CIM 410 – SENIOR PROJECT (CONCRETE PRECAST)

COURSE NUMBER CIM 410

COURSE TITLE Senior Project

COURSE STRUCTURE (3-0-3) (lecture hr/wk - lab hr/wk – course credits)

COURSE DESCRIPTION Project management, business plan evaluation, proposal development, library research, and computer usage are stressed. This course will explore the precast industry including the history, current methods, and processes being utilized within this industry. Issues and challenges being faced by precast industry will be discussed in detail. The course will include an experiential learning component will be included in the course to enhance understanding of the industry by requiring several plant tours and industrial guest lectures throughout the semester. The students will be required to develop a project plan for a precast concrete problem the student will choose to solve and develop technical specifications, charts, cost estimate and design specifications.

PREREQUISITE(S) All required 300-level courses
Join ACI as a student member:
https://www.concrete.org/membership/becomeamember.aspx?preselect=fs
Join PCI as a student member: https://www.pci.org/memberships/membership-list.aspx.

COREQUISITE(S) None

REQUIRED MATERIALS The following textbook and publications will be used for primary instruction:

- Precast Concrete Structures by Kim S. Elliott (Author)
- PCI Design Handbook, 7th Edition, Precast/Prestressed Concrete Institute, Chicago, Illinois.
- AASHTO LRFD Bridge Design Specifications 6th Edition, American Association of State Highway Transportation Officials, Washington, DC. 2013.
- Prestressed Concrete: A Fundamental Approach, Fifth Edition Upgrade (5th Edition), Edward G. Nawy, 2009, ISBN-10: 0136081509
- Post-Tensioning Manual 6th Edition, Post-Tensioning Institute (PTI), Farmington Hills, MI.
- ACI 318-14 Building Code Requirements for Structural Concrete and Commentary, American Concrete Institute, Farmington Hills, MI. 2014.

INDUSTRY WEBSITES
http://www.vsl.com VSL Prestressing (Aust.) Pty Ltd
http://www.apspt.com.au/ Australian Prestressing Services
http://www.raptsoftware.com/ RAPT Software
www.nationalprecast.com.au National Precast Concrete Association Australia
www.precastnz.org.nz Precast New Zealand Inc.
www.pci.org Precast/Prestressed Concrete Institute – USA
www.precast.org National Precast Concrete Association - USA
www.britishprecast.org British Precast Concrete Federation
www.cpci.ca Canadian Precast/Prestressed Concrete Institute
www.cpi-tv.com Concrete Plant International – the Concrete channel

COMPUTER USAGE Microsoft Word, Excel,PowerPoint

COURSE LEARNING OBJECTIVES By the end of the course students are able to:

1. Develop, design, and evaluate a concrete industry project plan approved by the program director.
2. Apply the project plan in the concrete lab through experimental work
3. Enhance critical thinking, research and communication skills.
4. Gain an appreciation for ethics, professionalism and life long learning.

CLASS TOPICS Engineering Design Process, Brainstorming, Library research, Microsoft Project

STUDENT LEARNING OUTCOMES	The Course Learning Outcomes support the achievement of the following: OUTCOME 5 - Understanding of project, quality, and safety management methods and the impact of their application on the financial and economic aspects of concrete materials, products and services. (Relates to CLO 1,2,3, and 4) OUTCOME 7 - Ability to communicate effectively ideas in oral, written, and graphical form. (Relates to CLO 3) OUTCOME 9- Appreciation and understanding of the legal and ethical implications of their work and an awareness of the impact of their actions and decisions-making on individuals, society, and the environment. (Relates to CLO 4) OUTCOME 10 - Understanding and ability to apply basic concepts in experimental work and how to solve concrete problems in the lab. (Relates to CLO 1,and 2)
GRADING POLICY	The grading policy is shown in Canvas, with point allocation for each assignment.
ACADEMIC INTEGRITY	NJIT has a zero-tolerance policy regarding cheating of any kind and student behavior that is disruptive to a learning environment. Any incidents will be immediately reported to the Dean of Students. In the cases the Honor Code violations are detected, the punishments range from a minimum of failure in the course plus disciplinary probation up to expulsion from NJIT with notations on students' permanent record. Avoid situations where honorable behavior could be misinterpreted. For more information on the honor code, go to http://www.njit.edu/academics/honorcode.php
MODIFICATION TO COURSE	The Course Outline may be modified at the discretion of the instructor or in the event of extenuating circumstances. Students will be notified in class of any changes to the Course outline.
PREPARED BY	Dr. M. Mahgoub
COURSE COORDINATED BY	Dr. M. Mahgoub
CLASS HOURS	FRIDAY 6:00 PM – 8:50 PM FMH 108
OFFICE HOURS	BY APPOINTMENT ONLY (GITC 2511) **(973) 596-6081** or **mahgoub@njit.edu**

COURSE OUTLINE

Week	Activity
1	Course overview and introduction Discuss Concept Documents Discuss how to generate ideas
2	Distribution of Sample Documents and review plans Visit to library for research seminar
3	Discussion on Project Management Brainstorming Session on Project Details Project Concept Discussion
4	Introduction to Precast Concrete
5	Prestressed concrete applications and history Sustainable and green construction
6	Transfer and development, Prestress losses, Connections and anchorage, Stress calculations, and Architectural
7	Materials: Design and curing Formwork: Design, strip, and store
8	Precast concrete fabrication facility precast manufacturing and QA/QC processes
9	Lifting, handling, transporting, and assembling of precast structures
10	NJIT's New Residence Hall: Design and construction
11	Cost Estimating and Scheduling
12	Precast Concrete Repairs
13	Final Report
14	Final Presentations