

Syllabus

Malla 2021

UTEC
Universidad
de Ingeniería
y Tecnología





DEPARTMENT

Data Science



SUBJECT

Introduction to Descriptive
and Predictive Analytics



CREDITS

2



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UNIVERSITY OF ENGINEERING AND TECHNOLOGY

SYLLABUS 2022-2

1. SUBJECT

Introduction to Descriptive and Predictive Analytics

2. GENERAL INFORMATION

2.1 Semester: 4^o and onwards

2.2 Credits: Two (2) credits

2.3 Theory hours: Thirty two (32) hours

2.4 Practice hours: Zero (0) hours

2.5 Period length: Two (2) weeks

2.6 Condition:

- Free elective

2.7 Attendance: In presence (1st week online and 2nd week face-to-face)

2.8 Language of instruction: English

2.9 Requirements:

- Students taking this course should have a basic knowledge of statistics.

Programming experience will be helpful but is not required.

3. PROFESSOR

3.1 Course Coordinator

Silvana Milagros Toranzo Aranciba (storanzo@utec.edu.pe)

Opening hours: Monday to Friday from 10:00hrs to 13:00hrs

3.2 Course Instructor

Dr. Stephen Hill (hills@uncw.edu)

Opening hours: 20 to 24 March 2023

4. COURSE INTRODUCTION

This course provides an introduction to two of three areas of analytics: descriptive and predictive analytics. Students completing this course will be exposed to data cleaning/preparation, data visualization, dashboard development, predictive

model development and evaluation. The course will be delivered as a mixture of lecture on key descriptive and predictive analytics concepts and hands-on work with data creating visualizations, preparing and cleaning data for analysis, and developing and evaluating various predictive models. Multiple demonstrations of tools and techniques will be provided. A small case study project will be completed to integrate and synthesize key course concepts.

5. OBJECTIVES

Session 1: Identify data types and select appropriate analysis techniques

Sessions 2, 3, and 4: Create appropriate data visualizations and recognize and correct common data visualization flaws

Sessions 5 and 6: Develop effective dashboards that allow for the exploration of data and extraction of insight

Session 7: Prepare data for the development of predictive analytics models

Sessions 8 and 9: Develop and evaluate predictive analytics models for continuous response variables

Session 10 and 11: Develop and evaluate predictive analytics models for categorical response variables (classification problems).

Session 12: Deploy predictive analytics models for managerial/client use.

6. COMPETENCES AND PERFORMANCE CRITERIA

The performance criteria for the program that will be addressed are:

- RE-C01: Computing knowledge:

This competency is achieved through the use of appropriate analytics software complemented by a discussion of the mathematical approaches that drive analytics.

- RE-C02: Problem analysis:

This competency is achieved via the analysis of a wide variety of problem types from a wide variety of subject matter areas (e.g., business, healthcare, sport, etc.)

- RE-C03: Design and Development of Solutions:

Students will use descriptive and predictive analytics tools and techniques to develop solutions to a variety of problems.

- RE-C04: Use of Modern Tools:

Students will use several modern analytics software tools to analyze and solve problems.

- RE-C06: Communication:

Throughout the course an emphasis is placed on communicating the results of analytics work to both technical and non-technical audiences.

7. LEARNING OUTCOMES

At the end of this course, the student will be able to:

- Create appropriate data visualizations given various types of data and various objectives.
- Create dashboards that allow users to effectively explore data and extract meaningful insights.
- Create and interpret predictive models for quantitative and categorical response variables.
- Clearly communicate analytics results to a wide variety of audiences and in a wide variety of settings.

8. TOPICS

This course will teach the following topics:

1. Introduction to Descriptive and Predictive Analytics
2. Types of Data
3. Visualizations for Categorical Data
4. Visualizations for Quantitative Data
5. Visualization Best Practices
6. Dashboard Development
7. Data Preparation for Predictive Modeling
8. Predictive Model Development for Quantitative Response Variables
9. Predictive Model Development for Categorical Response Variables
10. Model Interpretation and Deployment

9. WORK PLAN

9.1. Methodology

The course will be composed of a mixture of lecture and hands-on work using appropriate analytics tools and techniques. Such techniques will include frequent demonstration of analytics tools and techniques and work on a small case study to integrate/synthesize analytics concepts.

9.2. Theory session

The lecture portion of the course will focus on the underlying theory and concept behind various analytics techniques. Focus will be on application of analytics tools and techniques across a wide variety of disciplines. Such disciplines could include: business, healthcare, sport, etc. A variety of examples from these disciplines will be considered.

9.3. Practice sessions (laboratory or workshop)

Students will have ample opportunity for hands-on work in analytics software. This work will involve the development of data visualizations, dashboards, and predictive analytics models. Students will be provided datasets and appropriate problem statements. Collaboration between students and between students and the instructor will be highly encouraged.

10. EVALUATION SYSTEM

Final grades for each student will be calculated as follows:

The theoretical part of the course will be evaluated by a quiz:

- The quiz will be multiple choice
- The quiz will relate to the content covered in the lectures

The practical part of the course will be evaluated via a small-scale project:

- This project will provide students an opportunity to demonstrate their mastery of descriptive and predictive analytics techniques

	Theory	Laboratory
Evaluation		

(The evaluation weighting will be done if both parts are approved)	Final Evaluation quiz (60%)	Small Course Project
	60%	40%
	100%	

Notes are rounded from 0.5 up

Course evaluations are not recoverable. Failure to assess or non-compliance with a deadline for a deliverable implies the loss of the associated rating. The only acceptable reason for accessing an out-of-time evaluation will be duly documented for medical purposes.

The literature must be written according to the systems established by the American Psychological Association (APA). In case partial or total plagiarism of any work is detected, the student will be subject to the disciplinary process provided by the UTEC in its regulations.