San José State University
Lucas Graduate School of Business
Master of Science in Transportation Management
MTM 297: Emerging Technologies for Transportation System Management
Spring-A 2025

Course and Instructor Contact Information

Instructor:	Dr. Nick Compin
Office Hours:	By appointment
Class Day/Time:	Mondays: January 6th – March 17th
Classroom:	Online (Zoom)
Course website:	Canvas (http://sjsu.instructure.com)

Course Format

Students must have regular access to email and the internet in order to communicate with the instructor, submit assignments, and engage in other class activities.

Students attend class sessions online using Zoom, SJSU's online meeting application. During classes, students should:

- Be in a quiet room without distractions (e.g., no family members or colleagues walking through or asking questions)
- Have stable internet access
- Use a video camera and good quality microphone so that you are seen as well as heard
- Follow good "meeting etiquette" principles (one such list: https://blog.gotomeeting.com/7-rules-virtual-meeting-etiquette-every-professional-know/)

Plan to join at least ten minutes before 5:30 pm, to make sure you are ready when class begins. (The very first time you join from a computer or device, allow extra time for set-up.)

The university has many useful tutorials on how to use Zoom here: http://www.sjsu.edu/ecampus/teaching-tools/zoom/index.html

Faculty Web Page and MYSJSU Messaging

Course materials such as syllabus, handouts, notes, assignment instructions, etc. can be found on my faculty web page at http://www.sjsu.edu/people/firstname.lastname and/or on Canvas Leaning Management System course login website at http://sjsu.instructure.com. You are responsible for regularly checking with the messaging system through MySJSU at http://my.sjsu.edu (or other communication system as indicated by the instructor) to learn of any updates.

Course Description

Examines strategies to manage innovation and apply change management principles to implement the technologies used for real-time management of transportation system performance; (safety, reliability, environmental impact, etc.). Examines management and operation of individual transportation systems and multimodal, multi-jurisdictional networks in real-time using innovative, advanced Intelligent Transportation Systems (ITS) technologies, especially those that use Big Data, Machine Learning (ML), Artificial Intelligence (AI), The Internet of Things (IOT), IP cameras and video analytics, and complex algorithms. Provides an in-depth view of current and soon-to-be available command, control, and situational awareness technologies and big-data sources and how they are used to improve transportation safety, mobility, and efficiency. Presents a step-by-step approach to identifying needs, identifying potential technological solutions and integrating them into everyday Transportation System Management and Operations (TSMO) efforts.

MSTM Program Learning Goals:

(*Note:* Not all program learning goals are covered in every course)

Goal 1: Transportation Systems and Society: Identify and implement innovative, advanced technologies to improve multi-modal transportation network safety, mobility, and efficiency

Goal 2: Innovation: Develop innovative solutions to transportation management and operations challenges

Goal 3: Leadership: Develop high-impact leadership styles and competencies (traits, skills, behaviors)

Goal 4: Communications: Communicate effectively with a diverse workforce and citizenry

Goal 5: Analytical skills: Identify, evaluate, and implement innovative transportation technologies, data sources, and methods

Course Learning Outcomes

In this course students will learn creative approaches to addressing the most challenging issues facing the transportation industry today within the context of the identification, selection, and implementation of innovative technologies and the big data sources available. The goal is for students to begin to understand processes for identifying transportation system planning, management, and operational needs and the potential innovative, high-tech solutions available to meet those needs.

Upon successful completion of this course, students will be able to:

1. Explain the process for identifying transportation needs.
2. Explain the process for identifying innovative, high-tech approaches to meet needs.

3. Explain the process by which technological solutions are evaluated and implemented.

4. Explain how change management applies to the transportation field.

5. Explain the importance of workforce development to technological innovation in transportation management.

6. Explain the basic tenants/process and best practices of technology project management

Required Texts/Readings

Textbook

None.

Other Readings

Any additional reading will either be publicly available or be provided by the Professor.

Library Liaison (Optional)

The Library Liaison for the Lucas Graduate School of Business is Christa Bailey (christa.bailey@sjsu.edu).

Course Requirements and Assignments

Success in this course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course for instruction, preparation/studying, or course related activities.

The following activities/assignments are required in this course and will be graded: session class discussion/current technologies – each student is expected to bring a current technology item article to each class session and be able to discuss the transportation solution it relates to; two in-class writing assignments – each student will be expected to complete two, two-page writing assignments to assist students with brainstorming and creating outlines for class papers; two individual class papers – each student will be expected to complete two 5 page papers on transportation technology-related topics; two team assignments – students will be assigned to teams to research transportation system management needs and technological solutions; and a written course project – students will work in teams to identify a real-world transportation management need or needs, conduct analyses, provide a solution or solutions and present findings to the class.

Assignments/papers are open book, open notes, and will be sent out to students during specified times. Each student will be allowed a specified amount of time to complete each assignment/paper. Students will then be required to e-mail their completed assignments/papers to the instructor. Any technical difficulties encountered should be reported to the instructor immediately. Tentative course calendar including assignment due dates, date of final exam is "subject to change with fair notice".

Final Examination or Evaluation

The course project is due to the instructor on the last day of class (emailed to the professor). Students are also required to make a presentation to the class discussing their course projects during the last class meeting.

All work must be submitted via e-mail to the instructor as an attachment in MS Word format. All Course Project reports require an Executive Summary and a Table of Contents. Students should clearly identify all of their work with the student's name clearly indicated on all submitted work and each document title: last name first, first name last, and the title of the assignment. Late paper and project assignments will be accepted but the score will be reduced one full letter grade for missing the due date and/or time. In-class assignments may be made up if issues leading to their not being completed are discussed with the professor before or shortly after the time of the missed class. Missed assignments will result in a score of zero. Students who turn assignments in on time will normally receive comments from the professor within 7-10 days.

Grading Information

The following chart lists value of each graded assignment and its relationship to overall course grading. Each graded assignment will be returned to students within 7-10 days of submittal with comments indicating areas for improvement and to show how specific grades were determined and assigned. Students will have an opportunity to contact the instructor at any time to discuss grades, progress, or other issues as necessary. Should a student wish to speak directly with the instructor a mutually beneficial time will be identified, and the student will contact the instructor by phone at the number provided on the first page of this syllabus.

Assignments and Other Graded Activities	Due Date	% of Course Grade	Course Learning Objectives Addressed
In-class Writing Assignment #1	02/03/2025	5%	1, 3
Paper Needs &Tech	02/17/2025	20%	1, 3
In-class Writing Assignment #2	02/17/2025	5%	2, 3,
Team Assign. Needs & Tech	03/03/2025	30%	1, 2, 3, 4, 5
Course Project/Presentation	03/10/2025	35%	1, 2, 3, 4, 5, 6
Current Events	Daily	5%	1, 2, 3, 4, 5, 6

Determination of Grades

Success in this course is based on the expectation that students will attend each scheduled class. Grading will be determined through a combination of scoring on Class Discussion/Current Events, Two In-class Writing Assignments, Two Class Papers, and a Course Project.

- Class Discussion/Current Events: Students are expected to have any reading assignments completed and to be prepared, on the date indicated in the schedule of assignments (below), to discuss the assigned readings and additional readings assigned or as required for the full development of classroom discussions. Students are required to bring with them to every class one current technology item article that they will present to and analyze for the class. Readiness to discuss the current technology item

article will be noted and referenced when assigning points for this portion of the course as follows: participation in 9 or 10 class sessions = 5 pts; participation in discussion for 8 class sessions = 3 pts; participation in fewer than 8 sessions = 0 pts.

- Course Project and Assignments/Papers: Please see above.

- Assignments turned in late, will result in a full grade reduction. For example, if a paper were awarded an A, but was turned in late, the assigned grade would be a B. Unless cleared by the instructor, all assignments are due on the date of the last day of class.

* Extra credit is NOT available in this course.

<table>
<tr><th colspan="2">Letter grade calculation</th></tr>
<tr><th>Percentage</th><th>Grade</th></tr>
<tr><td>98% - 100%</td><td>A+</td></tr>
<tr><td>97% - 94%</td><td>A</td></tr>
<tr><td>93% - 90%</td><td>A-</td></tr>
<tr><td>89% - 87%</td><td>B+</td></tr>
<tr><td>86% - 84%</td><td>B</td></tr>
<tr><td>83% - 80%</td><td>B-</td></tr>
<tr><td>79% - 77%</td><td>C+</td></tr>
<tr><td>76% - 74%</td><td>C</td></tr>
<tr><td>73% - 70%</td><td>C-</td></tr>
<tr><td>69% - 67%</td><td>D+</td></tr>
<tr><td>66% - 64%</td><td>D</td></tr>
<tr><td>63% - 60%</td><td>D-</td></tr>
<tr><td>below 60%</td><td>F</td></tr>
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University Policies

Per University Policy S16-9, relevant university policy concerning all courses, such as student responsibilities, academic integrity, accommodations, dropping and adding, consent for recording of class, etc. and available student services (e.g. learning assistance, counseling, and other resources) are listed on this Syllabus Information web page. Make sure to visit this page to review and be aware of these university policies and resources.

Course Schedule

Note: This schedule is subject to change with fair notice. If necessary, the instructor will provide all information regarding schedule changes in class or by e-mail and through Canvas.

Week	Date	Reading/Discussion
1	1/6	**Course Overview** Student/Instructor Expectations Discussion of Course, Class Papers, Assignments and Project **I. Transportation Technologies** 1. What are Intelligent Transportation Systems (ITS)? **Discussion –** What transportation technologies/ITS do you experience every day? What transportation modes or technologies are you interested in learning more about? **Guest Presentation** Dr. Ahmad Sadegh, President, Conveyance Concepts The Deployment of Integrated Transportation Systems in Southern California
2	1/13	**II. Transportation System Management and Operations (TSMO)** 1. What is TSMO and how is it a different approach from the past? 2. How do advanced technologies fit in with TSMO? **Discussion** – How can a TSMO approach improve travel (commuting & leisure)?
-	1/20	**MLK Holiday - NO CLASS Today**
3	1/27	**III. Artificial Intelligence (AI), & Machine Learning** 1. What is it? Who has it? How do Transportation Agencies access and use it? 2. Artificial Intelligence (AI), Machine Learning (ML), Deep Learning (DL) a. How are They Different and How are They Related? 3. 20 Important AI Terms a. Microsoft Source: 10 AI terms everyone should know - 10 AI terms b. 10 more AI terms everyone should know (microsoft.com) 4. Using GenAI for Transportation purposes. **Discussion** – What questions can you think of that GenAI could transportation to improve the way we travel? **Guest Presentation** Renee Autumn Ray, Senior Director of Strategic Growth at Hayden AI. AI-Powered Mobility Intelligence Platform to Improve Bus Performance

4	2/03	**IV. Big Data and Determining Transportation Needs and Technologies**

IV. Big Data and Determining Transportation Needs and Technologies
1. What is "Big Data" and why does it matter in transportation?
2. What processes are used to determine transportation needs?
3. What current/new technologies link to transportation needs and how are they linked?
4. Recorded Presentation – Big Data

Discussion – What transportation needs are you aware of? What changes or technologies could assist in lessening/removing those deficiencies and meeting needs?

Guest Presentation
Ramses Madou, Division Manager, Planning, Policy, and Sustainability, Department of Transportation, City of San Jose
City of San Jose Emerging Mobility Action Plan - Processes for engaging equity priority communities around emerging mobility: micro-mobility and micro-transit.

In-Class Writing Assignment #1

Paper Needs and Tech. Assign.

V. Performance Measures, Performance Management, and Technological Innovation (Week 5, 2/10)
1. What is Mission, Vision, Goals, and Targets?
2. What are Performance Measures?
3. What is Performance Management?
4. What is the role of Technology in Performance Measurement/Management?

Discussion – What are performance measures that you use in your personal life? What are ones you use or are used where you work? How good are they at measuring "the right" performance? What technologies do you or could you use to make decisions easier or reach identified goals?

Guest Presentation
Kyle Holland, Deputy Executive Officer, TAP, LA Metro - TAP Fare Payment Technology & Innovation

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VI. Technical Innovation Implementation Processes for Transportation Agencies (Week 6, 2/17)
1. What are technical innovation processes for transportation agencies (PAL)?
2. Who is involved? What kind of information is necessary to implement a new technical innovation/ ITS element or approach??

Discussion – How is the technical innovation implementation process similar to or different from other processes you follow to purchase new technologies in your own lives?

Project Discussion

In-Class Writing Assignment #2

Paper Needs and Tech. Due

Team Project Assign. – Needs and Tech

7	2/24	**VII. Technology Project Management**
		   1. Concepts of Operation (ConOps)
		   2. Systems Engineering
		   3. Contract and Project Management
		
		Discussion – How is Contract management of Technology Projects similar to or different from other processes followed to contract for services?
		
		<center>**Guest Presentation**
		Sunny Chakravarty, Vice President,
		Engineering, Econolite - Detection and
		Sensors in ITS</center>

8	3/03	**VIII A. Change Management and Transportation Innovation**
		   1. What is Change Management?
		   2. What is the impact of change on transportation agencies?
		   3. How is the transportation workforce impacted by technological change?
		   4. How to prepare for workforce changes.
		
		Discussion – How is change management addressed in your current or former workplace? What are the positives and negatives of that approach?
		
		VIII B. Workforce Development and Transportation Innovation
		   1. What is the impact of change on transportation agencies?
		   2. How does change management apply to transportation agencies/ transportation profession?
		   3. What does a "TSMO Team" look like?
		   4. How to prepare for workforce changes?
		Discussion – Will your job change in response to technological changes? How?
		
		<center>*Project Discussion* **Team Project Assign. – Needs and Tech Due**</center>

9	3/10	**IX. Showcase of Tools, Analysis Techniques and/or Processes** 1. Modes TBD <center>**Guest Presentation** TBD</center>
10	3/17	**X. Presentation of Class Project – Discussion/Critique**

<center>**NOTE:**
Class Projects –
Due on 3/17! e-mail me….</center>