Please attach/submit additional documents as needed to fully complete each section of the form.

I. COURSE INFORMATION

Department: Environmental Studies
Course Title: Environmental Science
Lab Status: X Without Lab

Type of Request: Renew
Rationale: This is a core course in Environmental Studies curriculum and serves as a foundation for many students.

*If course has not changed since the last review and is taught by the same tenure-track faculty member, you may skip sections III-V.

JUSTIFICATION FOR COURSE LEVEL

Normally, general education courses will not carry pre-requisites, will carry at least 3 credits, and will be numbered at the 100-200 level. If the course has more than one pre-requisite, carries fewer than three credits, or is upper division (numbered at the 300 level or above), provide rationale for exception(s).

Not Applicable. Course has no prerequisites, is 3 credits, is lower division

ADDITIONAL INFORMATION (FOR OCHE DATABASE):
In which MUS Core Category, does this course fit? Natural Science
Does the course include content regarding cultural heritage of American Indians? No

II. ENDORSEMENT / APPROVALS

* Instructor: Vicki Watson
  Phone / Email: 243-5153; vicki.watson@umontana.edu
  Signature: Date

Program Chair: Phil Condon
Signature: Date

Dean: Chris Comer
Signature: Date

*Form must be completed by the instructor who will be teaching the course. If the instructor or the course changes before the next review, the new instructor must be provided with a copy of the form prior to teaching the course.

III. DESCRIPTION AND PURPOSE

General Education courses must be introductory and foundational within the offering department or within the General Education Group. They must emphasize breadth, context, and connectedness; and relate course content to students' future lives: See Preamble

Course has not changed & is taught by the same tenure-track faculty member as when last approved, hence skip sections III-V

IV. CRITERIA

BRIEFLY EXPLAIN HOW THIS COURSE MEETS THE CRITERIA FOR THE GROUP.

1. Courses explore a discipline in the natural sciences and demonstrate how the scientific method is used within the discipline to draw scientific conclusions:
Course has not changed & is taught by the same tenure-track faculty member as when last approved, hence skip sections III-V

2. Courses address the concept of analytic uncertainty and the rigorous process required to take an idea to a hypothesis and then to a validated scientific theory;
3. Lab courses engage students in inquiry-based learning activities where they formulate a hypothesis, design an experiment to test the hypothesis, and collect, interpret, and present the data to support their conclusions.

V. STUDENT LEARNING GOALS

BRIEFLY EXPLAIN HOW THIS COURSE WILL MEET THE APPLICABLE LEARNING GOALS.

1. Understand the general principles associated with the discipline(s) studied.

Course has not changed & is taught by the same tenure-track faculty member as when last approved, hence skip sections III-V

2. Understand the methodology and activities scientists use to gather, validate and interpret data related to natural process
3. Detect patterns, draw conclusions, develop conjectures and hypotheses, and test them by appropriate means and experiments.
4. Understand how scientific laws and theories are verified by quantitative measurement, scientific observation, and logical/critical reasoning.
5. Understand the means by which analytic uncertainty is quantified and expressed in the natural sciences.

VI. ASSESSMENT

A. HOW ARE THE LEARNING GOALS FOR THE GENERAL EDUCATION GROUP MEASURED?

Describe how you will determine that students have met each of the General Education Learning Goals. This should include specific examples of assignments, rubrics or test questions that directly measure the General Education learning goals. (See Example)

Please attach or provide a web link to relevant assessment materials.

Mastery of knowledge about Environmental Science (& achievement of the GE Learning goals) are assessed by critically evaluating the quality of answers on in-class essays, discussion section participation, reports on required applied environmental science service projects and reports on field trips or research projects (choice of these).

For each of the learning goals below, examples of exam questions or report requirements are provided.

Understand the general principles associated with the discipline(s) studied. 8 example questions:

Ecosystem Services

a) What is meant by an ecosystem service? Briefly explain at least 8 examples of ecosystem services from the Ecological Society’s web site or Gretchen Daily’s paper or the Christensen text.

b) Select either pollination OR water purification. Explain how ecosystems provide this service and how humans are benefitted by the service. What would it cost to provide this service artificially?

c) What human activities interfere with this service? What can we do to restore and protect this service?

Ecosystem Connections

a) The abundance & diversity of life in an ecosystem depends on the efficiency of energy capture & transfer up the food chain. Explain this statement and give examples. Explain some of the main ways humans affect these efficiencies both positively and negatively.

b) Explain what characterizes sedimentary cycles and atmospheric cycles. Give an example of each kind of cycle and explain the main ways that humans affect each kind of cycle.

c) What are some important ways parts of ecosystems are connected (include physical & biological examples)? What is meant by the statement – “You cant do just one thing – our actions have many unexpected, indirect effects.”

Water Cycle
a) List 8 ways that humans alter the water cycle (according to p22 of the course pack). For each of these 8 ways, briefly describe what you consider to be the main negative effects on the Clark Fork River (and/or its tributaries & aquifers). This online slide show (www.umt.edu/clarkforkslideshow) has some examples as did the class field trips on the Clark Fork and Blackfoot Rivers.

b) Water cycle changes have profoundly affected the Clark Fork in the following ways: 1) changed habitat and biodiversity; 2) changed river productivity, 3) changed material cycles and 4) affected human use of water resources. For each one of these 4 types of effects, state which one of the 8 types of water cycle changes you think has most negatively affected this aspect of the river and explain what the effect has been. How could this effect be reversed or reduced? What can you do personally to reduce the effects of water cycle change on the Clark Fork?

Community Concepts

a) Define & give examples of competition, predation, mutualism & symbiosis. What is meant by the statement: “Every species plays multiple roles in its community”? 

b) Explain what is meant by each of the following terms & how we can use information from these species to better conserve communities: Indicator species, umbrella species, keystone species. Give an example of each.

c) What is the importance of each of these kinds of interactions to the overall productivity and diversity of their community: Ruminants & their gut bacteria, N fixing bacteria & legumes, mycorhiza, lichens, coral.

d) Why do some exotic species do poorly when introduced to a new community while others outcompete native species? What are the advantages and disadvantages of using specialists & generalists for biocontrol?

e) What is meant by disturbance? What general pattern does a community follow after a major disturbance? How can disturbance reduce biodiversity? How can it increase biodiversity? Give examples.

Species & Populations

a) Define and give examples of species, population, gene pool and evolution (micro and macro).

b) Briefly explain 5 processes that cause changes in gene pools.

c) Why is genetic diversity important to a species’ chances of long term survival?

d) Briefly explain at least 5 characteristics that make a species extinction prone & why?

Biodiversity

a) Explain each of these kinds of biodiversity: habitat diversity, species diversity, genetic diversity.

b) Explain the 4 greatest threats to biodiversity according to the Wilcove article in Bioscience discussed in class?

c) Which biological community types are most threatened and why? Discuss at least 4 threatened community types.

d) List and explain 4 reasons it is important to maintain biodiversity. That is, why do we maintain biodiversity?

e) List and explain key parts of a strategy to maintain biodiversity. That is, how do we maintain biodiversity?

Population Growth, Regulation and Carrying Capacity

a) Explain what factors determine how fast a population can grow? (i.e., what determines rate of growth r?)

b) Explain what factors determine how large a population can grow? (i.e., What determines carrying capacity K?)

c) What is meant by living on Earth Principal vs living on Earth Interest?

d) What is meant by ‘sustainable use of resources & ecosystems’? Explain a resource example & an ecosystem example.

e) What is meant by ‘unsustainable use’, that is, ‘degrading, depleting or mining a resource or ecosystem’? Explain a resource example and an ecosystem example.

f) Explain what Garret Hardin means by ‘cultural carrying capacity’ (see fac pac or http://dieoff.org/page46.htm)

Ecological Footprint -- Calculate your Ecological Footprint using the course pack quiz or online calculators shown in class. Then Answer

a) What is meant by your Ecological Footprint and your Fair Earth Share? How are these estimated? What sorts of human demands/impacts are included and what sorts are not included? How much land is allocated to supporting other species when estimating a human’s Fair Earth Share?
b) How big is the average US citizen’s Ecological Footprint and how does it compare to our ‘fair earthshare’? How many planets would be required to support earth’s current population at the US lifestyle? Can the human population keep growing past the carrying capacity of the earth? If so, how?

c) What sorts of information sources were used to calculate Ecological footprints? Why do different calculators come up with somewhat different estimates? Does that mean they are wrong? What changes in your lifestyle would do the most to bring your footprint closer to your fair earthshare?

6. Understand methodology and activities scientists use to gather, validate and interpret data related to natural process.

**The Scientific Process question**

a) Briefly explain and illustrate with an example from environmental science, the steps of the scientific cycle as described in lecture (& on p. 19 & 20 of the course pac) which illustrates: Consult current knowledge (scientific theory); identify gaps or controversies; ask questions/pose hypotheses; design study to answer question or experiment to test hypotheses; make critical observations & evaluate sources of error/variability; analyze results & look for patterns, trends, possible cause-effect relationships, draw conclusions using simplest explanation consistent with observations; fill gap or resolve controversy; feedback to scientific theory.

b) Briefly explain each of the following concepts in the scientific process and give an example of each from environmental science: a scientific question, a hypothesis, a descriptive study, an experimental study, inductive logic, deductive logic, the reductionist approach & the holistic approach to studying an environmental problem. Explain how to assess uncertainty – explain accuracy, precision, method error (human & instrumental error), natural variability in space and time.

c) Briefly explain what is meant by the statement ‘correlation is not causation.’ Give an example from Env. science.

d) Why does environmental science rely on the ‘preponderance of the scientific evidence’ rather than ‘proof.’

7. Detect patterns, draw conclusions, develop conjectures and hypotheses, and test them by appropriate means and experiments. **Also tested by the Scientific Process question described in question 6.**

8. Understand how scientific laws and theories are verified by quantitative measurement, scientific observation, and logical/critical reasoning. **Also tested by the Scientific Process question described above plus this Critical Thinking question**

a) List & briefly describe some key elements of the Critical Thinking process as described on p. 15 & 16 of your course pac. Give examples from environmental science.

b) List and briefly explain up to 5 scientific principles and up to 5 philosophical principles from Miller’s Principles for Understanding & Working with the earth (p. 13 & 14 of the fac pac). Or you could use statements from the Earth Charter & its preamble.

c) How do you distinguish a scientific principle from a philosophical principle? Which of the 2 types of principles is most important in making environmental decisions?

9. Understand the means by which analytic uncertainty is quantified and expressed in the natural sciences. **Note the part of the Scientific Process question that deals with accuracy, precision, human error, Instrumental error, natural variability in space and time.**

A General Education Assessment Report will be due on a four-year rotating cycle. You will be notified in advance of the due date. This will serve to fulfill the University’s accreditation requirements to assess general education and will provide an opportunity to connect with your colleagues across campus and share teaching strategies. Items VI.B - D will be helpful in compiling the report.
B. ACHIEVEMENT TARGETS

[This section is optional. Achievement targets can be reported if they have been established.]
Describe the desirable level of performance for your students, and the percentage of students you expected to achieve this:

This will be prepared when called for in the rotating cycle mentioned above.

C. ASSESSMENT FINDINGS

[This section is optional. Assessment findings can be reported if they are available.]

What were the results/findings, and what is your interpretation/analysis of the data? (Please be detailed, using specific numbers/percentages when possible. Qualitative discussion of themes provided in student feedback can also be reported. Do NOT use course grades or overall scores on a test/essay. The most useful data indicates where students' performance was stronger and where it was weaker. Feel free to attach charts/tables if desired.)

This will be prepared when called for in the rotating cycle mentioned above.

D. ASSESSMENT FEEDBACK

[This section is optional. Assessment feedback can be reported if it is available.]

Given your students' performance the last time the course was offered, how will you modify the course to enhance learning? You can also address how the course could be improved, and what changes in the course content or pedagogy you plan to make, based upon on the findings. Please include a timeframe for the changes.

This will be prepared when called for in the rotating cycle mentioned above.

VII. SYLLABUS AND SUBMISSION

Please submit syllabus in a separate file with the completed and signed form to the Faculty Senate Office, UH 221. The learning goals for the Natural Science Group must be included on the syllabus. An electronic copy of the original signed form is acceptable.
ENSC 105 ENVIRONMENTAL SCIENCE

DR. VICKI WATSON, 243-5153, email Vicki.watson@umontana.edu
OFFICE: 101 Natural Science, office hrs: 10am to noon, Wed (usually) & by appointment

Class Goals: Provide students with opportunities to make a difference;
Help students build: scientific literacy; skills in critical thinking, research & self-instruction;
an understanding of the scientific basis of environmental issues, policies, laws;
habits of informed, active participation in social decisions, sustainable living,
and of service to their community and the earth.

Date LECTURE TOPICS at a glance
1-Sep Course goals & mechanics; What is Env. Science?
3-Sep Literacy—Scientific & Ecological
8-Sep Ecosystems—energy flow, matter cycles, watersheds
10-Sep env. fate (you can’t throw it away), biomagnification
15-Sep ecological services, climate change
17-Sep Communities—connections—your actions have many effects
22-Sep all creatures have a role; kinds of biodiversity
24-Sep Change/succession, disturbance, condition
29-Sep Populations—evolution/adaptation, flexibility
1-Oct population growth, limits, carrying capacity (K)
6-Oct Ecofootprints, Ecohandprints
8-Oct carbon and water footprints

15-Oct Earth’s resources, energy, economy
17-Oct Water & Energy (energy, water, climate)
24-Oct Toxics, pollution, human activities

13-Oct Scientists & env policy, NEPA, Tragedy of Commons
15-Oct LAND (MUSY,NFMA, Wilderness Act, etc)
20-Oct WATER (Clean Water Act, etc) & Watershed CPR
22-Oct LIFE/Biodiversity (ESA, etc)
27-Oct AIR (Clean Air Act)
29-Oct WASTE (RCRA, etc) & TOXICS (TSCA, etc)

Using Science to Meet Our Basic Needs Sustainably
5-Nov Shelter — Steve Loken, LokenBuilders.com

10-Nov Water—Michelle Hutchins, Travis Ross, Msla Water Quality District
12-Nov Transportation—Jordan Hess, ASUM trans; Bob Giordano, MIST
17-Nov Food — Josh Slotnick, PEAS, www.gardencityharvest.org
19-Nov *****EXAM 2*****

24-Nov films & food
1-Dec Class choice of topics: Story of Stuff, Permaculture,
3,8 Dec Env impacts of War; Watershed CPR in MT, Cuba, Australia
10-Dec Living Sustainably & Equitably, evaluations & fun

15-Dec *****MAKEUP EXAM, comprehensive, by appointment only****

References (identified at page bottom*)
FP p1-20; C ch1; www.earth charter.org
C ch3; FP p13-14 (science or philosophy?)
C chs 6,7 & 12.1 to 12.5
FP p21-22 water cycle; AO ch 4 recommended
C ch 8; check out web sites on FP p23
C ch 6 & 10: communities, species interactions
see world community types (ecoregions) at
www.ecoregion.org clickable list
C ch 4.1-4.2 & 4.5-4.7
C Ch 4.3-4.4 & 5; Hardin on Cultural K in FP p18
FP p23, www.panda.org/living planet see reports
www.umt.edu/greeningUM
C ch 15 & 16 & EROEI web site on FP p23
C ch 12.8-12.9 & 18.1; FP p27 (CWA); AO ch 10
C ch 11
C ch 9 & 8
C ch 18 & 19 (especially 19.3)

Nov 26 Thanksgiving (Think Globally, Gobble Locally)
Eco Literacy & MT Constitution by Watson
or student presentations or other class exercises
C ch 20; & rest of FP

REFS: FP = FACPAE (coursepack); AO = Alice Outwater’s Water (one chapter from part I & one from part II)
C = Christensen’s Environment & You or any env science text (use table of contents & index to find lecture topics)
*** See EVST’s online calendar www.umt.edu/conservationcalendar for field trips, service options, etc
Grade based on percentage of 500 points earned

HOW TO EARN POINTS:

200 pts 2 Midterm Exams (100 each); NOTE: final is a makeup, must have excused absence to take
100 pts Service Project includes: proposal (10) & report & thank you letter (90)
90 pts Lecture participation (based on in-class essays)
10 pts Learning Contract (indicating which assignments you plan to do)

100 pts You choose from among the following possible assignments:
  Research & action project: proposal (10), paper (70), letter to decision maker (20),
  Field trips & reports (due one week after the field trip) (10pts per hour up to 10 hours & 100 pts)
  Help session participation (up to 50 pts)
  Portfolio-- demonstrate your Science Literacy (25 pts)
  Presentation (oral, poster, or web page) on service project or research paper (25 pts)
  (You may also choose to do up to 50 points of extra credit selected by you from above choices)

HOW TO LOSE POINTS:

Unexcused absence from field trip once signed up – drop a letter grade for course.
Late work – Each week an assignment is late, it loses half its value.

ASSIGNMENTS ARE DUE IN HELP SESSION during WEEK INDICATED BELOW;
Keep a copy of all assignments turned in. INSTRUCTIONS FOR ALL ASSIGNMENTS ARE IN FAC PAC

WEEK OF WHAT HAPPENS IN HELP SESSION – Discuss study questions, lectures, student concerns, and the items below

9-1  Claim a place in a help session; Introduce yourself and your interests; go over fac pac instructions
9-8  Discuss study questions, field trips, service project ideas, learning contracts and extra credit
9-15 Service project proposal (10pts) due; you may change your project later but submit new proposal if you do.
9-22 Project proposals returned and discussed. Be sure your project is approved before proceeding.
9-29 Continue discussing study questions & reviewing for exam; 10-6 Same as 9-29 10-8 EXAM 1
10-13 Return & Review Exam 1, start discussing study questions for Exam 2
10-20 Learning Contract (10 pts) and Research Project proposals (10pts) due.
10-27 Research Proposals returned.
11-3 Progress report due on Service Project (short).
11-10 Progress report due on Research project (detailed outline & alphabetized list of references)
11-17 Research paper outline returned. Service project final reports due. Exam Review
11-19 EXAM 2
11-24 Help sessions do not meet this week (Thanksgiving)
12-1 ALL Remaining WORK DUE (research papers, any remaining reports, portfolios, presentations)
12-8 ALL graded work must be picked up to get credit. After finals week, IT WILL BE RECYCLED!
12-15 Finals Week -- Help sessions do not meet this week
ENS 105 2015 EXPLANATION OF EXERCISES THAT EARN POINTS Watson syllabus, p3

A. COMMUNITY SERVICE LEARNING PROJECT — up to 100 pts

UM wants all its graduates to develop the habit of community service. This course is a service learning course (see FAQ for definition). Students can earn up to 100 pts by providing community service that protects/restores our environment & builds a more sustainable society (15 hr minimum, including training, travel, & reporting, but at least 10 hrs of actual service). You may do group or individual projects. Provide your TA (help session leader) with a short proposal for your service project (need/environmental benefit, group served, what you will do, time required) & get approval before proceeding. To earn points for your service project, you must submit a final report that includes your proposal, your project evaluation, and a letter of thanks from those served. Your project evaluation should describe: what you did and learned; how it benefited the community and the earth by increasing sustainability; how you used skills or knowledge from this class; how the project contributed to your preparation for life &/or career; your level of satisfaction in the experience; how the project could have been improved. If you worked on a group project, evaluate each member’s contribution. Reports must be at least 2 pages long (single spaced, 10 pt font).

Ideas for service projects (TAs have more; also note Welcome Feast on Oval Sept 4 & Volunteer Fair in UC Sept 15-16)
  Help Missoula Health Dept. with its Household Hazardous Waste Collection  Sept 18-19
  Help restore open space lands on Public Land Day Sept 26; Great Burn wilderness monitoring weekend trips
  Help grow food for the food bank at the PEAS farm — all Sept; Bike Walk Bus Week Sept 19-26
  Help UM Recycling, ASUM Transportation, or UM Sustainable Campus Committee with projects
  Help community groups (MUD, WEN, etc) with their projects (many will come to class)
  see also web pages of UM Office of Civic Engagement and Internship Services

  and  EVST’s online calendar (www.umt.edu/conservationcalendar)

B. RESEARCH PAPER AND LETTER TO DECISION MAKER — up to 100 pts

UM wants its graduates to be informed, active participants in our democracy. Students can earn up to 100 pts by writing a research paper AND a related letter to a key decision maker on a timely environmental issue. Your 1-2 page letter to a key decision maker will be based on your research paper (which should be about 5 pages, single spaced; double space between paragraphs; 10 pt font). Give your TA a proposal (topic, why it is timely, who is target of letter). Your TA will provide you with feedback on your paper & letter, and you will mail the letter & paper to your target audience. If you develop a portfolio, include the proposal, paper, letter and any response you receive. Possible targets for your letter(s):
  elected representatives (national, state, local)—comment on pending legislation, ordinance, plan, voting record
  executive agency decision maker (national, state, local)—comment on upcoming decision, such as:
    (EIS, management plan, permit, etc)
  editor of a newspaper, magazine — note that letters to the editor have word limits

You will be graded on the quality and depth of the research in the paper, not on the opinion or values expressed. You must present verifiable scientific info on a timely environmental issue, but consider your target audience and their knowledge level & attention span.
Your research paper should back up the positions in your letter (ie, cite scientific sources & discuss logic—see TA in help session if you are unsure what constitutes a scientific source and logic). You may choose to provide info only, but we urge you to draw conclusions & take a stand; support your arguments with verifiable data & accepted scientific concepts. For topic ideas, see newspapers, newsletters/websites of groups working on environmental issues. Get help with your writing at:
  http://www.umt.edu/writingcenter/
Group research papers (still require 5 pages per person) are allowed; plan these carefully with your TA.

CITE YOUR SOURCES!!!!!! Very important. Both to show that you really did some research and to avoid plagiarism — that is, taking credit for the ideas or work of others. Plagiarism is grounds for failing the course and for dismissal from the university. Your research paper MUST include a list of references that cites all your sources in scientific citation style (not in footnote style). Scientific citation style is described in this faculty pac, and your TA can explain it further. Remember to cite sources as you use them in the paper as well as collect them all together in a list at the end of the paper (alphabetized by lead author’s last name). See instructions for planning your paper (p7), organizing papers (p8) & citing sources (pp 9-10).
C. FIELD TRIPS & REPORTS up to 100 pts

A large number of field trips will be offered early in the semester (subject to fire closures). Space in University vehicles is limited and will be allocated to those who sign up first. If space is full, a waiting list will be made. If you decide you cannot attend a field trip, notify instructor at least 48 hours in advance so others can be notified of available space. IF YOU DO NOT NOTIFY INSTRUCTOR, YOU WILL LOSE POINTS.

You can earn up to 10 points per hour of field trip time up to 10 hours & 100 pts. You must turn in a report to earn the points, and points received depend on the quality of the report. Reports should be at least ¼ page of single-spaced (10 point font) writing per hour of trip. Reports should summarize the important technical info presented on the trip and relate these to concepts discussed in class. Reports should not simply say that you ‘learned a lot and thought the trip was great’. Take careful notes on a field trip to help you write a good report. If fires or bad weather result in cancellation of most of our field trips, attendance at certain conferences may be substituted if pre-approved (proof of attendance required). Reports are due to your TA one week after the trip or conference. Students have failed for copying reports of others. Write your own.

D. PARTICIPATION/ATTENDANCE AT LECTURE AND HELP SESSIONS (up to 90 & 50 pts)

Students who attend lecture regularly get much more out of the course (or at least earn better grades). To encourage attendance, I will periodically request that a short essay question be answered in class. Those who regularly attend & turn in thoughtful essays will receive up to 90 additional points on their final grade.

Help sessions are intended to provide students with a place to interact in smaller groups with a discussion leader (the TA). Help sessions are a good place to discuss concepts or assignments that confuse you or topics that you feel have not received enough attention in class. Help sessions will also serve as exam review sessions and places to turn in assignments and receive graded work. Assignments will not be accepted or returned in lecture class—this is too disruptive. Help sessions should be used as open office hours with TAs. Students who actively participate in help sessions have earned higher grades in the past. To encourage active participation in help sessions, those who regularly participate actively in help sessions will receive up to 50 additional points.

E. PRESENTATIONS ON PROJECTS – up to 25 pts

Students may give a presentation on their service and/or research projects near the end of the semester. Most will probably choose to give oral presentations, but you may develop a poster to display & you are encouraged to find a high visibility place to display it (such as a library or the mall). Or you may develop a web page on your project. Excellent oral presentations may be invited to present to the entire class (but you may decline if you wish).

F. PORTFOLIO—up to 25 points

You can earn up to 25 points by collecting together the work you’ve done in this class and evaluating it in a portfolio in order to demonstrate you’ve developed proficiency in Science Literacy. Read UM’s historic definition of ‘Natural Science Literacy’ in this FacPac (p6). This states UM’s historic goals for science literacy among its graduates. The first section states a number of things that scientifically literate citizens can do. Write an essay (1) explaining how you increased your skills in each of these areas in this course; use examples from the work you did in the course (essay tests, letters, research papers, field trips, service projects, etc).

UM’s science literacy document then lists a number of desired outcomes for students. Write a short essay on each of these demonstrating your understanding of these concepts. Essays should be entitled:

2) The most critical concepts and processes of science I learned in Environmental Science
3) What are basic and applied environmental science, and how do they shape one another?
4) Science and technology—how have they harmed our environment? How can they help restore & protect it?

Your portfolio should be a 3 ring binder with dividers that includes the above 4 essays, all your exams revised, assignments, & any evaluations of these you are told to perform, including the one on community service. For each exam, rewrite/improve your essays to demonstrate your knowledge of these subjects. Include your field trip reports. Note—to receive credit for your portfolio, you must pick it up at the end of the semester.
ENSC 105 Frequently Asked Questions:  

The course pack (available at the bookstore) clearly explains: Lecture schedule, grading policy, texts, required reading & other assignments, exam schedules, office hours and how to contact the class instructors.

What is Service Learning? Service Learning is a method of teaching and learning in which students, faculty and community partners work together to enhance student learning by applying academic knowledge in a community-based setting. Student work addresses the needs of the community, as identified through collaboration with community or tribal partners, while meeting instructional objectives through faculty-structured service work and critical reflection meant to prepare students to be civically responsible members of the community. At its best, service learning enhances and deepens students' understanding of an academic discipline by facilitating the integration of theory and practice, while providing them with experience that develops life skills and engages them in critical reflection about individual, institutional, and social ethics.

Basic Class Etiquette
Arrive before class starts and stay until class ends. If you must arrive late, enter as quietly as possible. If you must leave early, let the instructor know in advance and leave as quietly as possible. Avoid scheduling conflicts that would cause late arrivals and early departures. When in class, participate in class activities and avoid disrupting class by talking during lectures. Class etiquette is especially important when guest speakers visit class. They are giving their time to you without pay; respect that. In help sessions, work with the TA to develop a respectful method of ensuring that all can participate in discussion. Respect all viewpoints, including your own.

What constitutes a Pass for P/NP option?  Earn 60% of possible points.

Attendance policy: Attendance is occasionally taken in lecture (usually when guest speakers appear) and always taken in help sessions. Regular attendance at lectures and active participation in help sessions earns points. Attendance is taken by having students answer a short question about the lecture. To receive full credit, answers should show you were present in mind as well as body.

Policy on making up exams: To make up an exam, student must contact Professor Watson before or soon after the exam and explain reason for missing the exam (medical or personal emergency). If a student misses either of the 2 mid term exams, the makeup exam is a comprehensive exam offered during the final exam period for this course. Taking this exam is by appointment only.

Receiving an incomplete: To receive a grade of I or 'incomplete', student must request an incomplete and explain what unexpected emergency made it difficult or impossible for the student to complete course work by due dates. Student must also agree to a date by which the work will be completed and turned in. Some late work penalties will still apply.

Late work: As fac pac says, assignments lose half of their value for each week late. Hence, work that is 2 weeks late will receive no points. Extreme hardship cases may negotiate some reduction in late penalties but will likely have to request an Incomplete if a large number of assignments must be handed in late.

What are the fall 2015 deadlines of adding, dropping or changing grade options in classes?
- Sept 9 -- last day to add online via Cyberbear without consent of instructor; after this, need override form.
- Sept 21 -- last day to add or drop with override or change to audit or receive partial refunds.
- Nov 2 -- last day to drop (or change grading system) with a simple drop/add form ($10 charges each drop, & no refund on classes dropped; you get a W on your transcript). After this date, you must petition to drop (more hassle) and you get a WP or WF on your transcript if your petition is approved.
- Dec 1 is the VERY last day to drop (last day of classes). After that, take your petition to God. (The 'drop dead' drop deadline).

Expectations of Auditors -- Auditors must practice the same basic class etiquette as regular students. This is the only expectation of unofficial auditors. Official auditors must attend class regularly (as evidenced by in class essays) and answer the 4 essay questions described in the portfolio. Failure to meet these expectations, will result in a notation in the student's academic record indicating that attendance/participation was not satisfactory.

Disabilities -- The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS). If you have a disability adversely affecting your academic performance, and you have not already registered with DSS, please contact DSS in Lommasson 154. I will work with you and DSS to provide an appropriate accommodation.

Academic Honesty -- All students must practice academic honesty. Academic misconduct is subject to academic penalty by instructor and/or disciplinary action by UM. All students must be familiar with the Student Conduct Code at [http://www.umt.edu/vpsa/documents/Student%20Conduct%20Code%20FULL%20-%20UPDATED%20AUG%2028%202012.pdf](http://www.umt.edu/vpsa/documents/Student%20Conduct%20Code%20FULL%20-%20UPDATED%20AUG%2028%202012.pdf)
University of Montana’s definition of Natural Science Literacy (from 1990 to 2016)  p. 6

In 1990, UM defined Natural Science Literacy thus—

The natural sciences are fundamental to modern society & the modern university. The intent of these areas of study within the Liberal Arts proficiencies is to provide graduates of UM with the fundamental knowledge & understanding of scientific concepts & processes, skills & attributes needed for active participation in civic & cultural affairs. Scientifically literate citizens are able to:

- make observations, ask questions & find answers related to their experiences in their environment;
- read critically articles about science in the popular press & engage in a dialog about the validity of the presented conclusions;
- identify scientific issues underlying national & local decision making & express positions that are scientifically & technologically informed;
- evaluate quality of the scientific information on the basis of its source & methods used to generate it, &
- pose & evaluate arguments based on scientific evidence & reach conclusions from those arguments.

Scientifically literate students should be able to

1) Understand the unifying concepts & processes of science

Concepts & procedures unify the science disciplines & provide students with powerful ideas & tools to understand the natural world. Using the content of a scientific discipline, students will develop an understanding of systems, order & organization; evidence, explanation & models; change, constancy & measurement, evolution & equilibrium; form & function.

2) Differentiate between science & technology

Science & technology have different goals. Science seeks to understand the natural world while technology seeks to modify the world to meet human needs & desires. However, the need to answer questions about the natural world can drive technology, and technological needs can drive scientific research.

3) Describe cultural role of science & technology, including their social, historical & ethical contexts.

Science is an ongoing, changing human endeavor and has played a profound role in the development of various cultures & the use of technology continues to raise ethical issues.

4) Engage in scientific inquiry.

Inquiry is a multifaceted activity involving –

making observations, identifying assumptions, posing questions, retrieving existing information; planning investigations, using tools to gather/analyze/interpret data; thinking critically & logically about evidence & explanations; proposing answers, explanations, predictions, constructing & analyzing alternative explanations; communicating study results & scientific arguments.

Student Learning Outcomes for General Education Natural Science classes in UM’s 2016 Catalog

Upon completion of UM’s general education natural science requirements, a student will be able to:

1. Understand the general principles associated with the discipline(s) studied.
2. Understand methodology & activities scientists use to gather, validate & interpret data related to natural process.
3. Detect patterns, draw conclusions, develop conjectures and hypotheses, and test them by appropriate means and experiments.
4. Understand how scientific laws and theories are verified by quantitative measurement, scientific observation, and logical/critical reasoning.
5. Understand the means by which analytic uncertainty is quantified and expressed in the natural sciences.