# Course Description

## Course Number
453 (Undergraduate) 553 (Graduate)

## Title
Freight Transportation and Logistics

## Section
001

## CRN(s)
- 44732 (Undergraduate)
- 44733 (Graduate)

## Credits
4

## Prerequisite(s)
CE351 or Graduate Standing

## Days/Time
Tuesday and Thursdays 12:00 PM to 1:50 PM

## Location
Engineering Building, Room 510

## Final Exam Day/Time
Thurs., Mar. 20, 10:15-12:05

## Course Website
[http://wiki.cecs.pdx.edu/bin/view/Main/CE453-553](http://wiki.cecs.pdx.edu/bin/view/Main/CE453-553)

## Instructor
Miguel Andres Figliozzi

## Office
301D Engineering Building

## Phone
503-725-2836

## E-mail
figliozzi@pdx.edu

## Office Hours
Tuesdays and Thursdays after class

## Mailbox Location
CEE Office, Engineering Building, Room 201

## Required Text or Other Materials:
- Supply Chain Management, by Chopra & Meindl (important for the first part of the course)
- Recommended: The Geography of Transportation Systems, by Rodrigue, Comtois, & Slack
- Journal papers and reports as indicated in class

## Catalog Course Description
Components and performance characteristics of the U.S. freight transportation system, with emphasis on data needs, planning, design and operation of the entire supply chain. Discussion of impact of freight on passenger transportation system and economy. Modal emphasis includes freight rail, motor freight, ocean freight and air freight. Terminal operations. Roles of public and private actors in freight system.

## Course Statement
The efficient, timely, and reliable movement of freight is a critical responsibility of the transportation system and strategically important to the U.S. economy. The sheer amount of freight moved in 2005 by all transportation modes in the United States alone is staggering – some 10 trillion dollars of freight and over 16 billion tons of raw materials and finished products.

Efficient supply chains with truck, rail, waterway, port, and ocean links require a strong and reliable freight transport systems. Freight transportation supports the activities of our
society and economy that are essential to our lives. Today, Americans purchase billions of dollars worth of goods over the Internet for home delivery, routinely send next-day express packages, and buy fresh fruits, flowers, and vegetables produced globally. These shipments move over an extensive freight transportation system comprising millions of vehicles and millions of miles of road, track, and pipeline—all supported by sophisticated information technology and operated, managed, and maintained by a large labor force.

Freight transportation is heterogeneous in nature—meaning various commodities are moved by various modes and carriers over numerous routes—and is almost exclusively the domain of the private sector. The public infrastructure, however, supports much of the freight system. The heterogeneity and private sector involvement present unique challenges for the transportation professional. A working knowledge of supply chain/logistics and the freight transportation system is essential to develop long-range transportation plans and projects to improve and enhance the freight system in a particular region (also to minimize negative impacts on the environment, communities, and the economy).

**Course Objectives – Students must demonstrate the ability to:**

1. Understand the fundamental concepts of supply chain management and their relation to the freight transportation system performance.
2. Comprehend the opportunities and challenges associated with economic globalization and the intermodal and multimodal nature of present and future transportation systems.
3. Understand the availability of data sources and models for use in planning, research, and design of freight and logistics systems.
4. Understand the challenges of logistics/distribution in congested urban areas.
5. Be prepared to be integral players in public/private transportation/logistics planning, design, and operation teams.
6. Perform individual research, with proper citation of academic sources and communicate results to colleagues and instructor.

**Course Evaluation**
The course is open to both graduate and undergraduate students, and as such, there will be different expectations for each group. Graduate students are held to higher standards when grading and may be required to do more work on problem sets and exams. If I have made a mistake in recording your grade, please send me an email with subject heading “grade correction” notifying me of my error. I will ask you to show me the corrected assignment. For this reason, save all your returned work! The course grade (A-F) will be determined with the following weight for class assignments:

- Assignments: 30%
- Research Paper: 40%
- Final Exam: 25%
- Participation 5%

A grade of incomplete “I” is granted by the instructor only with prior approval and consent. Criteria are outlined in the PSU Bulletin. Note that for Civil Engineering undergraduates the CEE Department requires that junior and senior engineering courses must be completed with a minimum grade of C-, and a student’s cumulative PSU GPA must be 2.25 or higher to graduate from the BSCE program.
**Expectations of the Student**

**Professionalism**
All assignments and class participation should be conducted in a professional manner. Attention to detail on class assignments and communication is important and is part of the learning experience and is included in part of student evaluation.

**Attendance**
Attendance is strongly suggested. We will do activities in class that will help in your learning of the material that can not be duplicated outside of the classroom. If you are going to miss a class, I suggest that you email me before with a reason stating why you will miss class. If you are on the border for a grade, I will consider attendance.

**Late Work**
Late work is NOT accepted. The due date for each assignment is clearly indicated and the work must be turned in at the start of class unless indicated otherwise. Exceptions can only be granted in the most extenuating circumstances.

**Computer and E-mail Accounts**
Electronic mail is a useful way for us to remain in contact and is the best way to reach me. I strongly prefer to use ODIN or MCECS supported accounts (@pdx.edu or @cecs.pdx.edu). I will periodically send reminders, hints, and other notices to the class via email. I ask that you include CE453/553 and topic of your message in the subject line (be as specific as possible) when sending me an email. Use proper grammar, spell check, and proof read your message. You may be required to submit some of your assignments electronically.

All engineering students should activate their engineering computer account which will allow them to use engineering computer labs and e-mail. You should activate it before the day you need it. If you encounter problems with this account, see the lab attendant, or e-mail: support@cecs.pdx.edu. Please note: the CEE Department regularly sends course announcements, job information, etc. to students’ CECS accounts, so if you do not check it regularly, we recommend forwarding your CECS e-mail to whatever e-mail address you use.

**Ethics and Professionalism**
As future professional engineers you should plan to take the Fundamentals of Engineering Exam and after the required experience, the Professional Engineering Exam (see the Oregon State Board of Examiners for Engineering and Land Surveying at www.osbeels.org). You should also be familiar with the ASCE Code of Ethics (www.asce.org/inside/codeofethics.cfm), which includes the following:

> Engineers shall act in such a manner as to uphold and enhance the honor, integrity and dignity of the engineering profession.

The PSU Student Conduct Code prohibits all forms of academic cheating, fraud, and dishonesty. Further details can be found in the PSU Bulletin. Allegations of academic dishonesty may be addressed by the instructor, and/or may be referred to the Office of Student Affairs for action. Acts of academic dishonesty may result a failing grade on the exam or assignment for which the dishonesty occurred, disciplinary probation, suspension or dismissal from the University. The students and the instructor will work together to establish optimal conditions for honorable academic work. Questions about academic honesty may be directed to the Office of Student Affairs (www.ess.pdx.edu/osa/).
Description of Assignments

Problem Sets (30 % of final grade)
Problem sets are assigned during the class session and are due the following week at the
start of class. Your name, problem set number, and date should appear on the header of
each page. Clearly restate the problem and provide your answer. I would greatly appreciate
that you staple multiple page assignments.

Exam (25% of final grade)
In this class, there will one comprehensive final exams and each will be worth 25% of your
grade.

Participation (5% of final grade)
Participation is especially important during presentations (guest lecturers, your classmates,
etc.) and during discussions of reading assignments.

Freight Transportation Research Project (40% of final grade)
A professional paper based on a relevant topic in freight transportation and logistics, which
is of interest to the student, is required as an integral part of this course. The topic will be
selected in close consultation with the instructors. The student is required to perform
individual library and literature based research (Note: research is much more than just
typing in a word at Google.com - If this is your first paper and/or presentation for a
graduate class, you are particularly encouraged to seek individual guidance from the
instructor. The paper will be developed as follows:

  - January 8, 2007 Discussion of possible paper topics.
  - March 20, 2007 Final paper due.

Paper Proposal (15% of project grade)
Select a topic that is of interest to you, and that is reasonable in scope--not too narrow, and
not too broad. This is not an easy task so please do preliminary research. Note that this is
15% of the paper grade, which is 40% of your final grade. I can’t stress enough how a well
thought out proposal will make your life easier! In addition, be sure that there is plenty of
information relating to your topic in easily obtainable sources. In selecting your topic, you
should think beyond presenting simply history, or a literature survey; you should think of
what new ideas and innovative solutions you can add to a particular topic. Papers that use
actual data for analysis of an issue will receive higher evaluations. The paper should be
written in your own words, with careful attention to proper citation of sources. A discussion
of possible topics will be held. In addition to the required library research, it may be helpful
to initially explore some web sites, especially:

  - FHWA Operations, Freight  http://www.ops.fhwa.dot.gov/freight/
  - Oregon DOT  http://www.oregon.gov/ODOT/TD/FREIGHT/
  - CSCPM  http://cscmp.org/

See if you can do some preliminary scanning and find a subject that interests and maybe
even excites you. I have listed several possible topic ideas for your consideration
(suggestions only, you can choose other topics):

  - Technology and freight/supply chains (RFID)
Driving hour change impact on safety and trucking efficiency
Environmental impacts
Models (routing, distribution, commodity flows)
Current practices in statewide freight transportation models (literature review)
Economic impact of system interruptions (weather, terrorism, natural disasters, bridge load restrictions)
Security issues in freight transportation
Data issues for freight transportation
Truck size and weight issues (ITS lab has access to weigh-in-motion data and classification data)
Performance measures for freight transportation planning
Mode choice models and issues
Routing models and analysis (UPS, FedEx)
Portland truck loading unloading zone in urban areas
A comparison of analysis methods for converting tons of freight flow into vehicle units
Value of time for commercial vehicles
Container barging trends on the Columbia River
Third-party logistics
Oregon’s weight-mile tax
Overweight enforcement of motor carriers (optimum deployment of stations or enforcement officers)
Separated roadways for trucks
Forecasting freight demand, input-output models
Assessment of freight emphasis in DOT organizational structures

At the minimum, your proposal should include the following:

- The title of your paper
- CLEAR evidence of preliminary library and literature research. This should include a list of library references (minimum of ten relevant journal articles or technical reports). These should be summarized in your research proposal.
- Specific objectives in bullet format (where you’re going)
- Preliminary outline of paper, in table of contents format (how you’re going to get there)

Research Paper (70% of the paper grade)

You will be evaluated on your paper as follows:

- Introduction/Background - 10 %
- Objectives - 10 %
- Body and Quality of Research Tools Used - 40 %
- Conclusions/Recommendations/Perspective - 20 %
- Language/Style - 10%
- Overall Impression - 10%

Please follow the Transportation Research Board (TRB) procedures for preparing your manuscript: [http://www.trb.org/Guidelines/Authors.pdf](http://www.trb.org/Guidelines/Authors.pdf)
Minimum requirements for the paper are:

- Paper should consist of approximately 15 pages of double-spaced text using 12-point clearly legible type on one side of letter-sized paper (consult the lecturer if you need to change this limit).
- All 1-inch margins top, bottom, left, and right
- All exhibits, tables, figures, charts, appendices, should be labeled, sources cited, and will not count towards the suggested 15-page length.
- Please use one-inch top, bottom, left, and right margins and number the pages in upper right corner.
- Include a title page, abstract, body of paper, acknowledgments and list of specific references cited in the text.
- Please staple the paper in the upper left hand corner, no special binding.
- Avoid jargon, acronyms, and use of personal pronouns in your paper.
- Each student must write an individual paper.
- The reference list shall include only those references cited in the text; number them in the reference list in the order they are first cited in the text.
- Denote a reference at the appropriate place in the text by an underlined or italic arabic numeral in parentheses, e.g., (2).
- Do not repeat a reference in the list and do not use ibid., idem, op. cit., or loc. cit. If a reference is cited more than one time in the text, repeat the number first assigned to the reference.
- Do not use footnotes to the text. Incorporate such notes within the text.

Research Presentation (15% of the paper grade)

- Attendance (1/2 of presentation grade)
  - Please attend all paper presentations. This should be looked upon as an opportunity to gain experience making a professional presentation in a supportive environment, among your peers.
- Delivery (1/2 of presentation grade)
  - The primary contributors to an effective presentation are (a) technical content, (b) visual aids, and (c) skills of the speaker. Remember that a presentation may (should) differ from the printed paper and that the presentation gives the author an opportunity to discuss and emphasize highlights of the work, which may not be possible to do in the printed version. It is recommended that you think towards structuring your presentation as follows:
    - Title
    - Objectives
    - Outline of Presentation
    - Methodology
    - Body
    - Summary
    - Conclusion
    - Perspectives

Do not read the paper or presentation. Practice to become completely familiar with your presentation so that you can speak from memory or notes. Concentrate on your delivery. Speak clearly and at a pace somewhat slower than normal conversation. Avoid a monotone. Can you be heard throughout the room, and are you facing your audience, instead of looking at the visual aids? Your presentation will be limited in time (to be determined). Most people are surprised when their time is up! It is very helpful if you practice your talk beforehand, keeping track of...
elapsed time. Recognize that actual presentations usually take longer than rehearsals. Help your audience by not exceeding your allotted speaking time.

Visual aids are always effective tools for communicating your ideas quickly, and therefore are recommended. An overhead projector will be available. Do not consider using the white/chalk board as a substitute for visual aids. Please do not use all text visuals that convey no additional information to the audience. A maximum of one or two visuals should be used per minute of presentation. The instructor will be happy to assist you in the development of visual aids.

Resources

**Student Groups and Professional Organizations**
Participation in student and professional groups can be a valuable part of your education experience. Membership gives students opportunities to get to know fellow students better, meet and network with professionals, collaborate in solving real engineering problems, learn about internship or job possibilities, socialize and have fun. Your fellow students can be a great source of help and guidance in your academic endeavors. Consider becoming active with a student organization, such as the following:

- American Society of Civil Engineers (ASCE) Student Chapter: http://www.asce.pdx.edu/
- Students in Transportation Engineering and Planning (STEP) and Institute of Transportation Engineers (ITE) Student Chapter: http://web.cecs.pdx.edu/~step/
- Engineers Without Borders (EWB) Student Chapter: http://www.ewb.pdx.edu
- Tau Beta Pi: http://www.cecs.pdx.edu/~tbp/index.php
- CEE Honor Society: http://web.cecs.pdx.edu/~ceehonor/

Most professional organizations have monthly meetings and encourage student participation by providing discounts for lunch and dinner meetings. These meetings provide opportunities to network with potential future employers, learn about scholarships, and increasing your technical knowledge. Take a look at these organizations as a starting point:

- American Society of Civil Engineers (ASCE) Oregon Section: www.asceor.org
- Institute of Transportation Engineers (ITE) Oregon Section: www.oregonite.org
- Society of Women Engineers (SWE) Columbia River Section - www.swe-columbia-river.org
- Structural Engineers Association of Oregon (SEAO): www.seao.org

**Research and Learning Opportunities**
Transportation is a growing and exciting research area at Portland State University. I invite you to review the research in the Intelligent Transportation Systems Laboratory (www.its.pdx.edu/). Also, every Friday during the semester a Transportation Seminar is presented. All are welcome. The schedule is available at www.cts.pdx.edu

**Campus Help**
As a PSU student, you have numerous resources at your disposal. Please take advantage of them while you are here. A small sample is listed below:

- CEE Website (includes program info, job listings, etc.): www.cee.pdx.edu
- Career Center: www.career.pdx.edu/
- Center for Student Health & Counseling: www.shac.pdx.edu/
- The Writing Center: www.writingcenter.pdx.edu/
PSU Disability Resource Center: 435 Smith Memorial Union Note: The PSU Disability Resource Center is available to help students with academic accommodations. If you are a student who has need for test-taking, note-taking or other assistance, please visit the DRC and notify the instructor at the beginning of the term.

**Library and Literature Research**

With the advent of the Internet it is very tempting to think that all necessary resources for a term project will be available in full text after typing in a few words at Google.com. This is not the case. You will often need to go to the library, use real library search tools and access real books and articles contained in refereed/archival journals.

Be sure to make use of the Vikat library catalog. Go to the PSU library home page at [www.lib.pdx.edu/](http://www.lib.pdx.edu/). Also available on the library home page are Full Text Electronic Journals: [www.lib.pdx.edu/~bvws/bytitle.html](http://www.lib.pdx.edu/~bvws/bytitle.html), and a list of on-line Databases: [www.lib.pdx.edu/resources/databases/databases.html](http://www.lib.pdx.edu/resources/databases/databases.html). Also, try EI Compendex ([www.engineeringvillage2.org/](http://www.engineeringvillage2.org/)) and Lexis-Nexis. Note that access to these databases is free for PSU students, but you must be using a computer on campus or via a dial-in service. See [http://www.lib.pdx.edu/resources/databases/EZ_proxy.html](http://www.lib.pdx.edu/resources/databases/EZ_proxy.html) for instructions on how to gain off-campus access using a proxy server.

**Campus Safety**

The University considers student safety paramount. The Campus Public Safety Office is open 24 hours a day to assist with personal safety, crime prevention and security escort services. Call 503-725-4407 for more information. For Campus emergencies call 503-725-4404.

**Final Notes**

- The syllabus is subject to change at the discretion of the instructor as course or other circumstances requires.
- Students with documented disabilities are encouraged to discuss with me arrangements that will enhance their learning in this class.
- Please feel free to discuss with me problems/concerns with your other classes.

*Drs Bertini and Monsere contributed to the original version of this syllabus*