

Western University - Faculty of Engineering
Department of Civil and Environmental Engineering

CEE 3328b – Appropriate Technology for International Development
Course Outline Winter 2024

This course introduces students to the background, conceptual underpinnings, and practical implementation aspects of Appropriate Technology for the purposes of sustainable development. As part of a series of courses in the Structural Engineering and International Development, and Environmental Engineering and International Development programs, the goal of this course is to equip civil engineering students with the skills to successfully undertake challenges in developing countries, countries in transition, and at-need communities in developed countries. The general objectives are for the student to become able to:

- Develop a knowledge base in the background of the appropriate technology movement, identifying its motivation, principles, and evolution.
- Formulate specific engineering challenges existing in developing regions and demonstrate appreciation for the region-specific context of proposed appropriate technology solutions.
- Identify how the standard engineering design process needs to accommodate appropriate technology principles and projects.
- Develop a knowledge base in key fields where technology, appropriately applied, can significantly impact development including water and wastewater treatment, solid waste management, construction, communication, and energy supply.
- Design solutions to open-ended engineering problems in the context of appropriate technology.
- Improve written and oral communication skills associated with complex engineering and development concepts by undertaking individual written compositions, participating in interactive discussions, and presenting projects both orally and in written form.
- Demonstrate professionalism by understanding the roles and responsibilities of the professional engineering in society.
- Appreciate the importance of economics, business practices, and politics in successfully implementing appropriate technology.
- Demonstrate the ability to make life-long learning a priority by managing and taking responsibility for one's own learning and bringing additional educational resources to the group.

Calendar Copy:

The course will introduce the concept of appropriate technology in the context of international development to students. It will examine the application of technologies to critical human needs in development, such as housing, transportation, provision of safe water and sanitation, waste management, and energy (0.5 course).

Prerequisites: Admission to the Environmental Engineering with International Development Option or Structural Engineering with International Development Option.

Antirequisite: None

Note: It is the student's responsibility to ensure that all Prerequisite conditions are met or that special permission to waive these requirements has been granted by the Faculty. It is also the student's responsibility to ensure that they have not taken a course listed as an Antirequisite. The student may be dropped from the course or not given credit for the course towards their degree if they violate the Prerequisite or Antirequisite conditions.

Contact Hours:

3 lecture hours per week;
Attendance at the lectures is mandatory.

2 tutorial hours per week;
Attendance only at scheduled tutorial sessions is mandatory. Other sessions are used for teams to work on the group projects.

Instructor:

Dr. Sabina Rakhimbekova
srakhimb@uwo.ca

Administrative Support: SEB 3005 or civil@uwo.ca

Textbook:

Mastering the Machine Revisited: Poverty, Aid and Technology [Paperback], Ian Smillie (Author), Publisher: Stylus Publishing, LLC (Dec 1 2000). (Purchase of textbook is required)

Other References:

Field Guide to Appropriate Technology [Paperback], Ed: Barret Hazeltine and Christopher Bull, Elsevier, 2003 - Available as an electronic resource through the library website (max 3 users at one time).

Additional reading material will be provided through the course website.

Computing:

Written assignments must be submitted as word processed documents in WORD or PDF formats. All assignments will be submitted via the OWL course website using TURNITIN.

Units:

SI units will be used in lectures and examinations

Course Style:

The pedagogical model is collaborative learning, so the classes will be based mostly on discussions, case studies, ideation sessions rather than lectures. Students are expected to come to class prepared to discuss the assigned readings. The course instructor will provide mentorship and guidance for the students to undertake individual and collective learning processes focused on achieving the course objectives. A substantial reading list will be employed that will provide material for digestion, synthesis, and reflection in individual written assignments and group

discussions in class. Students will research topics and present their findings to the class. Guest speakers will provide case studies that illustrate practical applications of the topic material.

Specific Learning Objectives [GA Indicator – **bold** denotes evaluated indicator]:

By the end of the course, the student should be able to articulate his/her own learning with respect to these key points aligned with the course's specific learning objectives [Graduate Attribute]:

- Describe several contexts in which appropriate technology (AT) could be successfully applied. [IESE1]
- Identify the key features of a region that must be considered for successful application of AT. [IESE1]
- Demonstrate knowledge of the birth and evolution of the AT movement. [KB4]
- Summarize the key aspects of AT projects that are successful and AT projects that have failed. [KB4, IESE1, IESE2]
- Describe promising and/or successful AT approaches in the areas of water, sanitation, agriculture, construction, and energy. [KB4, IESE1]
- Generate a diverse set of candidate engineering design solutions in the context of appropriate technology. [**D2**]
- Design solutions to open-ended engineering problems in the context of appropriate technology [D1, D4].
- Demonstrate ability to analyse the interactions of engineering with economic, social, health, safety, legal and cultural aspects of society. [**IESE1**, EPM1]
- Communicate verbally and through writings how your understanding of AT evolved via the research and readings undertaken during the course [CS2, CS3, LL2].

General Learning Objectives:

E=Evaluate, T=Teach, I=Introduce (*Developing level*)

Knowledge Base	T	Engineering Tools		Impact on Society	E
Problem Analysis	I	Team Work	T	Ethics and Equity	I
Investigation		Communication	T	Economics and Project Management	T
Design	E	Professionalism	I	Life-Long Learning	T

Evaluation:

The final course mark will be determined as follows:

- | | |
|------------------------------|-----------------------------|
| • Reflection Papers 9% | • Individual Assignment 15% |
| • Class Contributions 10% | • Group Project 25% |
| • Group Laboratory report 5% | • Final Examination 30% |
| • Team Debate 6 % | |

Total 100%

Note: (a) **Students must turn in all assignments and achieve a passing grade in this component, to pass this course.** Students who do not satisfy this requirement will be assigned 48% or the aggregate mark, whichever is less.

(b) Students who have failed this course previously must repeat all components of the course. No special permissions will be granted enabling a student to retain assignment or test marks from previous years. Previously completed assignments and laboratories cannot be resubmitted.

(c) Should any of the classes conflict with a religious holiday that a student wishes to observe, the student must inform the instructor of the conflict no later than two weeks before the scheduled class.

Class and Online Contributions

As this is a collaborative style course, you are expected to contribute to the class discussions and the learning of the class. In order to do so, you must prepare the readings carefully. During class, you must listen actively to the class conversation, ask questions of your classmates, offer insights, and contribute meaningfully. It also means that you are respectful of your classmates and their opinions, are punctual and attentive, and do not engage in negative or disruptive behaviours. You are expected to keep your videos on during synchronous lectures during all class discussion and breakout discussion periods. If you have an issue with using your video in zoom, please discuss this with the course instructor.

Students are also encouraged to contribute to the **online forum discussion** in OWL. These forums will be set up around different appropriate technology and development topics. **Posts should include relevant, original, constructive material with well-written summaries (at least 3-5 sentences) of a webpage, news article, podcast etc. that you would like to share with the class.** Students should be regularly monitoring the forum posts, to promote learning and discussion; please go to Forums→Watch and select “Send me an email whenever a new message is posted (to topics that allow notifications).”

It is important to discriminate between class participation and contribution. Class participation focuses on you, whereas class contributions focus on the benefits you accrue to the class. You must engage with the class process in order to contribute to the collective learning of the class. Each student is expected to participate and contribute each week.

Use of English

In accordance with Senate and Faculty Policy, students may be penalised up to 10% of the marks on all assignments, tests, and examinations for the improper use of English. Additionally, poorly written work with the exception of the final examination may be returned without grading. If resubmission of the work is permitted, it may be graded with marks deducted for poor English and/or late submission.

Course delivery with respect to the COVID-19 pandemic

Although the intent is for this course to be delivered in-person, the changing COVID-19 landscape may necessitate some or all of the course to be delivered online, either synchronously (i.e., at the times indicated in the timetable) or asynchronously (e.g., posted on OWL for students to view at their convenience). The grading scheme will not change. Any assessments affected will be conducted online as determined by the course instructor.

Plagiarism:

Students must write their essays, assignments and examinations in their own words. Whenever students take an idea, or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

The University of Western Ontario uses software for plagiarism checking. Students are required to submit their work in electronic form to Turnitin.com for plagiarism checking (accessible through the course website).

Cheating:

University policy states that cheating is a scholastic offence. The commission of a scholastic offence is attended by academic penalties that might include expulsion from the program. If you are caught cheating, there will be no second warning.

For more information on scholastic offenses, please see:

http://www.uwo.ca/univsec/handbook/appeals/scholastic_discipline_undergrad.pdf

Attendance:

Any student who, in the opinion of the instructor, is absent too frequently from class will be reported to the Dean (after due warning has been given). On the recommendation of the Department concerned, and with the permission of the Dean, the student will be debarred from taking the regular final examination in the course.

Accessibility:

Please contact the course instructor if you require material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Services for Students with Disabilities (SSD) at 661-2111 x 82147 for any specific question regarding an accommodation.

Sickness and Other Problems:**Academic Consideration for Absences**

Students should immediately consult with the instructor if they have any problems that could affect their performance in the course. The student should seek advice from the instructor regarding how best to deal with the problem. Failure to notify the instructor (or as soon as possible thereafter) will have a negative effect on any appeal.

<https://www.eng.uwo.ca/undergraduate/academic-consideration-for-absences.html>

Notice:

Students are responsible for regularly checking their email, course website (<https://owl.uwo.ca>).

Consultation:

Students are encouraged to discuss problems with their teaching assistant and/or instructor in tutorial sessions. Individual consultation can be arranged by appointment with the instructor and/or teaching assistant.

Course breakdown:

Engineering Science = 45% = 22.68 AUs

Engineering Design = 30% = 15.12 AUs

Complementary Studies = 25% = 12.6 AUs