



A
Summer training report
Taken at
Coursera

Submitted in partial fulfillment of award of Degree of B. Tech
Department of Electrical Engineering



GEETANJALI
INSTITUTE OF TECHNICAL STUDIES

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Details of the Online Courses

1. Course-1, Wind Energy

How tall is a modern wind turbine and how can it possibly generate power from the wind? This course gives an overview of key aspects in wind energy engineering. Whether for general insight in this green technology or your ambition is to pursue a career in wind energy engineering, 'Wind Energy' is an excellent starting point.

The most fundamental disciplines of wind energy research such as wind measurements and resource assessment, aerodynamics, wind turbine technology, structural mechanics, materials, financial and electrical systems. We will gain a rational understanding of wind energy engineering and, through hands-on exercises, we will learn to perform wind energy calculations based on simple models. Working with the different course disciplines will give us a taste of what wind energy engineering is all about. This allows us to identify the most interesting or relevant aspects of wind energy engineering to be pursued in your future studies or in your professional career.

2. Course-2, Electric Power System

This course familiarizes you with standards and policies of the electric utility industry, and provides us with basic vocabulary used in the business. It introduces the electric power system, from generation of the electricity all the way to the wall plug. We will learn about the segments of the system, and common components like power cables and transformers.

This course is for individuals considering a career in the energy field (who have a high school diploma, at minimum, and basic knowledge of mathematics), and existing energy sector employees with less than three years of experience who have not completed similar training and would benefit from a course of foundational industry concepts. The course is a combination of online lectures, videos, readings and discussions. This is the first course in the Energy Production, Distribution & Safety specialization that explores various facets of the power sector, and features a culminating project involving creation of a roadmap to achieve a self-established, energy-related professional goal

3. Course-3, Safety in Utility Industry

This course arms us with basic utility industry safety knowledge. We will be educated about personal protective equipment, fire safety, hazardous materials and their symbols. We will gain insights to recognize the importance of a safe work environment.

This course is for individuals considering a career in the energy field (who have a high school diploma, at minimum, and basic knowledge of mathematics), and existing energy sector employees with less than three years of experience who have not completed similar training and would benefit from a course of foundational industry concepts. The course is a combination of online lectures, videos, readings and discussions.

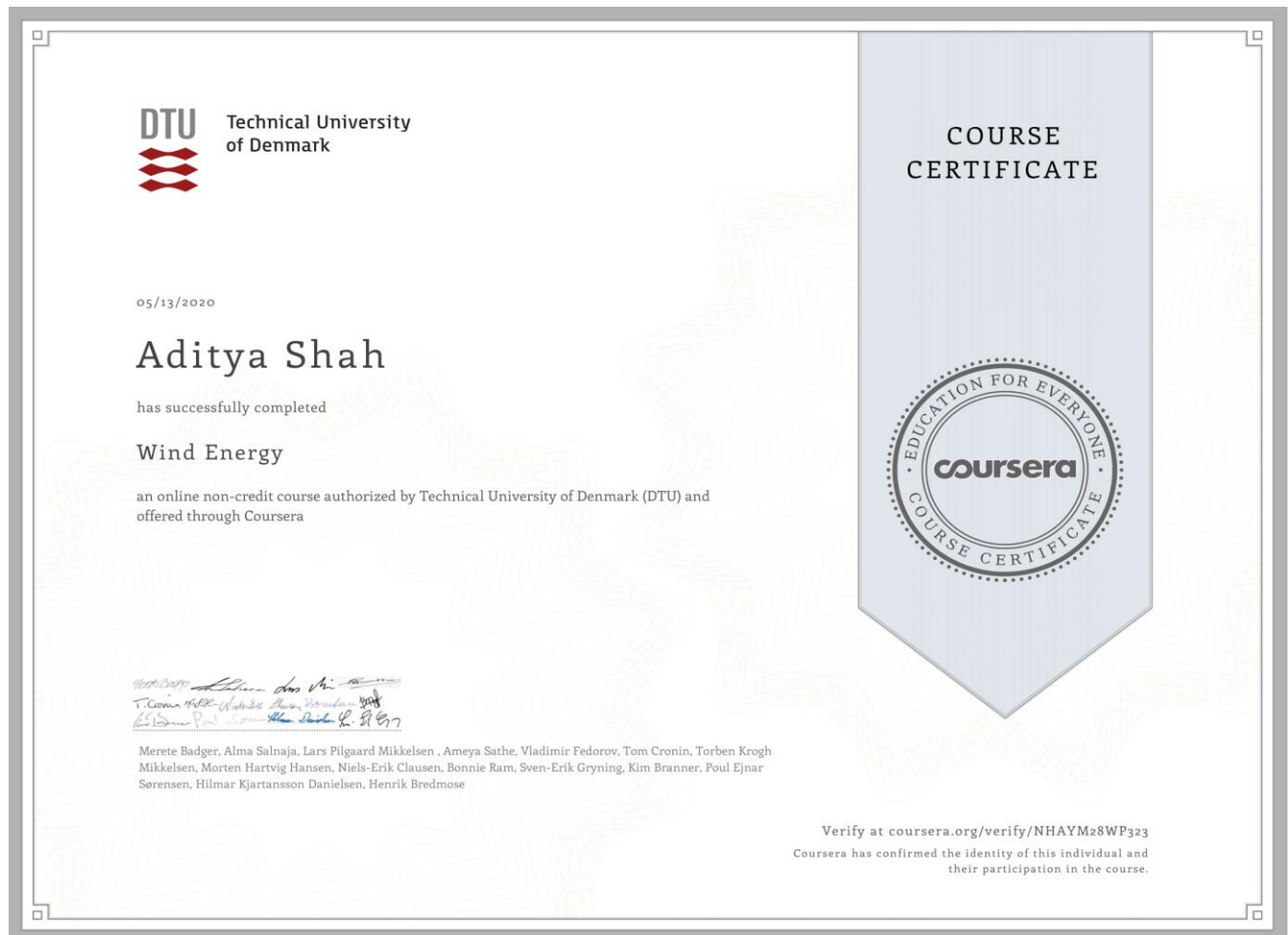
This is the third course in the Energy Production, Distribution & Safety specialization that explores various facets of the power sector, and features a culminating project involving creation of a roadmap to achieve a self-established, energy-related professional goal.

4. Course-4, Natural Gas

This course familiarizes you with standards and policies of the Natural Gas, preparing you with the ability to summarize gas system components and new pipeline technologies. You will be enabled to grasp the key factors behind formation of the natural gas industry and the historical use of natural gas. Ultimately, you will be able to identify gas and carbon monoxide safety procedures

This course is for individuals considering a career in the energy field (who have a high school diploma, at minimum, and basic knowledge of mathematics), and existing energy sector employees with less than three years of experience who have not completed similar training and would benefit from a course of foundational industry concepts.

Certificate in
Course – 1
Wind Energy



Certificate in
Course – 2
Electric Power System



05/13/2020

Aditya Shah

has successfully completed

Electric Power Systems

an online non-credit course authorized by University at Buffalo and The State University of New York and offered through Coursera

A handwritten signature in black ink, appearing to read 'Ilya Grinberg', is shown above a horizontal line.

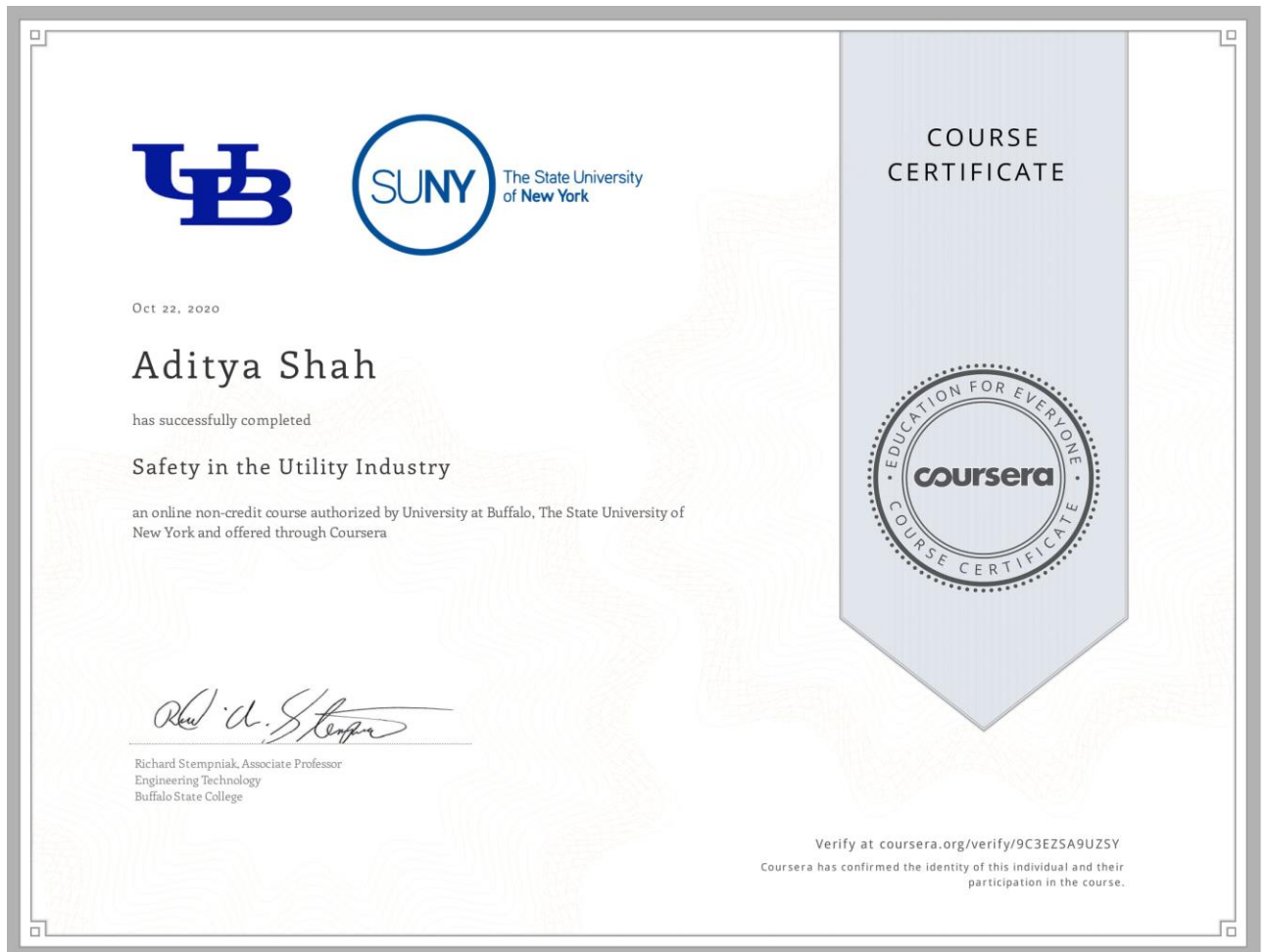
Ilya Grinberg, Professor
Engineering Technology
Buffalo State College

**COURSE
CERTIFICATE**



Verify at coursera.org/verify/ZVY27SLYS9TF
Coursera has confirmed the identity of this individual and
their participation in the course.

Certificate in
Course – 3
Safety in Utility Industry



Certificate in
Course – 4
Natural Gas



Details of Course – 1

Wind Energy

Week 1

Learning Objectives

- Estimate if you have the necessary math skills to complete the course.
- Estimate the amount of theoretical knowledge necessary to complete the course.
- Categorize the learning materials which will be given in the following course.

Week 2

Learning Objectives

- Practice the physics and theory for the wind profile.
- Simplify why the wind profile differs between night and day.
- Simplify the principle of wind resource assessment.
- Recall the three main components for the wind atlas methodology.
- Estimate how different types of terrain affect the wind speed.

Week 3

Learning Objectives

- Appraise simple calculations of a very approximate energy production figure.
- Recall four of the commonly used electricity tariff types for wind energy.
- Argue about the importance of revenue in the economics of a wind farm.
- Recall the four phases of a typical wind farm.
- Recall five of the major components of the cost of a wind farm.
- Write the economic profile of a wind farm project.
- Appraise the ‘simple payback time’ (SPT) for a wind farm.
- Estimate the meaning of the ‘net present value’ (NPV) of a wind farm project.

Week 4

Learning Objectives

- Choose a velocity triangle for the flow around a wind turbine blade.
- Recognize how the aerodynamic forces drives the rotor around.
- Appraise the lift on a blade section from an airfoil curve.
- Appraise how the wind flow is braked as it passes a wind turbine.
- Recall the theory behind the optimum power production of an idealized rotor.

Week 5

Learning Objectives

- Estimate boundary conditions and loads on beams.
- Appraise reactions and internal forces on beams.
- Simplify the basics of classical beam theory, beam deformations and stresses.
- Simplify the basic principles in structural design.
- Recognize the difference between loads, boundary conditions and strength.
- Recall the load carrying capacity of a wind turbine blade.

Learning outcome

1. In this course we learned about the need for wind energy and how wind energy projects are planned. It is all about the wind how the wind varies with height and during the day and night.
2. We learned about different wind turbine designs including the modern three-bladed turbine and financial aspects during the entire lifetime of a wind turbine.
3. We also learned about the ‘Aerodynamics’ and fundamental principle of a wind turbine and what makes it turn. Now we are able to calculate the mass of a turbine blade based on different material’s properties.

Details of Course – 2

Electric Power System

Week 1

Learning Objectives

- Describe basic electrical terms.
- Explain the difference between parallel and series of circuits.
- Analyze a basic DC circuit by calculating sum resistances.
- Determine whether a transformer is step-up or step-down.

Week 2

Learning Objectives

- Identify the segments of the electrical power system.
- Explain the difference between generation, transmission and distribution in an electrical system.
- Recognize the common the distribution voltages in the United States of America.
- Identify common electrical power components.

Week 3

Learning Objectives

- Identify and define what a circuit breaker is.
- Differentiate between low, medium and high circuit breakers.
- Evaluate the difference between switches and circuit breakers.

Week 4

Learning Objectives

- Identify reasons that fossil fuels are unsustainable.
- Differentiate the parts of a smart grid and identify the benefits of each part.
- Identify reasons that renewable energy sources are sustainable.

Learning outcome

1. Electricity is a term that covers all the phenomena caused either by static electric charge or by the movement of charge (current) and the electrical and magnetic fields associated with that.
2. We learned about the nature and effects of electricity; basic electrical properties and simple circuits.
3. We learned that electrical energy is transmitted and distributed via overhead lines and underground cables operating at different voltage levels. We also learned about the substations & transformers; generation; transmission & subtransmission and distribution.
4. We found that Circuit breakers are complicated electromechanical devices and must be serviced regularly. So that work on them can be performed safely, switches are installed before and after them.
5. We also learned about smart grid risks; smart grid, utilities & customers; smart grid & the environment and renewable energy. Our nation's electric power infrastructure that has served us so well for so long – also known as “the grid” – is rapidly running up against its limitations.

Detail of Course – 3

Safety in Utility Industry

Week 1

Learning Objectives

- Recognize the dangers in a workplace environment.
- Recall the history of workplace safety and how it has shaped the current workplace environment.
- Identify the necessary precautions for workplace safety issues in specific industries.
- Discuss how to control your own workplace safety in various environments

Week 2

Learning Objectives

- Recall solutions and best practices for handling hazards in the workplace.
- Recognize the symptoms of various injuries sustained in workplace related incidents.
- Describe how to treat workplace related injuries.

Week 3

Learning Objectives

- Recognize, evaluate and identify ways to control workplace hazards.
- List the different types of PPE.
- Identify which safety equipment to use based on the workplace environment.
- Identify safe practices for tool and equipment use in the workplace.

Week 4

Learning Objectives

- List the agencies that play a role in safety in the energy and utility industry.
- Recognize OSHA Standards.
- Identify environmental regulations and where they apply in the workplace.

Learning outcome

1. We learned about the safety and its history, and we'll see how we can play a role in enhancing it. An ideal workplace is an environment in which we feel safe and we are able to maximize your productivity.
2. We also learned about electrical and non-electrical hazards and if we may encounter any of them we know how to handle them.
3. We learned about necessary equipment to stay safe and comply with laws and regulation.

Detail of Course – 4

Natural Gas

Week 1

Learning Objectives

- State the characteristics and properties of natural gas.
- Identify and recall commonly used industry abbreviations.
- Describe the natural gas supply chain.
- Distinguish the difference between drilling and fracking, as well as the effects on the environment.

Week 2

Learning Objectives

- Examine natural gas transmission and storage.
- Describe FERC and its role in pipeline regulations.
- List the types of underground gas storage facilities.

Week 3

Learning Objectives

- Describe three qualities of Liquefied Natural Gas (LNG).
- Recall the Liquefied Natural Gas supply chain.
- Compare natural gas pipelines from natural gas utilities.

Week 4

Learning Objectives

- State three reasons for pipeline explosions.
- Describe the components of a gas bill.
- List those affiliated with the safety of pipelines and operators.

Learning outcome

- In this course we study about the basics of Natural Gas. We will follow a molecule of natural gas from the ground to the burner tip.
- We learned about the natural gas supply chain
- We learned about natural gas treatment and processing, then about natural gas transmission and storage.
- We learned natural gas distribution systems, including pipeline incidents monitoring, as well as customer service and qualifications.
- Liquefied Natural Gas (LNG) and the basics of natural gas pipelines and utility.

Conclusion

Through this summer training I personally learned about many things, like those details about a particular topic which are really important for building a good career

Wind energy is probably the solution for our energy demands. It has great potential and is easy to manage. All you have to do is build the turbine and everything else is going to be free. With only 1 turbine, you can power over 200 homes. Every wind turbine lasts for about 20-25 years. As long as the wind blows, wind turbines can harness the wind to create power. Wind power only makes up a tiny percent of electricity that is produced.

I had also done specialization in Electric Power System. As whole world is running through electricity and without electricity it will become very difficult for us to manage things. So, there is a need for all those who are connected to electrical department to attain a proper knowledge of generation, transmission and distribution that to without or minimum losses.

At the end, the very important thing is safety. We can achieve any goal if we are fit both physically and mentally. My last course ‘Safety in Utility Industry’ acknowledged me about various facts that I was ignoring and those are dangerous. It showed me the importance of safety equipment and maintenance of our workspace. Hard work is important and that too safety is.

Since the last review of the Program, considerable progress has been made toward the understanding and development of methane hydrate as a possible future energy resource. The U.S. position as one of the leaders in this field can be attributed to the overall high caliber of the research, the breadth of investigations undertaken, the training of new, highly qualified personnel under the Program’s auspices, and the successful collaboration between federal agencies conducting research on methane hydrate. Considerable progress has also been made in the overall management of the Program during the past 5 years, including enhanced interagency collaboration and specific efforts to include a peer review process in

evaluation of supported research projects. The committee largely endorses the direction that the Program has established.