

**LOM 6395/4398 – Seminar in Logistics and Operations Management**  
**Algorithms & Analytics**  
**Spring 2014**

**Instructor:** Dr. James F. Campbell  
**Office:** 208 ESH (Express Scripts Hall)  
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Algorithms and Analytics are becoming pervasive in modern life, and are especially useful for analyzing and better managing logistics and supply chain systems. This course will cover the use of algorithms, analytics and data visualization to address a variety of different problems, with a special focus on problems that can be presented using networks and graphs. We will consider a range of algorithms and analytical methods and explore the strengths and weaknesses of different optimal and heuristic solution approaches for solving the same problem.

The first component of the course will address algorithms and analytics, beginning with discussions of what are algorithms and how they can be used to solve problems. The course will illustrate algorithms and analytical techniques using network and graph problems, especially in logistics and transportation networks. Examples include problems involving shortest paths, minimum spanning trees, maximum flows, map coloring, matching, vehicle routing and facility location. Coverage will include both optimal and heuristic solution approaches, as well some basic notions involving efficiency and computational complexity.

Within the course we will address “big data” and “analytics”, which have become popular topics in business, but also have very important applications in many other fields, such as healthcare and politics. The course will explore different interpretations of “big data” and “analytics” and their role in decision-making, as well as privacy concerns and economic aspects of collecting and using “big data”. Another component of the course will address “data visualization” techniques for presenting data, including text, numeric and geographic data. We will cover the role of visualization, the different types of visualizations and how to develop effective visualizations of data using products such as Many Eyes or Tableau. Students will get hand-on experience developing their own visualizations.

The course will include presentations by the instructor and by the students, along with class discussions. In the latter part of the course, graduate students will present modern heuristic solution approaches taken from the research literature, such as Lagrangian relaxation, tabu search, genetic algorithms, ant colony optimization, etc.

**Course Materials:** There is not a text for this course, but there will be a variety of readings assigned, as well as a need for students to search out their own resources. Course materials assigned by the instructor will be available online from the UMSL library or distributed as needed. Instructor materials will be posted to MyGateway.

**Class Attendance and Preparation:** Please come to class on time and prepared. Late arrival is disruptive and disrespectful to other students. You should prepare for class by reading all the assigned materials before class and by completing all relevant assignments.

**LOGOM 4398 Grading:** Course grades will be determined based on performance on the various items with weightings as follows:

Presentations	25%
Assignments/Quizzes	10%
Class participation	10%
Visualization	20%
Exam 1	15%
Exam 2	20%

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Assignments/Quizzes	10%
Class participation	15%
Visualization	10%
Exam 1	10%
Exam 2	15%
Presentation of a Solution Approach	20%

**Presentations:** Three short class presentations using Powerpoint are required:

1. 8 minute small group presentation on “What is...?”
2. 6 minute two person presentations on “Analytics in...”
3. 8 minute individual presentation of an existing visualization.

Details on the presentations are provided in a separate document.

**Assignments and Quizzes:** There will be a variety of assignments and/or quizzes throughout the course on topics covered in the class meetings. These may be quantitative or qualitative/written. Quizzes are generally not announced in advance.

**Class participation:** Class participation, including contribution to class discussions and attendance, is an important component of class.

**Visualization:** Each student will develop and present a visualization near the end of the course for a data set of their choice.

**Exams:** There are two exams. Exam 1 is a short in-class test near the middle of the semester. Exam 2 is at the end of the course. The format for Exam 2 (e.g., problems, short answer, research paper, in-class, take-home, etc.) will be determined based on the content of the course.

**LOGOM 6395 Presentation of a Solution Approach:** Each presentation of a solution approach should instruct the class about an assigned modern heuristic approach, based on assigned readings. Additional material may be included at the student’s discretion. This will occupy an

entire class (between April 15 – 29) and should use PowerPoint, but may also include handout materials, other visual aids, writing on the board, etc. Each presentation should demonstrate a solid understanding of the heuristic algorithm and its application. Presentations should be clear, enthusiastic and well-rehearsed.

For the presentations, all slides should be numbered and the Powerpoint file should be named as follows: “Method”\_Student last name\_presentation date\_Version #”; for example, Tabu search\_Campbell\_April 12\_v1.pptx. When you are making a presentation, you must submit your PowerPoint file to me one week prior to the class of your presentation.

**Academic Honesty:** According to the University Standard of Conduct, Section 6.0101, “The Board of Curators recognizes that academic honesty is essential for the intellectual life of the University. Faculty members have a special obligation to expect high standards of academic honesty in all student work. Students have a special obligation to adhere to such standards.” Any student who is caught cheating on any exam or assignment will receive a grade of zero for that assignment or exam. Further, a recommendation may be made to the appropriate university officials that additional formal disciplinary action be taken.

**Disabilities:** This University abides by Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) which stipulates that no student shall be denied the benefits of an education solely by reason of a disability. If anyone has a condition or disability which may require accommodations in order to effectively participate in this class, please contact the Disability Access Services Office in 144 Millennium Student Center at 516-6554.