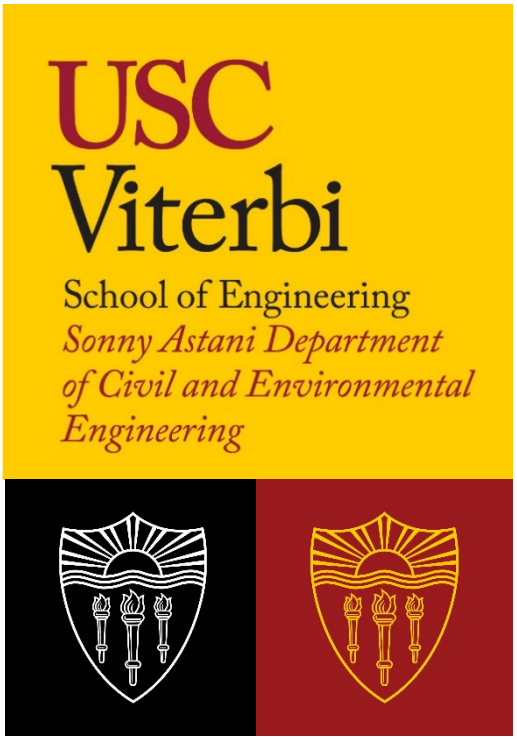

CE/ISE/PPD 589: Port Engineering: Planning and Operational Analysis

Units: 4
Term: Summer 2020
Day of Week:
June 5th , 6th and 7th
July 10th, 11th and 12th
August 1st and 2nd

Location: TBD

Instructor: Prof. Hanh D. Le-Griffin, Ph.D.
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cc: hanh.le-griffin@hatch.com
CEE589.legriffin@gmail.com
(for large attachments)
Mobile: (949)-439-8287

Website: https://blackboard.usc.edu/
IT Help: engrhelp@usc.edu for Viterbi IT
consult@usc.edu, 0-5555 for ITS

Catalogue Course Description

Marine port/terminal and landside logistics system and support facilities. Planning, design, operational efficiency and advanced technologies.

Expanded Course Description

Agents and issues changing the operating environment of marine ports and terminals are examined and discussed. The effects that these changes are likely to have on ports and terminals are analyzed to establish new requirements for terminal operating capacity and efficiencies that, in-turn, form the basis for port engineering design standards, development criteria, and related public policies.

This course presents various marine port and terminal topics pertaining to the principles of terminal planning and operations; statistical analysis and simulation techniques; intermodal transport and logistics services; technological applications, including automation; safety and security; and environmental management. Each topic covered is supported with case studies, practical examples, and illustrations of the latest developments in the field. The primary focus of the course is on planning and operational efficiency of container ports and terminals, and the implementation of advanced technology. Other types of terminals, such as general cargo and dry and liquid bulk terminals, are discussed as appropriate.

Audience

This course exists at the intersection of civil and environmental engineering, industrial and systems engineering, operations management, and public policy and urban planning. It serves multiple populations, and is appropriate for graduate students in the Viterbi, Price, and Marshall Schools.

Learning Objectives and Outcomes

This interdisciplinary course offers a comprehensive and detailed analysis of the technological applications, economics, and institutions that are collectively shaping the new and highly competitive environment for marine port operations. Port authorities, along with private terminal operators, shipping lines, rail companies, stevedore unions, and various service and logistics firms are adapting to rapid changes in their operating environments. Technological advances in marine engineering and information technologies are lifting the industry to ever-higher levels of operating efficiency. The physical form and managerial characteristics of ports are being rapidly altered in response to the strategic actions being taken by the various entities and institutions that depend on marine port facilities and services.

The cumulative effect of these changes occurring in the shipping industry, such as the high-velocity and high-capacity handling requirements of the larger container vessels, place an immense pressure on port authorities and terminal operators. This circumstance is particularly critical for national gateway ports, such as the ports of Los Angeles and Long Beach, which frequently receive large vessels with capacities of 14,000 plus containers. Given the scarcity of land and severe environmental constraints on terminal expansion, enhancing terminal productivity and efficiency through improved terminal planning, efficient management, and advanced technology are essential to the sustainable operation of gateway ports, both in the Los Angeles metropolitan area and worldwide.

Topics covered include:

1. **Introduction to Modern Container Ports**: Concepts and definitions of physical and operational characteristics of modern container terminals and port systems, approaches to port operations and management in the context of worldwide production, global supply chains, and modern logistics and liner shipping.
2. **Port Terminal Planning**: Infrastructure and capacity, capacity evaluations, needs assessment and demand forecasting, and operational terminal planning techniques.
3. **Port Operations—Basic Principles**: Introduction to port operations and services, terminal layout and configuration, cargo handling processes, cargo handling equipment, and developments in handling technologies.
4. **Port Logistics**: Network structure of port operations, freight logistics systems and ports, inter-modality and landside port logistics, and integrating ports with global supply chains.
5. **Port Operations—Analyses**: Terminal operations and capacity analysis including a multi-disciplinary approach to port performance, measurements of port productivity and efficiency, advanced cargo handling systems, and trends in container handling automation.
6. **Big Data and Automated Container Terminals:** Using the first newly developed automated container terminals in North America as examples (POLA/POLB), introduction to process automation; decision making for automated operating systems and equipment; and the implications of these systems for port planning, design, operations, including lesson learned.

7. **Environmental Management and Ports**: Environmental aspects of port operations, public policy and industry stewardship in sustainable operating systems and advanced technologies.

Completion of this course will provide students with a thorough understanding of the institutional, economic, and technological forces that are now shaping the physical characteristics and service requirements of modern ports and terminals, and how these factors are included in the analysis of terminal capacity, operational performance, and engineering design of port and terminal facilties.

Prerequisite(s)

None, however, student should have an interest in transportation and logistics with some prior coursework.

Co-Requisite(s): None

Concurrent Enrollment: None

Recommended Preparation: This course is designed primarily for graduate planning and engineering students. However, the course relevant to other students with an interest in supply chains, and has been proven beneficial for students with financial and business backgrounds and interests who want to explore the business aspects of marine port and logistics industries.

Communication

All class related information, assignments and reading materials are sent directly to students via USC email or registered @gmail.com account (e.g. CEE589.legriffin@gmail.com) for large attachment files. Power Point handouts will be made available to students at the beginning of each class. For issues requiring an immediate response, USC email (hdle@usc.edu cc: hanh.le-griffin@hatch.com) is the best way to communicate.

Course Notes

Course materials are available on blackboard, https://blackboard.usc.edu/, timed for release according to the course schedule. In addition, hard copies of class powerpoint presentations will be handed out at the beginning of each class, and reading assignments and quantitive exercises/homework will be distributed to students at the culmination of each class. Students are required to complete reading materials and turn in approximately weekly assignments two days prior to the next class. Blackboard's on-line tracking system is used to record communications and student submittals each week.

Technological Proficiency and Hardware/Software Required

Students should have the equivalent of an undergraduate planning and engineering background, familiar with Micro Soft Excel quantitative analysis functions including macro. Though it is not required but prefer student to be familiar with a anylysical tool such as JMP, Mathlab or any simulation software.

Required Readings and Supplementary Materials

Given the broad and interdiciplinary nature of this course, course readings are selected from a variety of books, journals, articles, case studies, and government reports. Case studies and real world application of course principles and global best practices are drawn from the professional project experience of the instructor.

While no single text book is required for the course, there are several text books recommended to students that provide an in depth understanding and analytical applications of topics presented in the course. These are available at the USC Book Store:

1. Kim, Kap Hwan, and Hans-Otto Gunther, eds., (2007) *Container Terminals and Cargo System: Design, Operations Managements and Logistics Control Issues*, Springer. Highly recommended if you are interested in modeling and operations research.
2. Bichou, Khalid (2009) *Port Operations, Planning and Logistics*, Informa, London.

Grading Breakdown

This course is a combination of lectures and some seminar, discussion-intensive classes. Students are required to complete all reading and assignments prior to each class. In addition to class participation and periodic class assignments, course requirements include a group project and a final paper.

Grades are calculated as follows:

Class Component	% of Course Grade
Class Participation and Discussion	5%
Periodic Quizes (5)	15%
Approximately Weekly Individual Homework Assignments (10)	25%
Group Project Presentation	25%
Final Individual Technical Report	30%
Total	100%

Grading Scale

Course final grades will be determined using the following scale:

A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
95-100	90-94	87-89	83-86	80-82	77-79	73-76	70-73	67-69	63-66	60-62	59 or below

This scale is presented for the sake of completeness. Courses in which students earn grades below a C cannot be presented for credit toward graduation in a USC graduate program, though the course grade remains part of the students' graduate GPA.