Oct): Foundations

**Total video runtime**: < 5 minutes

**Overview**: Here we will introduce the primary tools that we will use in this course. Much of the material this week will be a review of pre-course content.

**Topics include**:

* R Objects
* Importing, exploring, and exporting data
* Global assignments and the pipe operator
* How to solve my (sometimes brutal) problem sets
* Code formatting for this course

## Week 2 (28 Aug - 3 Nov): The tidyverse

**Total video runtime**: 1:37:10

**Overview**: This week will be a crash course in tidyverse basics. Most of you have identified tidyverse skills in your application materials, so much of the content will likely be review. We will continue to build on tidyverse skills throughout this course.

**Topics include**:

* Reshaping data frames
* Mutation
* Subset data frames (e.g.,, filter, select, slice)
* Summarize
* Data visualization (ggplot)

## Week 3 (4-10 Nov): Introduction to shapefiles

**Total video runtime**: 1:15:47

**Overview**: This week will be our first foray into working with spatial data! We’ll be learning the basics of the sf package and then use spatial and non-spatial joins to maximize the efficiency of our spatial data workflow. *Note: As much of the remaining course content is expected to be new to our students, the total video runtime is much lower from this point on!*

**Topics include:**

* Introduction to shapefiles with sf
* Joining data frames
* Spatial and non-spatial joins with sf

## Week 4 (11-17 Nov): Iteration and tmap

**Total video runtime**: 1:22:29

**Overview**: For those who are new to iteration, this will likely be the most challenging week of the semester. Iteration is a core concept across programming languages and becomes especially useful when addressing repetitive tasks associated with using R as a GIS. At the end of the week, we’ll learn to use tmap – a user-friendly package for visualizing spatial data.

**Topics include:**

* Iteration with purrr
* Applying iteration to spatial data
* Introduction to tmap

## Week 5 (18-24 Nov): Advanced shapefiles and introduction to rasters

**Total video runtime**: 1:26:34

**Overview**: This week we’ll finish up the core concepts of working with shapefiles and introduce working with raster data in the terra package.

**Topics include:**

* Advanced sf
* Additional sf tools
* Introduction to raster data

## Week 6 (25 Sep - 1 Dec): Categorizing vectors, shapefiles, and rasters

**Total video runtime**: 1:26:13

**Overview**: This week will be all about classifying data (i.e., defining categories for continuous data or reclassifying categorical data). We’ll work with non-spatial data at first and then apply those concepts to spatial data at the end of the week.

**Topics include:**

* Classifying and reclassifying values
* Working with factors using the forcats package
* Categorizing spatial data

## Week 7 (2-8 Dec): Rasters and spatial patterns

**Total video runtime**: 1:26:13

**Overview**: This week we’ll push the envelope a bit further by addressing concepts such as conducting terrain analyses of raster data, deriving density and distance rasters, and toe-dipping into the all-important concept of spatial autocorrelation.

**Topics include:**

* Advanced rasters
* Spatial autocorrelation

## Week 8 (optional; 9-15 Dec): Quarto and Shiny

**Total video runtime**: 1:09:09

**Overview**: Our final week of this course is optional (*but certainly suggested!)*. Although you will not be tested on this material, we’ll look at how to explore memory usage and build shiny applications for spatial data. Shiny applications are an awesome way to share geographic data with others! But … why is week 8’s video content so short *and* optional? This is to give you adequate time to work on the final project – a carefully crafted problem set that has been designed to assess your ability to integrate knowledge across the semester.

**Topics include:**

* Making web pages with Quarto
* Control flow with if … else
* Introduction to shiny apps
* Making a shiny dashboard