

UNIVERSITY OF PITTSBURGH

Swanson School of Engineering

ENGRXXX – Exploration of Energy and Electrification: Brazil

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(Draft)



Course description

This international experience course will explore energy conversion, conservation, delivery, and end-use in Brazil. Students will learn about the history of Brazilian energy infrastructure, and how it has driven Brazil's strategy to generate and use renewable energy. There will be a heavy focus on hydropower which makes up the largest percentage of Brazil's energy generation. In addition, students will explore new and emerging technologies which take advantage of other means of renewable energy.

Additionally, the concept of electrification in Brazil will be explored. Electrification is the conversion of devices which classically use fossil fuels or other non-electrical energy sources to devices which use electricity as their source of energy. This phenomenon is taking place all over the world at different rates and Brazil is no exception to that. Students will visit companies who are active in electrification to study electrification in Brazil. Students will make comparisons of electrification Brazil and the United States.

Students will also be exposed to Brazilian culture including food, music, dance, and sports. There will also be an opportunity to meet and learn with students from UNISNOS. This course may fulfill a requirement in the Electrical Engineering Power Concentration and may fulfill requirements for the SSoE Sustainability Certificate!

Learner outcomes

By the end of the course the student will be able to:

- Explain how Brazil's history and policy have shaped energy in Brazil. Identify the main types of energy production and describe the main factors that they are used
- Compare and contrast the energy and electrification in Brazil and the United States. Describe what challenges are shared and which are unique, as well as methods to solve them
- Prepare for effective and efficient site visits of companies, government entities, and universities
- Compose reflections of findings from site visits which include lessons learned and further ideas of these lessons
- Write a present a field report

Materials

- Organizing Academic Research Papers: Writing a Field Report:
<https://library.sacredheart.edu/c.php?g=29803&p=185952>

Expected Workload

Because this is a condensed course, students will be fully immersed in their studies during the entire trip. The main work that the student will do is to maintain a journal. The student will use this journal (this can be digital) to document experiences, capture thoughts and ideas, draw diagrams...etc. The more that the student uses the journal, the better.

Students will be expected to fully prepare for site visits. This preparation will include a write up in their journals which should include the answers to the following questions.

- Where is the site in Brazil?
- What is the purpose of the site?
- What is the history of the site?
- How is the site comparable to its American counterpart?
- Questions that you might have prior to the visit

After the site visit students will add a section of reflections, thoughts, and ideas. Based on the visit, the students will compare the site with American counterparts.

The final assessment will be a field report which will include

1. Introduction
2. Description of activities
3. Interpretation and analysis
4. Conclusion
5. Appendix
6. References

Students will also present their field reports with a 5–7-minute presentation

Assessment

The following ABET Outcomes will be used to guide instructor assessment of the pre-site visit preparations, journals, field report and presentation

3. an ability to communicate effectively with a range of audiences
4. an ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts
7. an ability to acquire and apply new knowledge as needed, using appropriate learning strategies.