CE 107: Introduction to Civil and Environmental Engineering

Instructor:
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Overview

• Instructor information
• History of Civil Engineering
• Course Overview
• Course outline
• Introduction to Civil Engineering
## INSTRUCTOR AUTOBIOGRAPHY

<table>
<thead>
<tr>
<th>Year</th>
<th>Details</th>
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<tr>
<td>2003</td>
<td><strong>BSc. Engg.</strong> (Civil Engineering), BUET (Major in Environmental Engineering)</td>
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<td>2003-’05</td>
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### Research Interests
- Water Quality Assessment and Control, Wastewater treatment and Management, Environment and Ecology
History of Civil Engineering

• Pre 18\textsuperscript{th} Century Civil Engineering : 4000 - 2000 BC – ancient pyramids, great walls of China

• 18\textsuperscript{th} – 20\textsuperscript{th} Century Engineering : Separate branch in 1819 in Norwich University – ASCE etc. Societies

• Modern Civil Engineering : Design, create and test simulations

http://www.usc.edu/dept/engineering/summerprograms/bridge-and-rov/group5/history-of-civil-and-mechanical-engineering/
Course Overview

• Objective
• Course outline
• Marks distribution
• Quizzes
• Assignment
• Policies
Course Outline

• Introduction to Civil Engineering
• Unit conversions
• Water and Environment: Man and Environment,
• Components of Environment,
• Ecosystem, Flow of Matter and Energy Through an Ecosystem,
• Biodiversity,
• Basic Population Dynamics,
• Water resources,
• River system in Bangladesh,
• Wetlands in Bangladesh
• Natural Disasters in Bangladesh
• Water Pollution,
• Urban Air Pollution, Acid Rain, Global Warming, climate change
• Renewable and Non-renewable Energy
Introduction to Civil Engineering

• What is Civil Engineering?

• Marvels of Civil Engineering

• Branches of Civil Engineering
What is Civil Engineering?

• Civil engineering is the oldest engineering.

• Civil Engineering deals with the design, construction, and maintenance of structures or public works as they are related to earth, water or in space.

• Civil Engineering is also known as the mother of all engineering.
Marvels of Civil Engineering

Buildings

Flyovers

Dams

Bridge over waters
Marvels of Civil Engineering

Highways and Tunnels
Marvels of Civil Engineering

Under Water Tunnels
Branches of Civil Engineering

– Structural Engineering
– Geotechnical Engineering
– Transportation Engineering
– Environmental Engineering
– Water Resources Engineering
Structural Engineering

- Design of new structures
- Upgrading existing structures
- Intelligent use of new technologies and materials to control structural behavior
- Structures include buildings, bridges, offshore platforms, transmission towers, and other specialized facilities
Dubai Towers
Dubai, United Arab Emirates
Burg al Arab
Dubai, United Arab Emirates
A self proclaimed 7-star hotel
Nebraska State Capital
Lincoln, Nebraska
Eiffel Tower
Paris, France
Dubai’s expansion from 1991 to 2005
Geotechnical Engineering

- Geotechnical Engineering is concerned with engineering behavior of earth materials
- Geotechnical engineers:
  - Investigate existing subsurface conditions (tunnels excavations, pipelines)
  - Determine physical and chemical properties relevant to project considered
  - Assess risks posed by site conditions
  - Design earthworks and structural foundations
  - Monitor earthwork and foundation construction
Tunnels

Foundations

Photo courtesy of MWRA
Transportation Engineering

- Planning, Design, Operation and Maintenance of safe and efficient transportation systems
- Incorporating new technologies to improve system performance
- Intelligent Transportation Systems
Highways

Traffic Signals and Signs

Train and Subway Lines

Runways
Environmental Engineering

- Protect & improve environmental quality
  - natural systems
  - engineered systems

- Protect human health & well-being
  - provide safe drinking water
  - waste water treatment systems
  - hazardous waste site clean-ups
Water Treatment Plant Processes

Underground Storage Tank Excavations

Photo courtesy of Black & Veatch
Hazardous Waste Remediation

Wastewater Treatment Plant Processes

Pipelines

Photo courtesy of Black & Veatch
Water Resources Engineering

- Physical control of water
  - public water supply
  - flood control
  - irrigation, navigation etc.

- Computer modeling of water flow

- Performance requirements for lock and dam structures
Reservoirs

Dams

Photo courtesy of Black & Veatch
HOW DO CIVIL ENGINEERS DESIGN THESE STRUCTURES?

• First They have an idea
Then they use computer programs to illustrate their idea...
And finally the idea turns into a reality!
A Computer Design of a Wastewater Treatment Plant

 Courtesy of Black & Veatch
An Actual Wastewater Treatment Plant
Reference

• www.slideshare.net