

Elective Course “English for Science, Technology, Engineering, and Mathematics”

1. Course Description

a. Pre-requisites

In order to complete the following course, the students will need to work through each unit and all of its assigned materials. Each student is required to have ready access to a computer and the Internet throughout the duration of the course. Students should be able to use Windows OS and a Web browser, and conduct research through library databases. Additionally, students are required to be at least high Beginner learners of English.

b. Abstract

This course is designed for non-native English speakers who are interested in improving their English skills in the sciences. In this course, students will explore some of the most innovative areas of scientific study, while expanding their vocabulary and the language skills needed to share scientific information within their community. The topics under discussion include climate change, energy systems, and nanotechnology.

2. Learning Objectives

The overall aims of this course are to improve students’ English skills at sciences and help them explore some of the most innovative areas of scientific study and understand the role of science in everyday life.

3. Learning Outcomes

At the language level, students are expected to become able to:

- define and accurately use content-related vocabulary;
- use the present progressive;
- understand the language of cause and effect;
- use intensifiers appropriately;
- use modal verbs to make a suggestion;
- use future possibility and probability modals.

Students will also learn to work with scientific sources, namely to:

- summarize main ideas of a text;
- preview texts;
- read for details;
- choose good sources for research;
- understand importance of citing sources in own research.

At the level of content, by the end of the course students will be able to:

- observe an experiment and analyze the data of an experiment;

- become familiar with the greenhouse effect;
- identify causes and impacts of climate change;
- investigate different types of renewable languages;
- demonstrate understanding of potential uses of Nanotechnology.

4. Course Plan

Unit 1: Is the Earth Getting Warmer?

Observing an experiment. Analyzing the data of an experiment to draw conclusions.

Definition of climate change. Previewing texts. Comparative adjectives in writing.

Unit 2: The Greenhouse Effect

The greenhouse effect. Causes of climate change. The present progressive. The language of cause and effect.

Unit 3: The Impacts of Climate Change on our World

The effects of warmer temperatures on the environment. The impact of climate change on people, animals, and ecosystems. Reading for details. Intensifiers.

Unit 4: Discovering Cleaner Energy Sources to Power the World

Types of renewable energy. Summarizing main ideas of a text. Modals of suggestion.

Unit 5: What Might the Future Hold?

Potential uses of Nanotechnology. Scientific communities and collaboration. Choosing and citing sources.

5. Reading List

<https://www.coursera.org/learn/stem>

a. Required

1. Glendinning, E. H., McEwan, J., & McEwan, J. (2002). *Oxford English for information technology*. Oxford University Press.
2. Herman, S. (2015, October 12). New Study Suggests Global Marine Food Chain Collapse. Retrieved from <http://www.voanews.com/a/study-suggests-global-marine-food-chain-collapse/3002665.html>
3. NASA. (2017, January 19). A Blanket Around the Earth. Retrieved from <http://climate.nasa.gov/causes/>
4. NASA. (2017, January 19). The consequences of climate change. Retrieved from <http://climate.nasa.gov/effects/>
5. NASA. (2018, December 04). Climate change evidence: How do we know? Retrieved from <http://climate.nasa.gov/evidence/>
6. Pasricha, A. (2016, August 26). Indian Scientists Design Solar Tree to Save Space for Solar Power Generation. Retrieved from <http://www.voanews.com/a/indian-scientists-design-solar-tree-to-save-space-for-solar-power-generation/3481641.html>

7. Share America. (2016, August 05). Scientists report that the Earth's fever is rising. Retrieved from <https://share.america.gov/scientists-report-that-earths-fever-is-rising/>

8. Taylor, R. (2016, May 20). Profits form Eco Friendly Vertical Farming Stack Up. Retrieved from <http://www.voanews.com/a/profits-from-eco-friendly-vertical-farming-stack-up/3337900.html>

9. Terhune, L. (2015, August 04). Need strategies to clear the air? | Share America. Retrieved from <https://share.america.gov/need-strategies-clear-air/>

10. Terhune, L. (2016, July 7). Saving Earth by Turning Co2 to Stone. Retrieved from <https://share.america.gov/saving-earth-by-turning-co2-to-stone/>

11. Terhune, L. (2016, Nov 17). Salting away renewable energy for future use. Retrieved from <https://share.america.gov/salting-away-renewable-energy-for-future-use/>

b. Optional

1. Berman, J. (2014, May 7). Study: Rising Carbon Dioxide Levels Threaten Human Nutrition. Retrieved from <http://www.voanews.com/a/study-rising-carbon-dioxide-levels-threaten-human-nutrition/1909926.html>

2. Enochs, K. (2016, March 16). Melting of Ice Wedges Adds to Arctic Warming. Retrieved from <http://www.voanews.com/a/melting-ice-wedges-add-arctic-warming/3240733.html>

3. Nanowerk News. (2015, August 7). Major Advance in Artificial Photosynthesis Poses Win/Win for the Environment. Retrieved from <http://newscenter.lbl.gov/2015/04/16/major-advance-in-artificial-photosynthesis/>

5. Nanowerk News. (2016, January 8). Biofilter made from peanut shells degrades air pollutants. Retrieved from <http://www.nanowerk.com/news2/green/newsid=42272.php>

6. Raman, M. (2009). Technical Communication: English Skills for Engineers. Oxford University Press. Available from <https://library.books24x7.com/toc.aspx?bookid=42077>

7. Schlein, L. (2016, July 21). WMO: Global Warming Happening Faster Than Predicted. Retrieved from <http://www.voanews.com/a/who-global-warming-happening-faster-than-predicted/3429127.html>

8. Share America. (2014, November 24). A city drought caused by destruction of a rainforest? Retrieved from <https://share.america.gov/city-drought-less-rainforest-less-rain/>

9. Share America. (2016, Aug 9). 'Blue energy' could be another way to go green. Retrieved from <https://share.america.gov/blue-energy-could-be-another-way-to-go-green/>
10. Terhune, L. (2016, April 20). 5 takeaways from the latest climate data. Retrieved from <https://share.america.gov/5-takeaways-from-latest-climate-data/>
11. VOA News. (2015, December 3). African Nations Vulnerable to Effects of Climate Change. Retrieved from <http://www.voanews.com/a/african-nations-vulnerable-effects-climate-change/3086573.html>
12. Voa News. (2016, Aug 18). Nuclear Developers Have Big Plans for Pint-sized Power Plants in UK. Retrieved from <http://www.voanews.com/a/britain-nuclear-power/3470331.html>
13. Xie, Y., Fang, M., & Shauman, K. (2015). STEM education. *Annual review of sociology*, 41, 331-357. Available from: <https://www.annualreviews.org/doi/abs/10.1146/annurev-soc-071312-145659>

6. Grading System

The grade is assigned based on the percentage of the student's completion of the course:

10 – 100-96%

9 – 95-91%

8 – 90-86%

7 – 85-80%

6 – 79-70%

5 – 69-65%

4 – 64-60%

3 – 59-55%

2 – 54-55%

1 – 49-0%

7. Guidelines for Knowledge Assessment

To complete the course, students are required to complete all reading and watching sections presented in the course, as well as to take graded quizzes and peer-assessed written and spoken tasks.

8. Methods of Instruction

The course is delivered primarily through lectures with elements of interactive teaching such as discussion and vocabulary games.

9. Special Equipment and Software Support (if required)

Computers with OS Microsoft Windows 10 or Microsoft Windows 8.1 Professional RUS or Microsoft Windows 7 Professional RUS or Microsoft Windows XP.

Web browser Google Chrome or Mozilla Firefox.