

## **Course 3: The Global Engineer in Sustainable Human Development**

**Academic coordinator: Mr. Andrew Lamb**, World Federation of Engineering Organizations – WFEO

### **Syllabus**

#### **Overview**

The practice of engineering involves much more than the mastery of technical subjects; in engineering design, non-technical factors and interactions can be just as significant. This is especially true when considering engineering from the perspective of international development work.

This course will provide participants with an overview of “international development” in its multitude of forms. The first three sessions will introduce new conceptions of development and provide a framework by which more specialized concepts of “sustainable” and “human” development can be understood.

Following this, the sessions will discuss theories and ideas such as gender, civic participation and citizenship, and analyse how these related to the definitions of development discussed earlier.

All discussions around development will relate back to engineering - what role does technology play in facilitating or contradicting ideas about development discussed within this course? When discussing specific ideas such as gender and citizenship in international development, the participant will be given the opportunity to reflect on the relationships between these and engineering practice in their own personal contexts.

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#### **Learning outcomes:**

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

1. Describe various theories of relationships between society and technology, and apply theories to develop new theories of socio-technical relationships which integrate a SHD perspective.
2. Compare different methodologies for the structuring and framing of problems which allow for a more holistic and multidisciplinary analysis of contemporary engineering practice.



3. Explain the importance of engaging stakeholders and the public in engineering practice in order to develop a practice more in line with SHD principles.

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**The course at a glance:**

Session	Week	Topic covered
1	1	(Re)Shaping knowledge: the contribution of Sustainability Science
2	1	Linking knowledge with action
3	2	The role of technology for SHD solutions
4	2	Understanding the social dimension
0	3	Final Exam

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**Estimated time commitment**

This course will run for 3 weeks beginning on May 5<sup>th</sup>, 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.

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### **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.

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### **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

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### **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

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**Course 1: The Global Engineer in Sustainable Human Development – COURSE TIMELINE**

**Course Start: May 5<sup>th</sup>**

Sessions	Learning Outcomes By the end of the course you will be able to:		Due <b>GA (Graded Activity)</b>
Orientation	<ul style="list-style-type: none"> <li>• Navigate the course</li> <li>• Know the other participants</li> </ul>	<b>WEEK 0</b>	<ul style="list-style-type: none"> <li>• Read carefully the Syllabus</li> <li>• Complete the orientation questionnaire</li> <li>• Introduce yourself to others participants (Forum)</li> </ul>
1. (Re)Shaping knowledge: the contribution of Sustainability Science	<ul style="list-style-type: none"> <li>• Recognise the complexity of sustainability as a concept</li> <li>• Distinguish sustainability science as an emerging academic discipline and its fundamentals principles of transdisciplinarity.</li> <li>• Identify and understand the differences between disciplinarity, multidisciplinarity, interdisciplinarity and transdisciplinarity.</li> <li>• Differentiate the types of knowledge needed in the context of transdisciplinarity.</li> <li>• Acknowledge the importance of the precautionary principle and transdisciplinarity to deal with environmental hazards and sustainability challenges.</li> </ul>	<b>WEEK 1</b>	<ul style="list-style-type: none"> <li>• Reading &amp; Coursework 1 (Release 05.05)</li> <li>• Quiz 1 (Release 06.05– Due 09.05) <b>GA</b></li> <li>• Discussion Forum (Release 06.05)</li> <li>• Reading &amp; Coursework 2 (Release 05.05)</li> <li>• Quiz 2 (Release 09.05– Due 13.05) <b>GA</b></li> <li>• Academic Activity 1 (Release 08.05– Due 14.05) <b>GA</b></li> </ul>
2. Linking knowledge with action	<ul style="list-style-type: none"> <li>• The existing gap between knowledge and decision making/implementation of decisions.</li> <li>• Different methodological approaches in problem framing/analysis for sustainable solutions.</li> <li>• A method to build analytical frameworks which include different perspectives in order to evaluate contexts and to deal with their specific problems.</li> <li>• The value of a fair combination of technical and human</li> </ul>		



	capabilities.		
3. The role of technology for SHD solutions	<ul style="list-style-type: none"> <li>• Environmental technologies</li> <li>• Technologies for SHD, appropriate technologies</li> <li>• Emerging technologies and their applications in SHD.</li> <li>• Understanding of the internal structures of technologies and the social context in which these details come to have particular meanings.</li> </ul>	WEEK 2	<ul style="list-style-type: none"> <li>• Reading &amp; Coursework 3 (Release 12.05)</li> <li>• Quiz 3 (Release 13.05– Due 16.05) GA</li> <li>• Discussion Forum (Release 13.05)</li> <li>• Reading &amp; Coursework 4 (Release 12.05)</li> <li>• Quiz 4 (Release 16.05– Due 20.05) GA</li> <li>• Academic Activity 2 (Release 15.05– Due 21.05) GA</li> </ul>
4. Understanding the social dimension	<ul style="list-style-type: none"> <li>• Understand the importance of the analysis of stakeholders and policies during all the phases of a project.</li> <li>• Draw the stakeholders' map of a particular context.</li> <li>• Describe actors' perceptions, discourses towards an intervention or a development project.</li> <li>• Analyse relationships among stakeholders, their influence and power that each sector may exert on the development of a project. How actors' engage or offer resistance towards potential changes can affect the success of a project.</li> <li>• Draw some recommendations to promote public participation in a project.</li> <li>• The obstacles or drivers to promote participation.</li> </ul>		
Final exam		WEEK 3	<ul style="list-style-type: none"> <li>• Exam (Release 19.05 – Due 25.05) GA</li> <li>• Post-course evaluation survey (Release 20.05)</li> </ul>