

Thermodynamics in the Land of Fire and Ice

A UC Davis Study
Abroad Program

June 18- July 15, 2016



Thermodynamics

- UC Davis ENG 105 is a required course for Mech and Aero Engineers, Civil Engineers, and Bio-Medical Engineers at UC Davis. Required course for other engineering disciplines at other institutions
- Typically a “difficult” course where we introduce engineers to energy flows, heat transfer , and engineered systems related to energy conversion.
- Without Thermodynamics Icelanders would still be living in →



<- Look close it's a Sod Mechanic's Shop

Because of Thermodynamics

- Iceland enjoys one of the highest rankings of standard of living in the world.
- The air and water are clean. The people are educated and enjoy a peaceful prosperous living.
- 70-80% (100% of the electric grid) of all the energy used in the country comes from “renewable” resources. Hydroelectric and Geothermal Electricity



Thermodynamics in Iceland

- Iceland presents a living laboratory to study heat flow, energy conversion, power plants and renewable energy use.
- Iceland showcases how heavy industries can be powered by renewable resources.

Alcan's Aluminum smelting
Facility outside of Reykjavik

Photo Courtesy of
Rio Tinto Alcan



Am I really going to learn anything?

- This is a class on Thermodynamics. Every homework assignment, exam , and concept mastery required of UC Davis Students will be required.
- However we will have a more scenic backdrop

Dettifoss: Europe's most powerful waterfall ->



Amazing Field Trips to:

- Burfell (hydroelectric power station)
- An aluminum smelter near Reykjavik
- Hellisheidi (Geothermal Combined Heat and Power Plant)
- Krafla (Geothermal power plant)
- But its not all work...



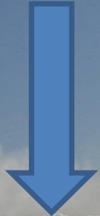
Cultural and Scenic Field Trips to:

- Þingvellir, Gullfoss, and Strokkur Geyser (Golden Circle)
- Cross the Arctic Circle at Grimsey Island
- Dalvík, Akureyri, Dettifoss, Godafoss
- Jökulsárlón
- Vatnajökull (Skaftafell) National Park
- Westmann Islands



We will even go swimming in the effluent of a geothermal power plant!

Here is the Power Plant



Is that you?



Tentative Schedule 18 Jun-2 Jul

| Day | Activity Morning | Activity Afternoon | Evening Accommodations | Notes |
|------------|---|---------------------------------------|------------------------|---------------------------|
| 18 Jun Sat | Arrive Reykjavik (KEF) fly bus Find Rooms | Briefing Intro to Class Safety review | Hlid | |
| 19 Jun Sun | Free time Sightseeing on your own | Free time Sightseeing on your own | Hlid | |
| 20 Jun Mon | Class 1 9-10:15 Class 2 10:30-11:45 | Free time /Study | Hlid | |
| 21 Jun Tue | Class 1 9-10:15 Class 2 10:30-11:45 | Local Field Trip 1 | Hlid | |
| 22 Jun Wed | Class 1 9-10:15 Class 2 10:30-11:45 | Free time /Study | Hlid | |
| 23 Jun Thu | Class 1 9-10:15 Class 2 10:30-11:45 | Extended Field Trip 1 | Vegamot | Homework due |
| 24 Jun Fri | Extended Field Trip 1 | Extended Field Trip 1 | Vegamot | |
| 25 Jun Sat | Extended Field Trip 1 | Extended Field Trip 1 | Vegamot | |
| 26 Jun Sun | Extended Field Trip 1 | Free time Sightseeing on your own | Hlid | |
| 27 Jun Mon | Class 1 9-10:15 Class 2 10:30-11:45 | Free time /Study | Hlid | |
| 28 Jun Tue | Class 1 9-10:15 Class 2 10:30-11:45 | Local Field Trip 2 | Hlid | |
| 29 Jun Wed | Class 1 9-10:15 Class 2 10:30-11:45 | Free time /Study | Hlid | |
| 30 Jun Thu | Class 1 9-10:15 Class 2 10:30-11:45 | Free time /Study | Hlid | Homework due Midterm Exam |
| 1 Jul Fri | Day trip 1 | Day Trip 1 | Hlid | Return to Base |
| 2 Jul Sat | Day trip 2 | Day trip 2 | Hlid | Return to Base |

Local Field Trip 1

Burfell hydropower station

Local Field Trip 2

Aluminum plant

Day Trip 1

Westmann islands lava flow

Day trip 2

Snaefells

Extended Field Trip 1

Thursday Bus North to Dalvik overnight in Dalvik

Friday Boat to Grimsey Island overnight in Dalvik

Saturday Bus to Godafoss Myvatn nature baths

Krafla Dettifoss Husvik overnight in Dalvik Sunday

back to Reykjavik



Tentative Schedule 3 Jul- 15 Jul

| Day | Activity Morning | Activity Afternoon | Evening Accommodations | Notes |
|------------|-------------------------------------|-----------------------------------|------------------------|--|
| 3 Jul Sun | Free time Sightseeing on your own | Free time Sightseeing on your own | Hlid | |
| 4 Jul Mon | Class 1 9-10:15 Class 2 10:30-11:45 | Free time /Study | Hlid | |
| 5 Jul Tue | Class 1 9-10:15 Class 2 10:30-11:45 | Local Field Trip 3 | Hlid | |
| 6 Jul Wed | Class 1 9-10:15 Class 2 10:30-11:45 | Free time /Study | Hlid | |
| 7 Jul Thu | Class 1 9-10:15 Class 2 10:30-11:45 | Extended trip 2 | Gerdi | Homework due |
| 8 Jul Fri | Extended trip 2 | Extended trip 2 | Gerdi | |
| 9 Jul Sat | Extended trip 2 | Extended trip 2 | Hlid | |
| 10 Jul Sun | Free time Sightseeing on your own | Free time Sightseeing on your own | Hlid | |
| 11 Jul Mon | Class 1 9-10:15 Class 2 10:30-11:45 | Free time /Study | Hlid | |
| 12 Jul Tue | Class 1 9-10:15 Class 2 10:30-11:45 | Local Field Trip 4 | Hlid | |
| 13 Jul Wed | Class 1 9-10:15 Class 2 10:30-11:45 | Free time /Study | Hlid | |
| 14 Jul Thu | Class 1 9-10:15 Class 2 10:30-11:45 | Free time | Hlid | Homework due Final Exam for 105 turn in journals for 198 |
| 15 Jul Fri | Pack up and Leave Iceland | | | |

Local Field Trip 3

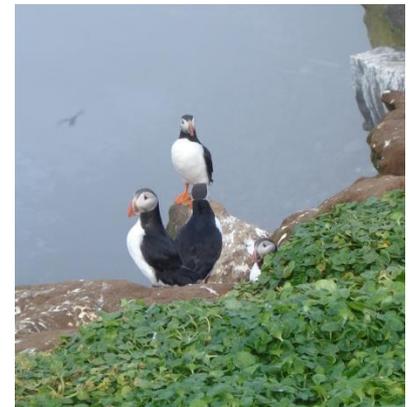
Hengill Hellisheidi geothermal power plant and Geothermal hot water pipeline

Local Field Trip 4

Svartsengi Power Station, CRI and Blue Lagoon Spa

Extended trip 2

Thursday Bus south to Skaftafell Overnight in Skaftafell Friday hiking and touring in Skaftafell. Overnight in Skaftafell Saturday to Jokulsaron Drive back to Reykjavik stopping at Selfoss.



Meet the Professor

- Full Professor at UC Davis
- Specializes in Thermal Science and Renewable Power Systems
- Has taught Thermodynamics (ENG 105) for the past 12 years
- Has been to Iceland on 3 different trips teaching for the (now defunct) Renewable Energy Science Masters of Science program in Akureyri .
- 2nd Time leading this specific Summer Abroad Program



Professor Paul Erickson and his wife Dena near Reykjavik



Professor Paul Erickson on top of Mt Sulur near Akureyri, Iceland



The Professor straddling a fissure between the North American and European tectonic plates at Thingvellir



Great! How do I sign up?

- Learn more at the Study Abroad Office (Third and A St.) Our Program Coordinator is Dana Armstrong.
- Visit the Website
<http://studyabroad.ucdavis.edu/programs/summerabroad/iceland.html>
- Enroll on the website between January and April. Warning!! There has been A LOT of interest in the program so sign up early as it may fill quickly.

I hope to see you in Iceland!

Unless otherwise noted all photos in this presentation are from Professor Paul Erickson's personal photo library. You can expect to see similar things on our study abroad trip to Iceland!

Hlid

- On Alftanes peninsula (super scenic, birdwatching, golf course nearby, pool nearby)
- 1 bus transfer to downtown Reykjavik Bus 23 to Bus 1
- Dinner and Breakfast Provided
- Our Classroom is here



Hlid

FISHERMAN'S VILLAGE

A beautiful country home overlooking the city



*Imagine falling asleep to the sounds of the sea
and waking up to the sounds of the birds.*

Well, at Hlid you can!

15 minutes to Reykjavik

Right next to the shore

In North Iceland our base will be the Gimli hostel

- In Dalvik
- Will catch Ferry to Grimsey Island (Arctic Circle) in Arctic Ocean
- Close to Akureyri, Godafoss, Dettifoss, Asbergi



Gerdi-Our base in Southern Iceland

- Skaftafell, Jokulsalaron

