Course Name: Global Environmental Change: Using Data to Inform Decisions
Course Number: BEE 411/511
Term Offered: Fall & Spring
Credits: This course combines approximately 90 hours of instruction, online activities and assignments for 3 credits.

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Course Description
Students will explore global environmental change questions using an online data sharing and mapping platform, Data Basin (www.databasin.org). This course will guide students through 1) an introduction to geographic information resources (GIS) and online mapping resources, 2) an exploration and critique of conservation data and information using on-line tools and; 3) a practical application developing an approach and gathering spatial datasets to address a global environmental change question.

Communications
Students will post all course-related questions in the Course Blog so that the whole class benefits from conversations with the instructors. Students will email the instructor for matters of a personal nature. The instructor will reply to course-related questions and email within 24-48 hours.

Technical Assistance
If students experience computer difficulties, need help downloading a browser or plug-in, assistance logging into the course, or if students experience any errors or problems while in this online course, they should contact the OSU Help Desk for assistance. Students can call (541) 737-3474, email osuhelpdesk@oregonstate.edu or visit the OSU Computer Helpdesk online.

Blackboard
The course will be delivered via Blackboard where students will interact with their classmates and with the instructor. Within the course Blackboard site students will access the learning materials, such as the syllabus, class discussions, assignments, projects, and quizzes. To preview how an online course works, students should visit the E-campus Course Demo. For technical assistance, students should visit Ecampus Technical Help.

Measurable Student Learning Outcomes

BEE 411 Students will be able to accomplish the following upon completion of the course:

Course Learning Outcomes	**A)** Ability to apply knowledge of Math, Science & Engineering	**B)** Ability to Design & Conduct Experiments - Analyze & Interpret Data	**C)** Ability to Design System Component or Process to Meet Desire Needs	**D)** Ability to Function on Multi-Disciplinary Team	**E)** Ability to Identify, Formulate & Solve Engineering Problems	**F)** Understanding of Professional & Ethical Responsibility	**G) Ability** to Communicate Effectively	**H) Broad** Education to Understand Impact of engineering Solutions in Global & Societal Context	**I)** Recognition of the Need for, and Ability to Engage in Life-long Learning	**J)** Knowledge of Contemporary Issues	**K)** Ability to Understand Techniques, Skills, and modern Engineering Tools for Engineering Practice	**L)** Ability to Apply Knowledge in Specialized Areas Related to Ecological Engineering	**N)** Ability to Model and Design Ecological Systems	**O)** Awareness of Forces Impacting Design & Decision Making. i.e., Resource Limitations, system Constraints & Identified Goals for Improvements	**Evaluation of Student Performance**
1. Identify global environmental change issues and become aware of the power of resource mapping to address challenging issues and find solutions to existing problems.							X	X	X	X		X			1. Students will read two articles per week and demonstrate their understanding by posting their reviews and asking questions on the class blog 2. Students will explore online mapping resources and learn how to apply data to environmental issues 3. Students will demonstrate their knowledge and understanding at the mid-term exam
2. Learn to use scientifically rigorous methods to explore complex issues related to global environmental change.		X	X				X	X		X		X	X		1. Students will apply newly acquired knowledge of information and spatial data to their own class project 2. The project report will demonstrate the students ability to chose robust methods to address an global change issue.
3. Explore and analyze spatial data and related documentation, applying appropriate		X									X		X		1. Students will use online data sharing sites (such as Data Basin) to find spatial data and evaluate the usefulness

spatial data and analysis tools to find answers to environmental questions.															of these data to answer their question on global environmental change 2. Students will demonstrate their understanding and knowledge at the mid-term exam
4. Synthesize their research results to develop a set of proposed solutions to solve a global environmental change issue of their choice.							X					X			1. Students will write a set of answers to a particular global change question of their choice for a final project presentation and report.
5. Evaluate the value of peers work based on their newly acquired knowledge.				X		X	X					X		X	1. Students will constructively critiquing their peers' final presentations

BEE 511 Students will be able to accomplish the following upon completion of the course:

1***. Identify global environmental change issues and become aware of the power of resource mapping to address challenging issues and find solutions to existing problems.***

Student will do this by reading three articles per week, watching weekly presentations, exploring online mapping resources and demonstrating their knowledge and understanding by participating in class session discussions and writing blog reviews about weekly articles. The mid-term exam will test their ability to absorb the information.

2. ***Learn to use scientifically rigorous methods to explore complex issues related to global environmental change.***

Students will do this by applying their newly acquired knowledge and spatial data to their own class project. Their final report will demonstrate their ability to identify and use robust methods to address a global issue.

3. ***Explore and analyze spatial data and related documentation, applying appropriate data and analysis tools to find answers to environmental questions***.

Students will do this by using online data sharing site (such as Data Basin) to find relevant spatial data and evaluate ther usefulness to answer their global environmental change question. Students will demonstrate their understanding and knowledge at the mid-term exam.

4. ***Synthesize their research results to develop a set of proposed solutions to solve a global environmental change issue of their choice***.

Students will do this by providing a set of answers to a particular global change question of their choice in a final project presentation and report.

5. ***Evaluate the value of peers work based on their newly acquired knowledge***.

Student will do this by constructively critiquing the work of their peers 1) during the project design phase, reviewing undergraduate and graduate methods reports, and 2) providing comments on their peers' final projects.

Slash Course Distinction

Assignments	Schedule	Undergraduate - BEE 411	Graduate - BEE 511
Reading weekly articles provided by instructor	Weeks 1,2,3,4,5,6,8	2 out of 3	3 out of 3
Writing reviews of journal articles provided	Week 1,3	Discussion comment	Blog about articles read
Written comments about on-line sites	Week 2	Spreadsheet will be provided by instructor	Spreadsheet will be provided by instructor
Mid-term exam	Week 5	Online Exam will be administered	No mid-term for Graduate Students
Writing reviews of databasin.org datasets	Week 6	1 dataset review posted	3 datasets review posted
Writing description of tools used in final project	Week 7	1 page description per tool posted	1 page description per tool and 1 review of 2 descriptions posted
Final project			
* Abstract	Week 4	posted	posted
* Methods	Week 5	posted	posted
* Tools description	Week 7	posted	posted
* Presentation	Week 9	posted	posted
* Final report	Week 10	5 pages	10 pages
* Presentation review	Week 10	2 presentation reviews	4 presentation reviews

Evaluation of Student Performance

BEE 411 Students will be evaluated:

15% - Class participation (blog posts and comments)
20% - Project proposal
20% - **Mid-term**
20% - Reviews
25% - **Final Presentation/Report**
100% total points

BEE 511 Students will be evaluated:

30% - Class participation (blog posts and comments)
20% - Project proposal
20% - Reviews
30% - Final Presentation/Report
100% total points

Course Content (Spring Term Sunday March 31 until Friday June 13 , 2014)

Week	Topic	Reading Assignments	Learning Activities	Due Date
1	**Introduction to course and students**	Bachelet, D. Comendant, T. and Strittholt, J. (2008) *Web platform for sharing spatial data and manipulating them online.* EOS, Transactions American Geophysical Union 92 (14):118-119 van Oort, P. et al. (2010) *Social networks in spatial data infrastructures.* GeoJournal 75(1):105-118 Hunter, G. Wachowics, M. and Bregt, A. (2003) *Understanding Spatial Data Usability.* Data Science Journal 2:79-89	1) Watch weekly presentations and read weekly articles 2) Write a 500-words introduction 3) Create own Data Basin profile	1) Before Monday April 7 2) Friday April 4 @ 5pm (PST) 3) Friday April 4 @ 5pm (PST)
2	**Introduction to Data Basin (www.databasin.org)**	Haak, L. et al. (2012) *Standards and Infrastructure for Innovative Data Exchange.* Information Science Sun, X. et al. (2012) *Development of Web-based visualization platform for climate research using Google Earth.* Computers & Geosciences 47:160-168 Borgman, C. (2012) *The conundrum of sharing research data.* Journal of the American Society for Information Science and Technology 63(3):1059-1078	1) Watch weekly presentations and read weekly articles	1) Before Monday April 14

3	**Exploration of Data Basin equivalent web sites**	Scheffer, M. et al. (2012) *Anticipating Critical Transitions.* Science 38: 228-334 Lenton, T. et al. (2008) *Tipping elements in Earth's climate system.* Proceedings of the National Academy of Sciences of the United State of America 105(6):1786-1793 Lemos, M. Kirchloff, C and Ramprasad, V. (2012) *Narrowing the climate information usability gap*. Nature 2(11):789-794	1) Watch weekly presentations and read weekly articles 2) Complete the Data Sharing Site Matrix worksheet 3) Graduate students post on blog 4) Undergraduate students post comments for this week	1) Before Monday April 21 2&4) Friday - April 18 at 5pm (PST) 3) Wednesday - April 16 at 5pm (PST)
4	**Choose a global change question that requires access to shared spatial data**	Fernandez, M.A., Blum, S.B., Reichle, S., Guo, Q., Holzman, B.A., & H. Hamilton. (2009) *Locality uncertainty and the differential performance of four common niche-based modeling techniques.* Biodiversity Informatics 6:36-62 Loarie, S.R., Duffy, P.B., Hamiliton, H., Asner, G.P., Field, C.B. & D.D. Ackerly. (2009) *The velocity of climate change.* Nature 462:1052-1055 Poulter, B, L Aragao, J Heinke, A Rammig, K Thonicke, F Langerwisch, U Heyder and W Cramer. (2010) *Net biome production of the Amazon Basin in the 21st century*. Global Change Biology 16(7):2062-2075. DOI: 10.1111/j.1365-2486.2009.02064.x.	1) Watch weekly presentations and read weekly articles 2) Write 500-words abstract for final project 3) Graduate students post on blog 4) Undergraduate students post comments for this week	1) Before Monday April 28 2&4) Friday - April 25 at 5pm (PST) 3) Wednesday - April 23 at 5pm (PST)
5	**GIS Refresher and Data Exploration**	C. J. Vörösmarty et al. (2010) *Global threats to human water security and river biodiversity*. Nature 467:555-561. Zhao, M. and Running, S. W. (2010) *Drought-induced reduction in global terrestrial net primary production from 2000 through 2009*. Science 329(5994):940 - 943 (doi: 10.1126/science.1192666). Allen, C. D. et al. (2010) *A global overview of drought and heat-*	1) Watch weekly presentations and read weekly articles 2) Watch the "How to Create a Map" screen-cast, and create your own map - submit PDF 3) Graduate students post on blog	1) Before Monday May 5 2&4) Friday - May 2 at 5pm (PST) 3) Wednesday - April 30 at 5pm (PST)

		induced tree mortality reveals emerging climate change risks for forests. Forest Ecology and Management 259(4):660-684.	4) Undergraduate students post comments for this week 5) Undergraduate mid-term	5) Wednesday - April 30 at 5pm (PST)
6	**Data Standards/Quality control**	Li, D., Zhang, J. and Wu, H. (2012) *Spatial data quality and beyond.* International Journal of Geographical Information Science 26(12):2277-2290 Delavar, M. and Devillers, R. (2010) *Spatial Data Quality: From Process to Decisions*. Transactions in GIS 14(4):379-386 Devillers, R. et al. (2010) *Thirty Years of Research on Spatial Data Quality: Achievements, Failure, and Opportunities.* Transactions in GIS 14(2):387-400	1) Watch weekly presentations and read weekly articles 2) Complete and submit Data Review Guidelines worksheet 3) Graduate students post on blog 4) Undergraduate students post comments for this week	1) Before Monday May 12 2&4) Friday- May 9 at 5pm (PST) 3) Wednesday - May 7 at 5pm (PST)
7	**Data Basin Tools**	Introduction to EEMS Modeling	1) Watch weekly presentations and read weekly articles 2) Graduate students post on blog 3) Undergraduate students post comments for this week	1) Before Monday May 19 2) Wednesday - May 14 at 5pm (PST) 3) Friday - May 16 at 5pm (PST)
8	**Data Analysis**	Cross, M. Zavaleta, E. Bachelet, D. Brooks, M. Enquist, C. Fleishman, E. Graumlich, L. Groves, C. and Hansen, L. et. al. (2012) *The Adaptation for Conservation Targets (ACT) Framework: A Tool for Incorporating Climate Change into Natural Resource Management*. Environmental Management doi 10.1007/s00267-012-9893-7 Franklin, J., Davis, F. W., Ikegami, M., Syphard, A. D., Flint, L. E., Flint, A. L. and Hannah, L. (2012)	1) Watch weekly presentations and read weekly articles 2) Submit 1 page description of analysis methods 3) Graduate students post on blog 4) Undergraduate students post	1) Before Monday May 26 2&4) Friday - May 23 @ 5pm (PST) 3) Wednesday - May 21 at 5pm (PST)

		Modeling plant species distributions under future climates: how fine scale do climate projections need to be? Global Change Biology doi: 10.1111/gcb.12051 Morrison, S.A., Sillett, T.S., Ghalambor, C.K., Fitzpatrick, J.W., Graber, D.M., Bakker, V.J., Bowman, R., Collins, C.T., Collins, P.W., Delaney, K.S., Doak, D.F., Koenig, W.D., Laughrin, L., Lieberman, A.A., Marzluff, J.M., Reynolds, M.D., Scott, J.M., Stallcup, J.A., Vickers, W. and Boyce, W.M. (2011) *Proactive Conservation Management of an Island-endemic Bird Species in the Face of Global Change*. BioScience 61(12): 1013-1021	comments for this week	
9 Dead-week	**Student Projects**		1) Record Final Presentations using Brain Shark 2) Watch peers presentations	1) Friday - May 30 @ 5pm (PST) 2) Before Monday - June 2
10	**Critique of Students Project**		1) Submit final report 2) Submit peer reviews/evaluations	1& 2) Friday - June 6 @ 5pm (PST)

Course Policies

Discussion Participation

Students are expected to participate in all graded discussions. While there is great flexibility in online courses, this is not a self-paced course. Students will need to participate in class discussions at least once each week due by the end of each week. Graduate students will be assigned one week during the term to write a 1500+ word blog post and all undergraduate students will participate by writing a 250+ word response each week, due on Friday of that week.

Incompletes

Incomplete (I) grades will be granted only in emergency cases (usually only for a death in the family, major illness or injury, or birth of a child), and if the student has turned in 80% of the points possible (in other words, usually everything but the final paper). If students are having any difficulty that might prevent them completing the coursework, they should not wait until the end of the term; instead, they should let the instructor know right away.

Statement Regarding Students with Disabilities

Accommodations are collaborative efforts between students, faculty and Disability Access Services (DAS) with accommodations approved through DAS. Students are responsible for contacting the faculty member in charge of the course prior to or during the first week of the term to discuss accommodations. Students who believe they are eligible for accommodations but who have not yet obtained approval through DAS should contact DAS immediately at 541-737-4098.

Expectations for Student Conduct

Student conduct is governed by the university's policies, as explained in the Office of Student Conduct: Information and Regulations.

Academic Integrity

Students are expected to comply with all regulations pertaining to academic honesty. For further information, visit Avoiding Academic Dishonesty, or contact the office of Student Conduct and Mediation at 541-737-3656.

OAR 576-015-0020 (2) Academic or Scholarly Dishonesty:

a) Academic or Scholarly Dishonesty is defined as an act of deception in which a student seeks to claim credit for the work or effort of another person, or uses unauthorized materials or fabricated information in any academic work or research, either through the student's own efforts or the efforts of another.

b) It includes:

(i) CHEATING - use or attempted use of unauthorized materials, information or study aids, or an act of deceit by which a student attempts to misrepresent mastery of academic effort or information. This includes but is not limited to unauthorized copying or collaboration on a test or assignment, using prohibited materials and texts, any misuse of an electronic device, or using any deceptive means to gain academic credit.

(ii) FABRICATION - falsification or invention of any information including but not limited to falsifying research, inventing or exaggerating data, or listing incorrect or fictitious references.

(iii) ASSISTING - helping another commit an act of academic dishonesty. This includes but is not limited to paying or bribing someone to acquire a test or assignment, changing someone's grades or academic records, taking a test/doing an assignment for someone else by any means, including misuse of an electronic device. It is a violation of Oregon state law to create and offer to sell part or all of an educational assignment to another person (ORS 165.114).

(iv) TAMPERING - altering or interfering with evaluation instruments or documents.

(v) PLAGIARISM - representing the words or ideas of another person or presenting someone else's words, ideas, artistry or data as one's own, or using one's own previously submitted work. Plagiarism includes but is not limited to copying another person's work (including unpublished material) without appropriate referencing, presenting someone else's opinions and theories as one's own, or working jointly on a project and then submitting it as one's own.

c) Academic Dishonesty cases are handled initially by the academic units, following the process outlined in the University's Academic Dishonesty Report Form, and will also be referred to SCCS for action under these rules.

Conduct in this Online Classroom

Students are expected to conduct themselves in the course (e.g., on discussion boards, email postings) in compliance with the university's regulations regarding civility.

Tutoring

NetTutor is a leading provider of online tutoring and learner support services, fully staffed by experienced, trained and monitored tutors. Students connect to live tutors from any computer that has Internet access. NetTutor provides a virtual whiteboard that allows tutors and students to work on problems in a real time environment.They also have an online writing lab where tutors critique and return essays within 24 to 48 hours. Access NetTutor from within your Blackboard class by clicking on the Tools button in your course menu.

OSU Student Evaluation of Teaching

Course evaluation results are extremely important and are used to help the instructor improve this course and enhance the learning experience of future students. Results from the 19 multiple choice questions are tabulated anonymously and go directly to instructors and department heads. Student comments on the open-ended questions are compiled and confidentially forwarded to each instructor, per OSU procedures. The online Student Evaluation of Teaching form will be available toward the end of each term, and students will be sent instructions via ONID by the Office of Academic Programs, Assessment, and Accreditation. Students will log in to “Student Online Services” to respond to the online questionnaire. The results on the form are anonymous and are not tabulated until after grades are posted.