

**DSA 5041 Advanced R**  
1 Credit Hour Online Course

**Instructor:** Wayne Stewart

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**Office Hours:** Tuesdays 1:00-2:00 CST or by appointment

**COURSE DESCRIPTION**

R is a free open source statistical programming language used by professionals in every field and industry. Advanced R will begin from where DSA 5011 Introduction to R left off which is essentially the tools necessary to make basic R functions. Most students should already appreciate the need to go further once basic procedural R and introductory functions have become common place to them. Students should already know how to make the common objects:

1. Data frames
2. Vectors
3. Matrices
4. Lists

And carry out basic arithmetic operations, use built in R functions such as plot, curve, summary etc.

**COURSE GOALS & LEARNING OBJECTIVES**

The following topics will be covered:

1. Names and values
  - a. Binding
  - b. Copy on modify
2. Vectors
  - a. Atomic
  - b. Lists
3. Subsetting
4. Control flow
5. Functions
6. Environments
7. Conditions
8. Functionals
9. Function factories
10. Function Operators
11. Object oriented programming (S3)
12. Advanced functions
13. Shiny server (dynamic and reactive)
14. R packages using roxygen2
  - a. Vignettes
  - b. Function help
  - c. Data installation
  - d. Demo
  - e. Inst

**LEARNING MANAGEMENT SYSTEM** <https://Canvas.ou.edu>

### **COURSE MEETING TIME & LOCATION**

100% Online course

### **PREREQUISITES**

Graduate standing in DSA/C S/ISE, Introduction to R (DSA 5011), or departmental permission.

### **REQUIRED TEXTBOOKS**

In this next level of R I will be using a number of online resources including:

- i) <http://adv-r.had.co.nz/>
- ii) <https://bookdown.org/csgillespie/efficientR/>
- iii) <https://rstudio-education.github.io/hopr/> iv) <http://r-pkgs.had.co.nz/>

The main resource would be the following book:

*Wickham, Hadley. Advanced R. CRC, 2014. Chapman & Hall/CRC the R Ser. (CRC Press). Web.*

### **COURSE FORMAT**

The course is delivered in an online format, consisting of lectures, demonstrations, quizzes, and mini projects.

### **UNIT QUIZZES**

Students are responsible for all of the material covered from the readings, lectures, demonstrations, and any other assigned materials. Each unit features a short quiz. Each quiz is designed to check key points from the readings and videos, and to help you prepare for the unit project.

### **UNIT PROJECTS**

Each unit will feature a mini-project. You will be required to integrate and/or apply the knowledge and skills you have previously developed in order to complete a small task.

### **EVALUATION**

Individual grades in the course are determined by a combination of quizzes and projects. All grades will be in points. Total points in the course are distributed as shown below:

Type	Description	Total points
Quizzes	8 quizzes x 5 points each	40
Projects	8 projects x 10 points each	80
<b>Total</b>		<b>120</b>

Students must earn 90% or more of the total points to an "A" in this class, 80-89% to earn a "B," 70-79% to earn a "C," and 60-69% to earn a "D."

COURSE SCHEDULE		
WEEK BEGINNING	TOPIC	DESCRIPTION
3/9/2020	1	1. Names and values a. Binding b. Copy on modify
3/16/2020	2	2. Vectors a. Atomic b. Lists
3/23/2020	3-4	Subsetting, Control Flow
3/30/2020	5-6	Environments, Functions
4/6/2020	7-8	Functionals, Conditionals
4/13/2020	9-10	Function Operators, Function Factories
4/20/2020	11	Object Oriented Programming (S3)
4/27/2020	12-13	Advanced Functions, Shiny Server
5/4/2020	14	R Packages using roxygen 2

**LATE POLICY**

All assignments will be considered late if not turned in when due, although assignments can be turned in early. Assignments submitted within five days after due date will get partial credit; however assignments submitted more than five days after due date will get 0 point for assignment.

**COURSE POLICY ON ACADEMIC INTEGRITY**

Cheating is strictly prohibited at the University of Oklahoma. As a member of the OU community it is your responsibility to protect your educational investment by knowing and following the rules. Should you see someone else engaging in this behavior, I encourage you to report it to myself or directly to the Office of Academic Integrity Programs. That student is devaluing not only their degree, but yours, too. Be aware that it is my professional obligation to report academic misconduct, which I will not hesitate to do. Sanctions for academic misconduct can include expulsion from the University and an F in this course, so don't cheat. It's simply not worth it. For specific definitions on what constitutes cheating, review the Student's Guide to Academic Integrity at [http://integrity.ou.edu/students\\_guide.html](http://integrity.ou.edu/students_guide.html).

**REASONABLE ACCOMMODATION POLICY**

Students requiring academic accommodation should contact the Disability Resource Center for assistance at (405) 325-3852 or TDD: (405) 325-4173. For more information please see the Disability Resource Center website <http://www.ou.edu/drc/home.html> Any student in this course who has a disability that may prevent him or her from fully demonstrating his or her abilities should contact me personally as soon as possible so we can discuss accommodations necessary to ensure full participation and facilitate your educational opportunities.

**RELIGIOUS OBSERVANCE**

It is the policy of the University to excuse the absences of students that result from religious observances and to reschedule examinations and additional required classwork that may fall on religious holidays, without penalty.

**TITLE IX RESOURCES AND REPORTING REQUIREMENT**

For concerns regarding gender-based discrimination, sexual harassment, sexual misconduct, stalking, or intimate partner violence, the University offers a variety of resources, including advocates on call 24/7. To learn more or to report an incident, please contact the Sexual Misconduct Office at 405-325-2215 (8 to 5, M-F) or OU Advocates at 405-615-0013 (24/7). For more information, please see <http://www.ou.edu/eoo>.

**ADJUSTMENTS FOR PREGNANCY/CHILDBIRTH RELATED ISSUES**

Should you need adjustments to your course requirements because of documented pregnancy-related or childbirth-related issues, please contact me or the Disability Resource Center at 405/325-3852 as soon as possible.

<http://www.ou.edu/eoo/faqs/pregnancy-faqs.html>