Four great learning labs:
- Bridge & Geotechnical Engineering
- Highway & Traffic Engineering
- Storm Water Management, Hazardous Materials, Environmental Planning
- Surveys & Geographic Information Systems (GIS)
## Agenda & Instructions

### Agenda
- 9:00 – 9:20 Welcome and Program Introduction in Cherry Auditorium
- 9:25 – 10:05 First Learning Lab
- 10:10 – 10:50 Second Learning Lab
- 10:55 – 11:35 Third Learning Lab
- 11:35 – 11:55 Lunch break (stay in place at 11:35)
- 12:00 – 12:40 Fourth Learning Lab
- 12:45 – 1:00 Program Wrap-up and URI Admissions overview in Cherry Auditorium

### Instructions
- After the Welcome and Introduction session, students will proceed to the Learning Lab that corresponds to their group number. Group 1 will start at Learning Lab 1, Group 2 will start at Learning Lab 2, etc.

- After the first Learning Lab, students will proceed in numerical order through the remaining labs. For example, students in Group 2 will start in Learning Lab 2 at 9:25 and then proceed through Learning Labs 3, 4, and 1, in that order.

- For the lunch break, students should stay where they are at 11:35. Lunch will take place in the same location as the 3rd Learning Lab.
Welcome to **RI Engineering Career Day**

The purpose of RI Engineering Career Day is to expose high school students to the field of transportation engineering and to develop interest both in the choice of engineering as a field of study at the college level and, more specifically, in the choice of transportation engineering as a career path.

Safe and efficient transportation systems are vital elements in any successful economy. Transportation engineering, a field within civil engineering, involves the planning, design and construction of new transportation facilities and improvements to existing facilities for all modes of transportation.

Engineering Career Day is sponsored by the Rhode Island Department of Transportation (RIDOT), the Rhode Island Consulting Engineers (RICE), the University of Rhode Island Transportation Center (URITC), University of Rhode Island, College of Engineering, and the Federal Highway Administration (FHWA).

The program for Career Day includes presentations and hands-on activities in the many disciplines that comprise transportation engineering, provided by professionals in the field.

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<td>THE UNIVERSITY OF RHODE ISLAND TRANSPORTATION CENTER</td>
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Learning Lab 1: Bridge & Geotechnical Engineering

What is it?
Bridge engineering is the specialty within transportation that involves structural calculations and the design of bridges, walls and other structural supports. Geotechnical engineering is the study of soils and different subsurface conditions that are encountered during both design and construction.

Designers must understand the conditions below the surface of the earth because different soil types are better for construction and can support more weight than others. Your knowledge of the soil you build on could mean the difference between a solid structure and a dangerous collapse.

What will you do?
• Find out what goes into the models, such as the geometry of the structure, the size and materials, and the loads that the bridge is designed to carry.
• Learn how to determine the subsurface conditions by examining various soil types.
• Use the West Point Bridge program to model a bridge yourself.
• Learn how engineers determine what the subsurface soils consist of, from ground level to hundreds of feet below the surface.
• Teams entered in the bridge building contest will have their bridges tested.

Lab participants:
Pare Corporation
Steere Engineering
What is it?
Imagine a world without traffic lights, where drivers don’t know when to stop and go and everyone struggles to avoid an accident. That’s a world without highway and traffic engineers.

Highway engineers lay out roads so they aren’t too curved or steep so traffic moves smoothly at the design speed. Traffic engineering focuses on the design of traffic signals that are needed to control traffic flow at busy intersections.

What will you do?
• Grasp the “big picture” of highway engineering by looking at images of the newly relocated Route 403 freeway to Quonset Point.
• Learn about what goes into the planning and the design of a highway.
• Connect what you learned in other labs to understand how bridge and geotechnical engineering, surveying, storm water management, etc., all come together in a transportation project.
• See some of the technologies used in traffic signals to detect vehicles and pedestrians and how they function.
• Find out how traffic signals are designed.
• View examples of computer models used to simulate and analyze traffic and try to control traffic in a simulated environment.

Lab participants:
Gordon R. Archibald, Inc.
Vanasse Hangen Brustlin, Inc.
Learning Lab 3: Storm Water Management, Hazardous Materials, Environmental Planning

What is it?
What happens to rain water that falls on a highway during a storm? The answer, of course, is that it has to be made to flow away from the highway for the safety of the motorists. The professionals in storm water management design the drainage systems that collect and handle the storm water. Because their work affects the environment, it intertwines them with professionals who deal with environmental concerns.

Another area of environmental concern that we often encounter on transportation projects is the identification and handling of hazardous materials.

What will you do?
• Gain an understanding of proper design of storm drainage systems, the principles that go into a design, and the reasons why they’re important.
• Learn about the runoff characteristics of different surfaces, the relationship between storm drainage design, and such factors as flooding, erosion and groundwater recharge.
• Find out about hazardous materials, their proper transportation, the handling of hazardous spills, and environmental issues that effect transportation projects.
• Get an introduction to environmental considerations in the planning of transportation facilities.
• Learn how and when pressure systems and instrument/control technologies are used.

Lab participants:
GZA GeoEnvironmental, Inc.
Crossman Engineering
Learning Lab 4: Surveys & Geographical Systems (GIS)

What is it?
These days Geographic Information Systems help us navigate our world. Do you need directions? Get them off of MapQuest! Lost as you drive around town? Switch on your GPS! Curious to see a birds-eye-view of your house? Use Google Maps! Surveys and GIS are the tools that allow us to know the real-world position of anything and everything.

Surveys and GIS technologies also play a significant role in the planning, design and construction of transportation projects.

What will you do?
• Learn about field survey techniques using Real Time Kinematics (RTK) Geographic Positioning Systems (GPS) that are being used in the engineering, planning and environmental fields.
• Have the opportunity to observe and assist in the operation of RTK/GPS equipment outdoors (weather permitting).
• Witness a demonstration of GIS and GPS software that will show the real-world position of the data collected in the lab.

Lab participants:
The Beta Group, Inc.
Bryant Associates, Inc.