

# DEPARTMENT OF AVIATION AND TRANSPORTATION STUDIES

## Programs Master

- Aviation and Transportation / Master of Science (<https://catalog.lewisu.edu/graduate/aviation-science-technology/aviation-transportation-studies/aviation-transportation-master-science/>)

## Courses

### AVTR 50000 - Overview of the Aviation and Transportation Industry (3)

The student will study the transportation industry's process of moving people and cargo around the world. Topics will include governmental regulation and the associated security concerns/procedures.

### AVTR 51000 - Strategic Planning for Aviation and Transportation (3)

The student will study current trends in aviation/ transportation fiscal management from the perspective of project development and monitoring, including accounting, budgeting and purchasing. Studies in innovative and strategic financial decision-making will be introduced which include issues such as purchasing vs. leasing, outsourcing, and fractional ownership.

### AVTR 53000 - Regulatory Systems for Aviation and Transportation (3)

Governmental bodies, domestic trade organizations and international advisory groups issue regulations, guidelines and procedural standards which directly impact transportation. This course highlights the degree to which regulation shapes the industry.

### AVTR 54000 - Safety Management Systems for Aviation and Transportation (3)

A Safety Management System (SMS) is a dynamic management system based on Quality Management System (QMS) principles in a structure scaled appropriately to the operational risk, and applied in a safety culture environment in aviation and transportation. Safety management must be a cardinal priority for every transportation organization, including private enterprise and regulatory agencies. This course will cover not only concepts of SMS, but also the history of quality management, and present critical QMS concepts such as quality tools, strategic planning, deployment, statistical performance measurement, leadership/ management, and documentation.

### AVTR 54500 - Transportation Operations in Supply Chain and Logistics (3)

Students will be introduced to a supply chain perspective within the complex environment in which transportation service is delivered. The course provides a framework and foundation for the role of multiple modes of transportation in the logistical movement of goods within the various modes. Global transportation topics include fuel, energy, managerial, economic, and environmental issues.

### AVTR 55000 - Implementing Safety Management Systems (3)

This course will examine issues associated with implementing a safety management systems program in aviation and transportation. Topics will include a review of SMS, review of human factors, and examine best practices for implementing SMS.

### AVTR 55500 - Transportation Security and Operational Resilience (3)

The student will study the transportation industry's security concerns in a comprehensive manner and address security issues along with solutions to minimize risk.

### AVTR 56000 - Human Resource Management and Labor Relations (3)

A study of the role of human resource management including hiring practices, initial employee training, professional development, and establishing employee benefit packages. Ethical concerns underlying labor relations, employee dissatisfaction, collective bargaining, labor/ management conflicts, and other human resource management issues and trends will be discussed.

### AVTR 57000 - Current Practices and Future Trends (3)

Select studies of contemporary issues and future trends in aviation and other transportation industries. Topics may include such contemporary practices as incorporating Unmanned Aerial Vehicles into the National Airspace System, airspace capacity and the Next Generation Air Transportation System, planning responses to intermodal transport systems, and current trends in transportation security. This course could identify potential applied research studies.

### AVTR 58000 - Special Topics in Aviation and Transportation (3)

A select study of issues in aviation and other transportation industries. Topics will vary.

### AVTR 58100 - Unmanned Autonomous Systems (3)

This course will provide an overview of Unmanned Systems. Topics include the history of unmanned systems, regulations, industry and societal implications, and ethical considerations regarding the unmanned industry. The course will also introduce hands-on unmanned flight and operation principles through simulation and other means.

### AVTR 58200 - Applied Research (3)

Under professor supervision, students will work in a small group on a research project and submit a written proposal with the intent of carrying out applied aviation research and reporting findings in a publication or poster. Students will model ethical and professional research etiquette, consistent with CITI.

### AVTR 58300 - Fatigue Risk Management Systems (3)

This course will explore the science behind human performance in relation to fatigue, the regulations that govern transportation operations with regards to fatigue, and the administration of a fatigue risk management system (FMRS).

### AVTR 58400 - Economics in Aviation and Transportation (3)

Economic applications to the aviation industry including the economics of an airline and how economic problems are analyzed. Demand analysis and its relation with price and economic conditions. Costs and supply and the interaction of demand. An in-depth examination of the economic aspects of the air transportation industry, with microeconomic analysis applied to decision making in the airline, general and corporate aviation, and airport businesses. Topics include: basic economics of air transport supply and demand; demand forecasting; cost drivers; network structures and strategies; ratemaking; yield, revenue and capacity management; regulatory issues; political influences; unique economic characters of international commercial aviation; capitalization and credit facilities; economic and structural analytical tools and models.

### AVTR 58500 - Evolution of Air Traffic Control Systems (3)

This course will examine the evolution of the air traffic control system in the United States and explore its future. Students will study the growth and evolution of the United States Air Traffic Control System, understand its operation, and explore concepts of future operation.

**AVTR 58600 - Ops Resrch for Aviation & Tran (3)**

This course will provide students with a sound conceptual understanding of the role that operations research plays in the decision-making process. Operations research, also known as management science or decision science, is an approach to decision making based on the scientific method, and makes extensive use of quantitative analysis.

**AVTR 58700 - Leadership for Aviation and Transportation (3)**

Leadership in organizations is about much more than simply barking orders. It sets the tone for communication, establishes and shapes the group culture, guides strategy, and ensures a sustainable future – or, it can jeopardize all of those when leadership isn't purpose-driven and effective. This course examines the philosophy of good leadership and applies elements to practical aviation examples, focusing on leading in a public/private balance, in a highly regulated industry, and in a multinational setting. This course examines individual leadership strengths and how to expand one's positive influence as a leader.

**AVTR 58800 - Technical Writing in Aviation and Transportation (3)**

The purpose of technical writing is to improve the clarity and accessibility of processes, procedures, and documents such as technical manuals, instructions, promotional materials, and safety guidelines. In this course, students learn how to draft technical documents (reports, instructions, manuals, proposals, user-tests, etc.) solve problems, conduct job related research, and explain professional content to both wide and expert audiences. Students work with technical documents and procedures to run user-tests, offer revisions, and improve usability.

**AVTR 58900 - Human Factors and Psychology in Aviation and Transportation (3)**

This course explores the fundamentals of human factors in aviation. Human factors essentially focuses on the interaction between humans and technology. Human factors is a multidisciplinary field that is applicable to diverse areas of the aviation domain (pilot & crew operations, aircraft maintenance, spaceflight operations, aircraft interface design, unmanned aerial system operations, air traffic control, etc.). Drawing on concepts from experimental psychology, cognitive science, and system design, the application of human factors knowledge to the interaction with aviation systems results in many benefits including but not limited to, enhancing productivity, increasing safety, reducing user stress, and enabling new capabilities.

**AVTR 59100 - Lean Six Sigma for Aviation and Transportation (3)**

Six Sigma's main goal is to continuously improve the process outcome through identifying and eliminating the defects as well as reducing variables within the process. It is a set of statistical tools and methods that are used within Six Sigma projects to reduce defects, increase profits or increase customer satisfaction.

**AVTR 59200 - Sustainability for Aviation and Transportation (3)**

This course focuses on aviation sustainability primarily from a fuels perspective. Topics include: the petroleum supply chain from oil exploration, to refining, then transportation, and finally use in aircraft. Furthermore, combustion principles, chemistry, exhaust emissions, and fuel testing procedures will be explored. Airline operations as well as airport design will also be covered exploring ground operations, flight routing, support equipment, and alternative energy. Grading for this course will be approximately 2/3 individual work and 1/3 group work.

**AVTR 59300 - The Commercial Space Industry (3)**

This course focuses on the commercial space industry from a technical perspective. Topics include the history of both the United States and Soviet Union space programs, terminology, rocket design and fuels, the commercialization of space, and non-government rocket launch providers. In addition, orbital dynamics will be covered for low-Earth orbits, Earth-Moon system, and interplanetary orbits. This course is designed to provide a working level knowledge of the commercial space industry. Grading for this course will be approximately 2/3 individual work and 1/3 group work.

**AVTR 59500 - Research Methods 1 (3)**

This course introduces students to both quantitative and qualitative research methods useful for academic and professional inquiry in aviation and transportation studies. The course also focuses on identifying the types of methodologies best suited for investigating different types of problems and questions. The course will provide students with the knowledge of: how to develop research questions; an introduction to statistics used in research; an understanding of the responsible and ethical conduct of research; and use of APA style in research writing.

**AVTR 59600 - Research Methods 2 (3)**

This course is sequential to Research Methods 1. Students will be expected to draw from and actualize the research methods and theory previously taught in Research Methods 1 through additional performance of statistical analysis. With instructional oversight, students will be required to work individually and complete one original research project proposal to demonstrate and refine their skills as researchers. Prerequisite: AVTR 59500 (may be taken concurrently)

**AVTR 59700 - Capstone Experience (3)**

This course is designed for the student completing the Masters Degree in Aviation and Transportation. The student will employ acquired knowledge through one of the following options: Thesis (students selecting this option must meet at scheduled times with an advisor); Practicum/ Internship (requires a journal, culminating paper, and comprehensive exam); or Development and Presentation of Case Study/Action Plan.