

Course 1: Making the case for a critical global engineer

Academic coordinator: Dr. Alejandra Boni Aristizábal, professor at Universitat Politècnica de València.

Syllabus

Overview

By its very nature, engineering is bound to society and human development. It seeks to solve complex problems using scientific knowledge and practical experience. Nonetheless, different factors in engineering problems - complexity, interdependence, the rapid advancement of technology, among others – have resulted in an engineering profession focused primarily on the technical.

Contemporary global issues (such as climate change and extreme poverty) are problems with engineering dimensions that require a more holistic approach to be addressed. A new step forward is required in how we view engineers and the profession of engineering.

This course provides participants with an introduction to what is meant by the “global dimension” in engineering. It starts by discussing the relationship between science, technology, and society (STS) from practical and theoretical perspectives, which will prepare participants to critically assess the current state of the engineering profession, and focusing on engineering for development, addressing the link between technology and basic human needs.

The participant will finish the course with a broader understanding of the ethical and social responsibilities of an engineer.

Learning outcomes:

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

1. Compare and contrast historical and contemporary views on engineering for development, applying relevant STS theories.
 2. Construct a set of guidelines or standards governing the social responsibility of engineers in professional practice.
 3. Identify relationships between technology and society, both in theory and practice.
-

The course at a glance:

Session	Week	Topic covered
1	1	The global dimension of engineering
2	1	Science, Technology and Society
3	2	Technology and basic human needs
4	2	Professional and international perspectives of Engineering
5	3	Professional ethics and social responsibility of the engineers
0	3	Final Exam

Estimated time commitment

This course will run for 3 weeks beginning on March 31st 2014. In total, the course should take approximately 20-25 hours to complete, including readings, assignments and activities. Each session is equivalent to two hours in the classroom plus 3 hours of personal study, broken down as follows.

N.	Activity	Estimated time commitment
1	Reading & Coursework	100 minutes
2	Explore Further Materials	60 minutes
3	Review Quizzes	20 minutes
4	Academic Activity	90 minutes
5	Participation in Discussion Forums	(Minimum of) 30 minutes



Course structure:

New lecture materials will be posted every Monday. Once posted, materials will be up for the duration of the course.

Each week, lecture material for two sessions will be posted. The lecture materials for each session will be comprised of one assigned reading, an Academic Activity, and a set of web resources, carefully selected to help participants deepen their understanding of the topics covered.

Session Review Quizzes will be posted online twice per week. They will be graded and passing the Review Quizzes is a requirement for passing the course. (For more information on course grading, please read the section entitled "Passing the Course").

The Academic Activity, included with each session, is designed to test your ability to put into practice what you have learnt during the sessions. **Only 2 of the 5 available Academic Activities will be graded. The course coordinator will announce the Academic Activities to be graded at the beginning of the course.** You will only be required to complete the 2 graded activities.

The Final Exam will take place in the last week of the course. It will be comprised of 30 questions covering all of the course material. Passing the Final Exam is a requirement of the course.

In addition to the graded activities, a discussion forum will run throughout the duration of the course. Each week, the course coordinator will post a discussion question related to the session topics. Participation in the discussion forum is not required to pass the course, and participants' discussion contributions will not be graded. However, students are **strongly encouraged** to participate in the discussion forum as the discussion and debate which will take place in the forums will greatly enhance student learning and topic engagement.

Quizzes/Assignments/Final exam:

Review Quizzes

There are 5 quizzes in total, each comprised of 10 questions and worth 10 possible points. 2 review quizzes will be posted each week, evaluating participants understanding of the weekly session topics. All quizzes count towards the final grade and can be attempted twice. The quiz format is a mixture of True/False and Multiple Choice questions.

Academic activities

Each session includes an academic activity for practicing key concepts learnt. Only 2 academic activities will be evaluated for grading. The course coordinator will indicate at the beginning of the course which activity will be evaluated, as well as provide detailed instructions and evaluation criteria. The completed activity must be uploaded on the



platform upon completion. Activities can be attempted only once; they worth a maximum of 10 points each, for a total of 20 points.

Final exam

The final exam consists of a mix of 30 True/False and Multiple Choice questions covering all the course topics. It worth a maximum of 30 points. It can be attempted twice.

Passing the Course

To pass the course you should:

- Have submitted all review quizzes before the due date
- Have submitted the academic activities before the due date
- Have submitted the final exam before the due date
- Obtain a grade of at least 70 points in total

Grading Policy

Students who successfully complete the course will be offered a Statement of Accomplishment according to the following grading policy.

Grading Policy	
Statement of accomplishment	at least 70 points
Statement of accomplishment with distinction	at least 90 points



Course 1: Making the case for a critical global engineer – COURSE TIMELINE

Course Start: March 31st

Sessions	Learning Outcomes By the end of the course you will be able to:		Due GA (Graded Activity)
Orientation	<ul style="list-style-type: none"> • Navigate the course • Test your prior knowledge of course’s topics • Know the other participants 	WEEK 0	<ul style="list-style-type: none"> • Read carefully the Syllabus • Complete the orientation questionnaire • Attempt quiz “test your knowledge” (ungraded) • Introduce yourself to others participants (Forum)
1. The global dimension of engineering	<ul style="list-style-type: none"> • To visualize the societal and ethical issues within engineering • Consolidate a conceptual framework for the Global Engineer • To identify what are the skills for a Global Engineer • To understand the opportunities and challenges for engineering education 	WEEK 1	<ul style="list-style-type: none"> • Reading & Coursework 1 (Release 31.03) • Quiz 1 (Release 01.04 – Due 04.04) GA • Discussion Forum (Release 01.04.14) • Reading & Coursework 2 (Release 31.03) • Quiz 2 (Release 04.04 – Due 08.04) GA • Academic Activity 1 (Release 03.04 – Due 09.04) GA
2. Science, Technology, Innovation and Society	<ul style="list-style-type: none"> • Provide a broad historic perspective of the evolution of science and technology. • Identify the social and environmental effects of scientific and technological progress. 		



	<ul style="list-style-type: none"> • Clarify the main institutional factors that shape the priorities of scientific and technological systems. • Describe the importance of more inclusive and sustainable pathways for innovation. 		
<p>3. Technology and human basic needs</p>	<ul style="list-style-type: none"> • Visualise the role of technology in international human development • Understand the social aspects related to the implementation of technologies for human development • List the main trends and challenges of some key technologies 		
<p>4. Professional and international perspectives of Engineering</p>	<ul style="list-style-type: none"> • Identify the challenges of current international cooperation together with the relevance of energy access in the global development • Understand why the energy sector is by default a multidisciplinary frame of action • Understand the role of engineers in a multi-stakeholder, multi-objective frame • Define the transversal competences, skills and attitude required to operate in the sustainable development field • Identify features of appropriate solutions and capacity-building activities • Understand the role of academia in preparing these new professional figures 	<p>WEEK 2</p>	<ul style="list-style-type: none"> • Reading & Coursework 3 (Release 07.04) • Quiz 3 (Release 08.04 – Due 11.04) GA • Discussion Forum (Release 08.04) • Reading & Coursework 4 (Release 07.04) • Quiz 4 (Release 11.04 – Due 15.04) GA • Academic Activity 2 (Release 10.04 – Due 16.04) GA



5. Professional ethics and social responsibility of the engineers	<ul style="list-style-type: none">• Become aware of the ethical aspects of engineering.• Be able to identify and apply professional ethical values and duties.• Be able to critically assess the most commonly used ethical business processes (e.g. ethical codes, ethical auditing, etc.) specifically targeted at engineering.	WEEK 3	<ul style="list-style-type: none">• Reading & Coursework 5 (Release 14.04)• Quiz 5 (Release 15.04 – Due 22.04) GA• Exam (Release 16.04 – Due 23.04) GA• Post-course evaluation survey (Rel. 23.04 -Due 27.04)
Final exam			