



# DTSC 2301 and 2302

# Modeling and Society

## Course Information

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# DTSC 2301 and 2302 Spring 2021

MWF 9:05am-11:00am  
Online

**Description:** In this studio students will learn how to use statistical methods/tools and query languages on relational databases to explore a data science approach to socially relevant challenges associated with a social science discipline. Students will learn the ethical implications of collecting and using data from external sources.

**DTSC 2301 and DTSC 2302 are co-requisites.** They must be taken in two subsequent part-of-term sessions in the same semester.

**Pre-requisites:** DTSC 1302 AND (STAT 1220 or STAT 1221 or STAT 1222)

## Instructor Information

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Angela Berardinelli, PhD      Jason Windett, PhD

Woodward 410D                      Fretwell 450A

aberardinelli@uncc.edu      jwindett@uncc.edu

# Course Objectives

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Upon successful completion of DTSC 2302, students will be able to...

## Social Science

- Develop hypotheses that anticipate associations in the data based on a thorough literature review.
- Understand the complexity of power structures in the US and World, focusing on theoretical frameworks of political and non-political institutions, social actors, and public policy.
- Evaluate the unique position of citizens in social phenomena that occur in the US and world, with a particular focus on differing types of inequality.
- Understand and linking social, economic, and political concepts to measurement, data collection, and analysis.

## Ethics and Humanities

- Evaluate ethical and policy-based debates within data science.
- Apply ethical principles/values/frameworks within data-driven organizational processes.
- Understand and present the positions on multiple sides of an ethical issue, including the reasons, principles, and values offered in ethical arguments.
- Understand and assess the ethical stakes of conducting research on or about human subjects and/or human-derived biospecimens.
- Critique arguments that involve ethical issues in data science.

## Computing and Data Science

- Understand the structure of a dataset stored in a relational database, given its entity-relationship diagram.
- Use SQL queries in relational databases to explore hypotheses and generate predictive models to answer social science research questions.
- Collect and clean data obtained from various sources.
- Appropriately deal with missing values in a dataset during import and analysis.
- Create classification and decision models.

## Statistics and Probability

- Use a statistical programming language to perform data analysis.
- Create predictive models using concepts of correlation, linear regression, least squares, and residuals.
- Test hypotheses and identify statistically significant results.

# Course Materials

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- Students must have access to a laptop or desktop computer.
  - Linux, Windows 10, or macOS operating system preferred. ChromeOS will suffice but has limitations.
- All software required for the course is free and open source.
- All readings for the course will either be open source or available for free through the University library.
- Course website: [canvas.uncc.edu](https://canvas.uncc.edu)

# Course Strategy

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Teaching methods are grounded in an interdisciplinary studio style approach to learning in which students are presented with cross-disciplinary data science challenges that guide the mini lectures, in-class activities, and group data-driven projects. Students are expected to participate in discussions, problem solving, critical thinking exercises, analysis of case studies, collaboration, peer-teaching, and design and critique sessions. All students are expected to contribute in a meaningful way to team efforts. The course includes small group writing and presentation assignments that are the basis for formative assessment.

# Course Grading

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Weighted average (%)	Final grade assigned
[90, $\infty$ )	A
[80, 90)	B
[70, 80)	C
[60, 70)	D
[0, 60)	F

- If you elect to be graded H/P/N for a course, you automatically receive an N if you miss more than 25% of the class meetings.
- Students will be assigned a final grade for DTSC 2301 at the end of spring session A (mid-March).
- A student must pass DTSC 2301 with a D or better to continue on to DTSC 2302.
- Students will be assigned a final grade for DTSC 2302 at the end of spring session B (early May).
- To progress to STAT 2223, a student must earn a D or better in DTSC 2302.

Assessment Type	Weight
Individual Assignments	30%
Group Assignments	40%
Projects	30%

# Important Dates

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- Wednesday, January 20: First day of class for DTSC 2301
- Friday, January 22: Last day to add or drop DTSC 2301
- **Friday, January 22: Project 1 introduced in class**

No class meetings February 8-12 (spring break).

- After Wednesday, February 18: Midterm grades for DTSC 2301 will be released
- Monday, February 22: Last day to withdraw from DTSC 2301
- **Wednesday, March 10: Project 1 presentations in class**
- **Sunday, March 14: Project 1 final draft due**
- **Wednesday, March 17: Last day of DTSC 2301**

No class meetings Monday, March 15 (first half term reading day) or Friday, March 19 (day between end of DTSC 2301 and start of DTSC 2302)

- Monday, March 22: First day of class for DTSC 2302
- **Monday, March 22: Project 2 introduced in class**
- Tuesday, March 23: Last day to add or drop DTSC 2302
- After Thursday, April 8: Midterm grades for DTSC 2302 will be released
- Thursday, April 15: Last day to withdraw from DTSC 2302
- **Wednesday, May 5: Last day of DTSC 2302; Project 2 presentations in class**
- **During final exam period (exact date & time TBD): Project 2 final draft due**

# DTSC 2301 Schedule

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<b>Week of</b>	<b>Preparation for Project 1</b>
<b>Jan 20</b>	Responsible research practices, finding data, writing a research question
<b>Jan 25</b>	Responsible research practices, finding literature sources, writing testable hypotheses, databases and SQL
<b>Feb 1</b>	Responsible research practices, SQL, statistical programming with R
<b>Feb 8</b>	No class - spring break
<b>Feb 15</b>	Data cleaning, debate analysis
<b>Feb 22</b>	Statistics (sampling, polling, measurement, hypothesis testing, mean comparison, correlation), research ethics
<b>Mar 1</b>	Research ethics
<b>Mar 8</b>	Project presentations, case study analysis
<b>Mar 15</b>	Project due, debate analysis

# DTSC 2302 Schedule

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<b>Week of</b>	<b>Preparation for Project 2</b>
<b>Mar 22</b>	Research ethics
<b>Mar 29</b>	Statistics (regression)
<b>Apr 5</b>	Statistics, working with economic data
<b>Apr 12</b>	Statistics (hypothesis testing for slope, nonlinear regression), working with census data
<b>Apr 19</b>	Classification and decision models, working with political data
<b>Apr 26</b>	Interaction terms
<b>May 3</b>	<b>Project presentations</b> , case study analysis
<b>May 10</b>	<b>Project due</b>



# Course Policies

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Course policies have been provided in a separate document. This document was collaboratively edited and agreed to by all students and faculty involved in the course on the first day of class.

The final version of the course policy document is available on our course Canvas page.