

# ABE 593: Achieving Transdisciplinarity (1 Credit)

## Course Description

This course is a supplement to a project-based course where cross-disciplinary collaboration is a major component. Achieving transdisciplinarity is a process that new researchers and practitioners should develop especially when seeking to have impact on grand challenge scale problems. Grand challenges are problems that are often considered by individuals from a variety of disciplinary perspectives, but would benefit from a more comprehensive, collaborative approach. Such projects often involve a community of stakeholders who would benefit from the project's success. Students will be trained in a reflective approach to achieving the core competencies of transdisciplinarity: asking transdisciplinary questions, systems thinking, high performance teaming, stakeholder engagement, and communication.

## Co-requisite Information

Students should be co-enrolled in ABE 452

## Instructors

Name	Contact Information	Office Hours
Luis F. Rodríguez	O: 376C AESB P: +1-217-333-2694 E: lfr@illinois.edu	Accessible to you for reservation via <a href="http://my.aces.illinois.edu/advising">http://my.aces.illinois.edu/advising</a> Open door policy: You may feel free to drop by at any time to room 376C Agricultural Engineering Sciences Building. If my door is open, feel assured that I will make time to talk to you. You should feel free to knock.

## Learning Objectives

- Students will develop their skills in Systems Thinking and Visual Mapping of complex problems
- Students will develop their skills in effective Communication across disciplines
- Students will apply the principles of “High Performing Teams” in establishing their own transdisciplinary teams
- Students will recognize the importance of stakeholder engagement and consider their perspectives when solving problems

## Required Materials

- This course website.
- Your laptop
- Slack
- Trello
- Google Drive

## Selected Readings From the Following Recommended Materials

### *What is Transdisciplinary Research?*

- Gould, M. (2010). GIScience Grand challenge: How can research and technology in this field address big-picture problems? *ArcUser*, Fall, pp. 64-65. Retrieved from: <https://www.esri.com/news/arcuser/1010/files/geochallenges.pdf>
- Lang, D. J., Wiek, A., Bergmann, M., Stauffacher, M., Martens, P., Moll, P., ... Thomas, C. J. (2012). Transdisciplinary research in sustainability science: Practice, principles, and challenges. *Sustainability Science*, 7(1), 25–43. <https://doi.org/10.1007/s11625-011-0149-x>
- NAE. (2019). Grand Challenges—14 Grand Challenges for Engineering. Retrieved December 12, 2019, from NAE Grand Challenges for Engineering website: <http://www.engineeringchallenges.org/challenges.aspx>
- NRC. (2014). *Convergence: Facilitating Transdisciplinary Integration of Life Sciences, Physical Sciences, Engineering, and Beyond*. Washington, DC: National Academies Press.
- Stock, P., & Burton, R. J. F. (2011). Defining Terms for Integrated (Multi-Inter-Trans-Disciplinary) Sustainability Research. *Sustainability*, 3(8), 1090–1113. <https://doi.org/10.3390/su3081090>
- UN. (2018). *The Sustainable Development Goals Report: 2018* (p. 40). Retrieved from United Nations website: <https://unstats.un.org/sdgs/files/report/2018/TheSustainableDevelopmentGoalsReport2018.pdf>

### *High Performing Teams*

- Koelsch R., Kaslon, L., McElroy, L. (2018). High Performing Teams for Wicked Food/Energy/Water Challenges (recorded webinar). Retrieved from: [https://mediaspace.illinois.edu/media/t/1\\_bpk0j0rj](https://mediaspace.illinois.edu/media/t/1_bpk0j0rj)
- Katzenbach, J. R., & Smith, D. K. (2015). *The wisdom of teams: Creating the high-performance organization*. Harvard Business Review Press, Boston, MA. [Semantic Scholar abstract of the book](#)
- Lencioni, P. (2006). *The five dysfunctions of a team*. John Wiley & Sons, Hoboken, NJ. [Wikipedia introduction to Lencioni's book](#)
- Schneider, M. (2017). Google Spent 2 Years Studying 180 Teams. The Most Successful Ones Shared These 5 Traits. Retrieved from: <https://www.inc.com/michael-schneider/google-thought-they-knew-how-to-create-the-perfect.html>

### *Stakeholder Analysis*

- Bullen, P. (2014). Stakeholder Analysis Matrix Template. Retrieved from: <http://www.tools4dev.org/resources/stakeholder-analysis-matrix-template/>
- Emery, M., & Flora, C. (2006). Spiraling-up: Mapping community transformation with community capitals framework. *Community development*, 37(1), 19-35. <https://doi.org/10.1080/15575330609490152>

- Reed, M. S., Graves, A., Dandy, N., Posthumus, H., Hubacek, K., Morris, J., ... & Stringer, L. C. (2009). Who's in and why? A typology of stakeholder analysis methods for natural resource management. *Journal of environmental management*, 90(5), 1933-1949. <https://www.sciencedirect.com/science/article/pii/S0301479709000024>
- Roseke, B. (2019). How to perform a stakeholder analysis. Retrieved from: <https://www.projectengineer.net/how-to-perform-a-stakeholder-analysis/>
- Smartsheet (n.d.). Stakeholder analysis matrix template. Retrieved from: <https://www.smartsheet.com/free-stakeholder-analysis-templates>

### *Communicating Science*

- Alda, Alan. 2018. *If I Understood You, Would I Have This Look on My Face?: My Adventures in the Art and Science of Relating and Communicating*. Random House.
- “Communicating Science Online.” n.d. American Association for the Advancement of Science. Accessed February 25, 2019. <https://www.aaas.org/programs/center-public-engagement-science-and-technology/communicating-science-online>.
- “Communicating to Engage.” n.d. American Association for the Advancement of Science. Accessed February 25, 2019. <https://www.aaas.org/resources/communication-toolkit>.
- Siegrist, M. (2008). Factors influencing public acceptance of innovative food technologies and products, *Trends in Food Science & Technology*, 19, 603- 608
- Sinatra, G. Kienhues, K. & Hofer, B. (2014) Addressing Challenges to Public Understanding of Science: Epistemic Cognition, Motivated Reasoning, and Conceptual Change, *Educational Psychologist*, 49:2, 123-138
- Van der Linden (2015) The social-psychological determinants of climate change risk perceptions: Towards a comprehensive model, *Journal of Environmental Psychology* 41, 112-124
- Visschers, VHM and Siegrist, M. (2014). Find the differences and the similarities: Relating perceived benefits, perceived costs and protected values to acceptance of five energy technologies, *Journal of Environmental Psychology* 40 117e130
- Deb Weitzenkamp. n.d. *Infographics*. Accessed February 25, 2019. <https://www.youtube.com/watch?v=okqv5d3xQ3c&feature=youtu.be>.

### **Basic Course Policies**

#### *Evaluation*

In general, we will adhere to a standard grading scale. This course is graded out of approximately 1000 points distributed below as follows.

A+ > 98.0% (>980)	A 90.0-97.9% (900-979)	A- 88.0-89.9% (880-899)
B+ 85.0-87.9% (850-879)	B 80.0-84.9% (800-849)	B- 78.0-79.9% (780-799)
C+ 75.0-77.9% (750-779)	C 70.0-74.9% (700-749)	C- 68.0-69.9% (680-699)
D+ 65.0-67.9%(650-679)	D 60.0-64.9% (600-649)	

F <60% (<600)

However, I will calculate both curved and standard grades and the highest of the two possible scores will be awarded to the student. You will be evaluated based on the following three categories of evaluation.

*Participation (15% of total grade; 150 points)*

Class participation will be quantitatively assessed for each individual in this class and calculated to the maximum extent possible using the following assessments. Active and sincere participation in this course is essential for its success. You will all engage with your peers to analyze complex grand challenge scale problems.

Participation is considered at every class session using participation-based assignments which must be completed during your class session. In case of an emergency that causes you to miss multiple class sessions (often 3 or more is a major concern in any class), please contact the [Student Assistance Center in the Office of the Dean of Students](#). Please read the [University's Revised Student Code of Conduct](#), which considers class attendance closely if you have any concerns.

These participation assignments are designed to ensure that all students can actively reflect on all projects. This provides a structure for students to add their expertise towards these projects in a safe and anonymous manner, while building their individual transdisciplinary core competencies. Feedback provide during these intervals will be reviewed by project teams, prioritized and acted upon. Students are encouraged to provide their feedback directly to project teams on a regular basis.

Group Peer Review: Several assignments throughout the semester are group assignments. You will be asked to quantitatively review the level of participation of you and your group team members at several intervals throughout the semester. Your participation in these assessments will be recorded and used to determine your level of participation during group activities.

*Homework on Developing Transdisciplinarity (15% of total grade, 150 divided across several homework assignments)*

Homework packets testing the theory, problems solving, and achievement of the core competencies of transdisciplinary are assigned on a weekly basis. This homework will be completed individually.

*Reflection on Transdisciplinary Projects (70% of total grade, 700 points in total divided across several parallel projects)*

This course is coupled to other project-based courses. You will actively reflect on your team's achievement of transdisciplinary core competencies. You will document what you have learned in the context of your group projects and propose potential approaches for your team to achieve higher quality products. These potential approaches will be prioritized by the class in collaboration with our stakeholders, thus modifying your team's approach to resolving project challenges. A scaffolded process is utilized here to facilitate the development and review of core competencies.

**Table of Topics and Classroom Activities (1 hr)**

*Typically delivered in one class meeting, 50 minutes per week*

Topic	Contact Hour
Stating with Why: Asking transdisciplinary questions	1

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Systems Thinking: Setting the Agenda	1
Systems Thinking: Performance Indicators	1
Systems Thinking: Unintended Consequences	1
Systems Thinking: Visualization of Complex Problems	1
Systems Thinking: Evaluating Success	1
High Performance Teams: Accountability	1
High Performance Teams: Team Contracts	1
High Performance Teams: Identifying Roles and Responsibilities	1
High Performance Teams: Maintaining Accountability	1
Environmental Justice	1
Understanding your Stakeholders: Community Capitals Framework	1
Communications: Visual Communications	1
Communications: With Lay Audiences	1
Communications: Engaging with Stakeholders	1
Total	15

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## Sample Course Calendar

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Week ABE 491 (1 hrs, For Graduates and Returning Undergraduates)

Meeting 3 (50 minutes)

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1	Stating with Why: Asking Transdisciplinary Questions
2	Systems Thinking: Setting the Agenda
3	High Performance Teams: Identifying Roles and Responsibilities
4	High Performance Teams: Establishing Accountability
5	High Performance Teams: Team Contracts
6	Understanding your Stakeholders: Community Capitals Framework
7	Communications: Engaging with Stakeholders
8	Environmental Justice
9	High Performance Teams: Maintaining Accountability
10	Systems Thinking: Visualization of Complex Problems
11	Systems Thinking: Performance Indicators
12	Systems Thinking: Unintended Consequences
13	Communications: Visual Communications
14	Communications: With Lay Audiences
15	Systems Thinking: Evaluating Success

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### STANDARDS OF PROFESSIONAL BEHAVIOR

- Turn off your cell phone at the start of every class. Any exceptions require instructor approval.
- Critical thinking is expected and discussions reflect individual investment. Keep criticisms issue-based and factual. Personal attacks are not tolerated under any circumstances.
- Energy! We are actively working in each class period. You should arrive ready to work. Get your rest the night before. Stay up to date on your assignments.

### Academic Integrity

The University of Illinois at Urbana-Champaign Student Code should also be considered as a part of this syllabus. Students should pay particular attention to Article 1, Part 4: Academic Integrity. Read the Code at the following URL: <http://studentcode.illinois.edu/>.

Academic dishonesty may result in a failing grade. Every student is expected to review and abide by the Academic Integrity Policy: <http://studentcode.illinois.edu/>. Ignorance is not an excuse for any academic dishonesty. It is your responsibility to read this policy to avoid any misunderstanding. Do not hesitate to ask the instructor(s) if you are ever in doubt about what constitutes plagiarism, cheating, or any other breach of academic integrity.

## **Special Considerations: Caring for your health and safety**

### *Diversity and Integration Statement*

The Instructional Team is committed to the creation of a fully inclusive community that welcomes diversity and encouraged integration along a number of dimensions, including, but not limited to, race, ethnicity and national origins, gender and gender identity, sexuality, disability status, class, age, or religious beliefs. We especially recognize that we are learning together in the midst of the Black Lives Matter movement, that Black, Hispanic, and Indigenous voices and contributions have largely either been excluded from, or not recognized in, food, agriculture, or society writ large, and that both overt racism and micro-aggressions threaten the well-being of our students and our university community. Indeed, the effectiveness of this course is dependent upon each of us fostering the creation of a safe and encouraging learning environment that allows for the open exchange of ideas while also ensuring equitable opportunities and respect for all of us. Everyone is expected to help establish and maintain an environment where students, staff, and faculty can contribute without fear of personal ridicule, or intolerant or offensive language. If you witness or experience racism, discrimination, micro-aggressions, or other offensive behavior, you are encouraged to bring this to the attention of the course director if you feel comfortable. You can also report these behaviors to the Bias Assessment and Response Team (BART) (<https://bart.illinois.edu/>). Based on your report, BART members will follow up and reach out to students to make sure they have the support they need to be healthy and safe. If the reported behavior also violates university policy, staff in the Office for Student Conflict Resolution may respond as well and will take appropriate action.

### *Students with Disabilities*

To obtain disability-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor as soon as possible. To ensure that disability-related concerns are properly addressed from the beginning, students with disabilities who require assistance to participate in this class should contact Disability Resources and Educational Services (DRES) (<http://www.disability.illinois.edu/>) and see the instructor as soon as possible. If you need accommodations for any sort of disability, please speak to me after class, or make an appointment to see me, or see me during my office hours. DRES provides students with academic accommodations, access, and support services. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TDD), or e-mail a message to [disability@illinois.edu](mailto:disability@illinois.edu).

### *Additional Statement on Accessibility during COVID-19*

This semester presents new challenges for all of us, and many students may not know right away how COVID-19 requirements and procedures may affect their classroom experience. I am committed to working with you to create a rigorous and flexible space for learning. If at any time you are experiencing difficulty in any aspect of this course due to social distancing and the mandatory wearing of face coverings, you are welcome to share your concerns with me. Please note that you never need to share diagnosis or medical information with me. The staff members with Disability Resources and Educational Services and the Office for Access & Equity are also available to provide guidance and advice if you have questions or concerns related to a visible or invisible disability.

- Disability Resources and Educational Services ([disability.illinois.edu](http://www.disability.illinois.edu/))
- Office for Access & Equity ([oae.illinois.edu](http://www.oae.illinois.edu/))

### *Emergency Response Recommendations*

Emergency response recommendations can be found at the following website: <http://police.illinois.edu/emergency-preparedness/>. I encourage you to review this website and the campus building floor plans website within the first 10 days of class: <http://police.illinois.edu/emergency-preparedness/building-emergency-action-plans/>.

### *Family Educational Rights and Privacy Act (FERPA)*

Any student who has suppressed their directory information pursuant to Family Educational Rights and Privacy Act (FERPA) should self-identify to the instructor to ensure protection of the privacy of their attendance in this course. See <https://registrar.illinois.edu/academic-records/ferpa/> for more information on FERPA.

### *Sexual Misconduct Policy and Reporting*

The University of Illinois is committed to combating sexual misconduct. Faculty and staff members are required to report any instances of sexual misconduct to the University's Title IX and Disability Office. In turn, an individual with the Title IX and Disability Office will provide information about rights and options, including accommodations, support services, the campus disciplinary process, and law enforcement options.

A list of the designated University employees who, as counselors, confidential advisors, and medical professionals, do not have this reporting responsibility and can maintain confidentiality, can be found here: [wecare.illinois.edu/resources/students/#confidential](http://wecare.illinois.edu/resources/students/#confidential).

Other information about resources and reporting is available here: <http://wecare.illinois.edu>.

### *Counseling and Personal Concerns*

Successfully negotiating the demands of undergraduate classes, work, and life requires consistent attention. It's okay to seek professional help, and you just may acquire skills that will benefit every area of your life. The [University of Illinois Counseling Center](#) offers comprehensive services ranging from self-help materials to individual and couples counseling and suicide prevention, and features same-day appointments at no cost to you. Take advantage of them at before you get in over your head.