Learning Analytics (LAPS)

COURSES

LAPS 5310. LEARNING ANALYTICS FUNDAMENTALS. 3 Hours.
Introduction to foundational elements in the emerging field of learning analytics, including theory, philosophy, ethics, cognitive processes, and tools, as well as its contribution to the psychology of learning research and relationship with other academic fields.

LAPS 5320. EXPERIMENTAL DESIGN & METHODOLOGY. 3 Hours.
Methodologies in learning analytics research, including the philosophy of science, measurement, and complex experimental and quasi-experimental designs.

LAPS 5330. PSYCHOLOGY OF LEARNING & LEARNING SCIENCES. 3 Hours.
Exploration of knowledge processes such as learning, sensemaking, decision-making, and self-regulation with focus on psychological processes and the science of learning.

LAPS 5340. BIG DATA METHODS. 3 Hours.
The collection, analysis, and reporting of large-scale educational and social interaction datasets, including the survey of different types of data, data infrastructure, methods for managing and interacting datasets, governing policies, and data stewardship.

LAPS 5350. PRIVACY & ETHICS IN LEARNING ANALYTICS. 3 Hours.
Ethical considerations for the collection and use of learning data, including social and trust practices with learners, access, ownership, storage, security, privacy, policy, transparency, and algorithms.

LAPS 5360. INTRODUCTION TO DATA ANALYSIS AND R. 3 Hours.
Fundamental elements of conducting data analysis in the R programming language, including basic operations, data structures, dataset cleaning and manipulation, and visualization.

LAPS 5370. INTRODUCTION TO STATISTICAL ANALYSIS. 3 Hours.
This course will provide students who receive probationary admission due to an inadequate mathematical background with the core principles of statistical analysis necessary to be successful in the program. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5375. PROBABILITY AND STATISTICAL INFERENCE. 3 Hours.
Examination of probability, distributions, estimation, and hypothesis testing in learning contexts. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5376. APPLIED REGRESSION ANALYSIS. 3 Hours.
A comprehensive review of different regression models that emphasizes modeling, inference, diagnostics, and application to educational datasets. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5377. LINEAR MODELS AND EXPERIMENTAL DESIGN. 3 Hours.
In-depth exploration of univariate and multivariate linear models to derive inferential procedures depending on appropriate learning contexts. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5378. MULTIDIMENSIONAL SCALING AND CLUSTERING. 3 Hours.
In-depth study of the investigation of observed similarities and dissimilarities between different objects and then grouping the objects based on those similarities. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5380. CAUSAL INFERENCE FOR PROGRAM EVALUATION. 3 Hours.
Using learning analytics to determine the impact of intervention outcomes and critically evaluate quantitative research pertaining to cause and effect in a learning context. This will include potential pitfalls and key factors, as well as application of both practitioner and research lenses. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5388. ADVANCED METHODS IN EDUCATIONAL DATA MANAGEMENT/LEARNING ANALYTICS. 3 Hours.
Sophisticated and emerging techniques for analyzing learning data, including advanced graphing and visualization techniques, multimodal data (such as psychophysiological data), modeling, process mining, measurement of psychological attributes involved in knowledge creation, and learner profile development. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5390. LEARNING DESIGN AND ANALYTICS. 3 Hours.
Survey of foundational learning design theories related to human behavior in formal and informal learning settings. Focus on models and strategies to design and evaluate technology that supports and helps improve learning. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5391. INDEPENDENT STUDY. 3 Hours.
Student and instructor agree upon topic of study and requirements for deadlines and products. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5392. COGNITION, COMPUTERS, AND METACOGNITION. 3 Hours.
The role of learning, sensemaking, human development, and cognition theories in relation to the use of digital technology in knowledge processes. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5393. NATURAL LANGUAGE PROCESSING FOR EDUCATIONAL RESEARCH. 3 Hours.
Application of methods in natural language processing (NLP) and natural language understanding (NLU) to text and language data in the educational setting. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5394. SOCIAL NETWORK ANALYSIS. 3 Hours.
Introduction to social network analysis in educational settings. The course focuses on how to analyze and interpret relationships between people, artifacts, and text in digital learning settings. The students will learn to prepare data, map and analyze these relationships. Foundational graph analysis concepts and their application in learning analytics will be discussed. Students will be trained to use R programming for analysis, but the use of other software is possible. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5395. HUMAN AND ARTIFICIAL COGNITION. 3 Hours.
Artificial intelligence (AI) is exerting growing influence in all aspects of modern life. This course surveys AI trends and details prominent models for how human and machine agents intersect in knowledge work, using discrete cognitive processes as the basic unit for determining agent roles. A specific focus is on optimal relationship determination and the data types that provide indicators of cognitive states. Prerequisite: Completion of LAPS 5310, LAPS 5320, LAPS 5330, and LAPS 5340 or LAPS 5360.

LAPS 5610. CAPSTONE. 6 Hours.
Application of program knowledge and skills learned in prior coursework to complete a small-scale, integrative project involving analysis of a real world, educational data set. Students will have the opportunity to apply for competitive internships that will provide small scholarships. All students will to work in diverse groups of 5 to 6 students along with a faculty mentor analyzing specific industry data to solve real-world problems. The small groups will be designed to combine students with diverse skill sets and emphasize community and collaboration. Prerequisite: Completion of coursework and approval of department.