Southern New Hampshire University

Graduate Course Syllabus

DAT 640: Predictive Analytics

Center: Online

Course Prerequisites

DAT 510 and DAT 520

Course Description

Building on prior coursework in decision methods and modeling, learners will get a deeper understanding of the art and science of predictive analysis. Learners will examine the elements that contribute to building reliable predictive models that result in actionable performance predictions such as identifying the variables that have the most predictive power and developing and deploying predictive models currently in use.

Course Outcomes

- Recommend appropriate types of predictive algorithms for use in data analysis scenarios with selective structure, interaction, and relationship specifications
- Select appropriate tools for successful predictive algorithm implementation within various environments
- Evaluate predictive model structure, interactions, and relationships in data for reliability using common scoring models
- Propose valid and measurable methods for continuous predictive modeling improvement by employing guiding scoring models and implementing continuous feedback
- Defend predictive model design and pilot implementation plans by communicating the value of predictive analytics within the context of specific scenarios

Required Materials

Using your learning resources is critical to your success in this course. Please purchase directly through the SNHU Online Bookstore rather than any other vendor. Purchasing directly from the bookstore ensures that you will obtain the correct materials and that the IT Service Desk, your advisor, and the instructor can provide you with support if you have problems.

Data Mining With Rattle and R: The Art of Excavating Data for Knowledge Discovery
Graham Williams
Springer
2011
ISBN: 978-1-4419-9889-7

Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die

Optional: Data Mining and Business Analytics With R

Software Requirement

In this course, you will use the Virtual Lab to access the following software:

- R
- Rattle

Please create accounts when prompted to do so, if you do not already have them.

Diversity, Equity, and Inclusion

As indicated in our core values, SNHU is committed to "embrace diversity where we encourage and respect diverse identities, ideas, and perspectives by honoring difference, amplifying belonging, engaging civilly, and breaking down barriers to bring our mission to life."

This may or will be reflected in SNHU's curriculum as we embrace and practice diversity, equity, and inclusion (DEI) to provide the most transformative experience for our students, faculty, and staff. Because topics pertaining to DEI can be sensitive, please remember that embodying and practicing diversity, equity, and inclusion is one of our core values that you will encounter throughout the academic experience. In higher education, we are expected to think and engage critically. Use a growth mindset to embrace the diverse readings, course assignments, and experiences of your peers and faculty.

For more information about DEI at SNHU, please visit our website at the Office of Diversity and Inclusion.

Instructor Availability and Response Time

Your class interaction with the instructor and your classmates will take place on a regular, ongoing basis. Your instructor will be actively engaged within the course throughout the week. You will normally communicate with your instructor in the weekly discussions or the General Questions discussion topic so that your questions and the instructor's answers benefit the entire class. You should feel free, however, to communicate with your instructor via SNHU email at any time, particularly when you want to discuss something of a personal or sensitive nature. Your instructor will generally provide a response within 24 hours. Instructors will post grades and feedback (as applicable) within seven days of an assignment's due date, or within seven days of a late submission.

Grade Distribution

Assignment Category	Number of Graded Items	Point Value per Item	Total Points
Discussions	8	25	200
Practical R Activities	8	40	320
Final Project			
Milestones	5	36	180
Final Submission	1	300	300
			Total Course Points: 1,000

This course may also contain practice activities. The purpose of these non-graded activities is to assist you in

mastering the learning outcomes in the graded activity items listed above.

University Grading System: Graduate

Grade	Numerical Equivalent	Points
A	93–100	4.00
A-	90–92	3.67
B+	87–89	3.33
B	83–86	3.00
B-	80–82	2.67
C+	77–79	2.33
C	73–76	2.00
F	0–72	0.00
I	Incomplete	
IF	Incomplete/Failure *	
W	Withdrawn	

* Please refer to the policy page for information on the incomplete grade process.

Grading Guides

Specific activity directions, grading guides, posting requirements, and additional deadlines can be found in the Assignment Guidelines and Rubrics section of the course.

Weekly Assignment Schedule

All reading and assignment information can be found within each module of the course. Assignments and discussion posts during the first week of each term are due by 11:59 p.m. Eastern Time. Assignments and discussion posts for the remainder of the term are due by 11:59 p.m. of the student's local time zone.

In addition to the textbook readings that are listed, there may be additional required resources within each module.

Module	Topics and Assignments
1	Introduction to Predictive Analytics *Data Mining With Rattle and R*, Chapters 1 and 2 1-1 Access the R Environment 1-2 Discussion: Evaluate CRISP-DM 1-3 Practical R Activity One: R and Rattle Reference 1-4 Final Project Review
2	Working With Data in R *Data Mining With Rattle and R*, Chapters 3 and 4; Section 7.1 (pp. 149–153) 2-1 Activity: Add to Your Cheat Sheet (non-graded) 2-2 Practical R Activity Two: Summarizing Data 2-3 Milestone One: Describe a Data Set for the Final Project

Module	Topics and Assignments
3	Exploring Data *Data Mining With Rattle and R*, Section 5.1 (pp. 99–107) 3-1 Activity: Add to Your Cheat Sheet (non-graded) 3-2 Practical R Activity Three: Selecting Visualizations 3-3 Milestone Two: Introduction
4	Interactive Visualization *Data Mining With Rattle and R*, Chapter 6 4-1 Activity: Add to Your Cheat Sheet (non-graded) 4-2 Discussion: Reproducible Research 4-3 Practical R Activity Four: Interactive Data
5	Descriptive Analytics, Predictive Analytics, and Cluster Analysis *Data Mining With Rattle and R*, Chapters 8 and 9 5-1 Activity: Add to Your Cheat Sheet (non-graded) 5-2 Discussion: Descriptive Versus Predictive Analytics 5-3 Practical R Activity Five: Cluster Analysis 5-4 Milestone Three: Problem Statement/Research
6	Building Models, Part One *Data Mining With Rattle and R*, Chapter 10 6-1 Activity: Add to Your Cheat Sheet (non-graded) 6-2 Discussion: Heuristics 6-3 Practical R Activity Six: Association Analysis 6-4 Predictive Data Analytic Model Draft
7	Building Models, Part Two *Data Mining With Rattle and R*, Chapter 12 7-1 Activity: Add to Your Cheat Sheet (non-graded) 7-2 Discussion: Improving the Forests 7-3 Practical R Activity Seven: Random Forest Analysis 7-4 Milestone Four: Pilot Plan
8	Model Evaluation *Data Mining With Rattle and R*, Chapter 15 8-1 Activity: Add to Your Cheat Sheet (non-graded) 8-2 Discussion: Evaluating Risk 8-3 Practical R Activity Eight: Performance Evaluation With the Rattle Risk Chart 8-4 Milestone Five: Model Optimization
9	Model Deployment *Data Mining With Rattle and R*, Chapter 16 9-1 Discussion: Model Deployment 9-2 Final Project Submission: Predictive Data Analytic Model
10	Reflection on Predictive Analytics *Predictive Analytics: The Power to Predict Who Will Click, Buy, Lie, or Die*, Introduction 10-1 Discussion: Reflective Application

Attendance Policy

Online students are required to submit a graded assignment/discussion during the first week of class. If a student does not submit a graded assignment/discussion during the first week of class, the student is automatically dropped from the course for non-participation. Review the full attendance policy.

Late Assignments Policy

Meeting assigned due dates is critical for demonstrating progress and ensuring appropriate time for instructor feedback on assignments. Students are expected to submit their assignments on or before the due date. Review the full late assignment policy.

SNHU Student Handbook

Review the student handbook.

ADA/504 Compliance Statement

In accordance with Section 504 of the Rehabilitation Act of 1973, Title III of the Americans with Disabilities Act (ADA) of 1990, and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008, Southern New Hampshire University does not discriminate on the basis of disability, including intellectual disability, in admission, treatment, or access to its programs or activities, nor does it discriminate in employment in its programs or activities.

The university prohibits unlawful discrimination on the basis of disability and takes action to prevent such discrimination by providing reasonable accommodations to eligible individuals with disabilities. A disability is a condition or impairment that impacts a "major life activity" or "major bodily function."

- **Major life activities** include, but are not limited to, caring for oneself, performing manual tasks, seeing, hearing, eating, sleeping, walking, standing, lifting, bending, speaking, breathing, learning, reading, concentrating, thinking, communicating, and working.

- **Major bodily functions** include, but are not limited to, functions of the immune system, normal cell growth, and digestive, bowel, bladder, neurological, brain, respiratory, circulatory, endocrine, and reproductive functions. Disabilities include physical, medical (including pregnancy), mental health, and learning needs.

At the beginning of each term, or as soon as you become aware of a disability or accessibility concern, we encourage you to contact the Online Accessibility Center (OAC) to discuss accommodations for which you may be qualified. Reasonable accommodations are established through an interactive process between the student and the OAC.

Note that accommodations are not retroactive and that disability accommodations are not provided until acceptable documentation of a disability and its impact is received and an accommodation letter has been processed. If you are unsure whether your condition qualifies as a disability or accessibility concern, please contact the OAC for determination.

Contact Information:
Online Accessibility Center
Phone: 866-305-9430
Email: oac@snhu.edu

For questions concerning support services, documentation guidelines, or general disability issues, please visit the Online Accessibility Center website.

If you feel you have been denied appropriate disability-related accommodations, including appropriate auxiliary aids and services, you may file a grievance as described in the ADA/504 Grievance Policy found on the Disability and Accessibility Services website.

Academic Honesty Policy
Southern New Hampshire University requires all students to adhere to high standards of integrity in their academic work. Activities such as plagiarism and cheating are not condoned by the university. Review the full academic honesty policy.

Copyright Policy
Southern New Hampshire University abides by the provisions of United States Copyright Act (Title 17 of the United States Code). Any person who infringes the copyright law is liable. Review the full copyright policy.

SNHU Withdrawal Policy
Review the full withdrawal policy.

Southern New Hampshire University Policies
More information about SNHU policies can be found on the policy page.