

TRIBHUVAN UNIVERSITY
INSTITUTE OF ENGINEERING
PULCHOWM CAMPUS
DEPARTMENT OF ARCHITECTURE

COURSE MANUAL
ON
CLIMATE CHANGE AND ITS IMPACT ON ENERGY
SECTOR

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ESPM Elective I: Climate Change and its Impact on Energy Sector (873 ME)

Course description

This course deals with basic science related to climate change and impact of climate change on environment, society and economy. It also provides the possible solutions to combat environmental impact of climate change on Earth by introducing and implementing various technologies as adaptation and mitigation measures.

Objectives

- The course will apply basic principles of physics and chemistry to analyze and quantify the environmental impacts of energy use.
- Environmental impacts and climate change will be studied at three levels: local, regional, and global.
- Technological options for adaptations and mitigation will be studied to combat the global warming.
- Global and national policy on climate change will be discussed to reduce the greenhouse gas effect on planet.

Course contents

- **Climate change science:** introduction to climate change, key indicators of global climate change and evidence, climate change models and scenarios.
- **Climate change impacts, adaptation measures and risk analysis:** climate change impacts, adaption measures and risk analysis in agriculture and food security, water resources and energy, climate induced disasters, forest and biodiversity, public health, urban settlement and infrastructure, cross-cutting sectors.
- **Climate change mitigation:** technological options for mitigating climate change such as carbon capture and storage, switching to more renewable energy and greater energy efficiency, cost effectiveness analysis of mitigation measures.
- **Climate change policy:** global and national policy on climate change, regulatory instruments and human behavior and social change.

References

- Assessment report (AR5) – IPCC 2014
- Houghton, J., 2009. "Global warming. The complete briefing", fourth edition, Cambridge University Press [www.cambridge.org/9780521882569].
- 2010. "Global warming and climate change: prospects and policies in Asia and Europe", edited by Antonio Marquina, Palgrave Macmillan, U.K.
- Rojey, A., 2009. "Energy & Climate: how to achieve a successful energy transition", John Wiley and Sons, Ltd, Publication in association with Society of Chemical Industry, U.K.
- http://ipcc.ch/pdf/assessment-report/ar5/syr/SYR_AR5_FINAL_full_wcover.pdf

- <https://www.e-education.psu.edu/egee102/>
- <http://www.globalissues.org/article/233/climate-change-and-global-warming-introduction>
- <https://www.e-education.psu.edu/meteo469/node/112>

Lesson plan on Climate Change and its Impact on Energy Sector

Day	Date	TOPICS	REMARKS
1	7 December 2016 Wednesday 12 – 2 PM	Introduction to course, time table, course requirement, available books and reading materials, project work and marking scheme	
2	8 December 2016 Thursday 12 – 2 PM	L-1: Introduction on climate change and its impact	
3	9 December 2016 Thursday 12 – 2 PM	L-2: Greenhouse gas effect	
4	12 December 2016 Monday 12 – 2 PM	L-3: Earth surface temperature calculation	
5	15 December 2016 Thursday 12 – 2 PM	L-4: Greenhouse gases	
6	16 December 2016 Friday 12 – 2 PM	L-5: Methane and other greenhouse emissions	
7	18 December 2016 Sunday 12 – 1:30 PM	Test I	
8	19 December 2016 Monday 12 – 2 PM	L-6: Greenhouse gases emission calculations	
9	20 December 2016 Tuesday 12 – 2 PM	Film show: An inconvenient truth	
10	21 December 2016 Wednesday 12 – 2 PM	L-7: El Nino & Thermohaline circulation	
11	22 December 2016 Thursday 12 – 2 PM	Guest lecture:	Prof. Dr. Binod Kumar Bhattarai and Prof. Dr. Ram Kumar Sharma from Department of Science and Humanity
12	23 December 2016 Friday 12 – 2 PM	L-8: Impact of climate change - 1	
13	25 December 2016 Sunday 12 – 2 PM	L-9: Impact of climate change – 2	
14	26 December 2016 Monday 12 – 2 PM	L-10: Impact of climate change – 3	
15	27 December 2016 Tuesday 12 – 2 PM	L-11: Impact of climate change - 4	
16	28 December 2016 Wednesday	Preparation for test II	
17	29 December 2016 Thursday 12 – 2 PM	Test II	
18	1-2 Jan 2017	Project report preparation	

19	3 January 2017 Tuesday 11:00 – 15:00	Project report presentation	External evaluator: Prof. Dr. Amrit Man Nakarmi from Department of Mechanical Engineering
21	4 Jan 2017 Wednesday 12 – 2 PM	L-13: Technology needs assessment for adaptation and mitigation in the context of Nepal	
22	17 January 2017 Tuesday 12-4 PM	Field trip to Chandragiri Hills Cable Car Station, Thankot	Organized by CARD, IOE and accompanied by Faculty members and CARD staff together with students

The course was conducted by using various methods such as lectures, videos related to climate change, discussions, guest lectures and field visit. The performance of students were evaluated by conducting the assessment and final examination of the course. The evaluation marks were divided as followings:

Test I: 10 marks

Test II: 10 marks

Project report presentation: 10 marks

Project report submission: 10 marks and

Final examination: 60 marks