

# NatSci 490 SH (iCons 4 Spring Module) “Integrative Science Senior Exposition Seminar”

Syllabus  
Spring 2015

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**Prerequisites:** Completion of iCons 3 with a grade of “C” or better

**Credits:** 1.00

## **Course Catalog Description:**

NatSci 490 SH enhances the thesis research experience for students in the iCons program through peer support teams and advanced scientific communication as students prepare to present their research findings at the Statewide Undergraduate Conference and at the iCons Senior Exposition. This course satisfies Integrative Experience criterion #1 by providing a structured context for students to reflect on and to integrate their previous learning as they prepare to present their senior research findings in these two public forums. This seminar, in combination with the iCons 3 course already taken (either Bio 383H or NatSci 389H), fulfills the university’s Integrative Experience requirement.

## **University of Massachusetts Integrative Experience Criteria<sup>1</sup>**

1. IE1 = Providing a structured, credited context for students to reflect on and to integrate their learning and experience from the broad exposure in their General Education courses and the focus in their majors.
2. IE2 = Providing students with the opportunity to practice General Education learning objectives such as oral communication, collaboration, critical thinking, and interdisciplinary perspective-taking, at a more advanced level.
3. IE3 = Offering students a shared learning experience for applying their prior learning to new situations, challenging questions, and real-world problems.

## **Integrative Experience:**

The General Education Integrative Experience is intended to provide a framework for deep exploration of General Education skills and knowledge (#2), the development and application of those in a real-world context (#3), and opportunity for personal reflection leading to an understanding of how the cumulative learning experiences from GenEd, the major, and other activities has lead to an integrated, valuable, and unique undergraduate education for each individual (#1). From the General Education purpose statement: “Integrative learning comes in many varieties: connecting skills and knowledge from multiple sources and experiences; applying theory to practice in various settings; utilizing diverse and even contradictory points of view; and understanding issues and positions contextually.”<sup>2</sup> As fourth-year iCons students, you have experienced all of these forms of integrated learning throughout your academic career,

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<sup>1</sup><http://www.umass.edu/gened/teachingAdvising/integrativeExperience/ieCriteria.html>

<sup>2</sup><http://www.umass.edu/gened/teachingAdvising/integrativeExperience/ie.html>

especially in your iCons courses. By now, you understand the process and appreciate the value of reflecting on your experiences and seeking a deeper expression of what those experiences have provided to you and to others through your work and service to your discipline(s).

In iCons 3, you demonstrated excellence in IE criterion #2 (practicing GenEd skills such as collaboration and communication at a more advanced level) and criterion #3 (applying prior learning to new situations and real world problems). In this 1-credit seminar, we will focus on IE criterion #1, by providing a structured context for you to reflect on and to integrate your learning and experience from the broad exposure in your GenEd courses, your focus in your major, and the unique context of iCons. The combination of these courses (iCons 3 and iCons 4 seminar) fulfills the GenEd IE graduation requirement. The specific activities (see below) will provide an evolving framework for you to identify discrete learning gains, their origins, and their ultimate value to you as you individually conduct your research and as you collectively bring your new scientific insight together in a meaningful and collaborative way. Such course activities are designated below in the Week-by-Week schedule (pp. 4-5) as “IE1 Focus” activities.

### **The Final iCons Component:**

The mission of the iCons Program is to produce the next generation of leaders in science and technology with the attitudes, knowledge, and skills needed to solve the inherently multifaceted problems facing the world. This course is the final step along your pathway to becoming young leaders in your fields, by finalizing and reflecting upon the insights and wisdom you have gained along your undergraduate career. At the end of this course and hence the iCons Program, it is our expectation that you will be able to identify important societal problems, recognize the role that science and technology will play for a given problem, articulate the fields of inquiry needed to address the problem, work effectively in diverse teams to advance understanding, and develop the habits of mind and reflective skills of life-long-learners.

### **Student Learning Goals:**

- Integrate learning from present and previous study to promote general applicability of key attitudes, knowledge, and skills (i.e., wisdom) developed during your college years. (IE1 Focus)
- Engage in self-reflection as learners; providing and utilizing constructive criticism.
- Enhance awareness of effective team function by contributing to and improving effective team function.
- Communicate and contextualize research motivation and findings, orally and in writing, to scientists and non-scientists.
- Share research in a public forum.

### **Prerequisites:**

- iCons 1: “NatSci 189H -- Global Challenges, Scientific Solutions.”
- iCons 2: “NatSci 289H -- Integrated Scientific Communication” (section 1 for iCons students in the Biomedicine/Biosystems track; section 2 for iCons students in the Renewable Energy track).
- iCons 3: “NatSci 389H -- Team-oriented Lab Discovery in Renewable Energy” for iCons students in the Renewable Energy track; or “Bio 383H -- Gene and Genome Analysis” for iCons students in the Biomedicine/Biosystems track.

**Course Components:**

- Bi-weekly peer-support team meetings
- Bi-weekly team-assessment diaries
- Integrative Experience in readings, reflections, and writings
- Producing powerpoint or poster presentations of research
- Presenting research findings at Statewide Undergraduate Research Conference
- Presenting research findings at iCons Senior Exposition

**Meeting Schedule and Course Mechanics:**

The full iCons 4 cohort (students from both Biomedicine/Biosystems and Renewable Energy tracks) will meet at least four times during the semester:

1. Near the beginning of the semester for discussion of a text that stimulates the integrative experience and the process of reflection (e.g., “Siddhartha” by Hermann Hesse);
2. Near the middle of the semester to prepare for the Statewide Undergraduate Research Conference;
3. At the Statewide Undergraduate Research Conference;
4. At the end of the semester at the iCons Senior Exposition.

Your peer-support team (already formed in the fall semester during NatSci 490 FH) will meet roughly every other week throughout the spring semester to share IE-related reflections, to support each other’s research, and to critique practice presentations. Students submit bi-weekly Teamwork Effectiveness Diaries on alternate weeks. The NatSci 490 SH instructor will join each peer support team’s first meeting of the spring semester. The semester culminates with the public presentation of research findings at the iCons Senior Exposition. Woven through the semester, starting in week 3 (see below), each student iteratively develops a reflective narrative addressing his or her progress and intellectual growth through college.

**Personal IE Reflective Essay:**

As a semester-long assignment, you will construct a (max 1000 words) narrative on your intellectual / personal journey through college. In this narrative, you are asked to explain *how you came to be the scholar you are now*. This narrative will be developed iteratively, subject to peer and instructor critique, with the objective of obtaining a deeply meaningful statement of personal and academic growth.

In considering growth, we will ask about the major or minor turning points in your career as an UMass Amherst student, incorporating experiences from your major, from your GenEd courses, from your elective activities, and from the iCons program, that have prepared you for success both in conducting your research and in translating that research to a larger societal challenge. As a starting point, you should consider the following themes:

- Complex problem-solving challenges (e.g., possibly involving any of your iCons work, but not limited to iCons work) that **required integration** of attitudes, knowledge, and skills across disciplines (specifically incorporating your unique palate of Gen Eds, major courses, and extra-curriculars) -- Did you have some success or not? In either case, what lessons of wisdom did you take away that may have changed your world view?

- Character-building experiences (e.g., significant academic "mistakes" or "mishaps," required courses that "in the moment" were otherwise uninspiring, extended periods of academic confusion and/or frustration) that upon reflection have ***changed who you are*** as a scholar and/or problem-solver, or that may likely change in the future who you will be as a scholar or problem-solver.
- Shared learning experiences that required you to work with an intellectually diverse team to solve complex, real-world problems by ***drawing on the distributed expertise of your team***, and led you to think and communicate using an interdisciplinary set of values and perspectives. What did you do to better understand your teammates from other fields? How did you communicate your own scientific perspective in an effective way? What was the benefit of working with an intellectually diverse team?

### **Week-by-Week Outline:**

#### **Week 1:**

- Online Career Planning Survey
- Outline of semester's activities & assignments, reviewed & submitted through Moodle.

#### **Week 2:**

- Read reflective text, e.g., "*Siddhartha*" by Hermann Hesse (IE1 Focus).

#### **Week 3: Full Cohort Meeting #1**

- Discuss IE criterion #1 and its value. (IE1 Focus)
- Construct specific writing prompts by discussing shared IE mission. (IE1 Focus)
- Discuss reflective text and its relation to each student and writing prompts. (IE1 Focus)
- Assign timeline for reflection & submissions/revisions of reflective IE essay. (IE1 focus)

#### **Week 4:**

- Undergraduate Research Conference Registration/Abstract Submissions Due.
- Peer-support Team Meetings (#1) with Instructor; Topic: Sharing IE Reflections, Writing Plans (IE1 Focus)

#### **Week 5:**

- Peer-support Team Meetings (#1) with Instructor; Topic: Sharing IE Reflections, Writing Plans (IE1 Focus)
- Teamwork Effectiveness Diary submission (#1)

#### **Week 6:**

- Peer-support Team Meeting (#2); Topic: Thesis Outlines

#### **Week 7:**

- First draft of IE Reflective Narrative due, distributed to peers for critique (IE1 Focus)
- Teamwork Effectiveness Diary submission (#2)

#### **Week 8:**

- Instructor and Peer critique of IE Reflective Narratives due, returned to authors for revision (IE1 Focus).
- Team Meeting (#3); Topic: Wrapping up Research & Writing.

**Week 9: Full Cohort Meeting #2**

- Directed discussion on insights gained through IE Reflective Writing (IE1 Focus)
- Teamwork Effectiveness Diary submission (#3)
- iCons Senior Survey

**Week 10:**

- Team Meeting (#4) -- Formatting posters/slides
- Practice presentations

**Week 11:**

- Teamwork Effectiveness Diary submission (#4)

**Week 12:**

- Team Meeting (#5) -- Rehearse Presentations
- Submit posters for printing
- Final Reflective Narrative Due (IE1 Focus)

**Week 13: Full Cohort Meeting #3**

- Statewide Undergraduate Research Conference, Campus Center, UMass Amherst
- Teamwork Effectiveness Diary submission (#5)

**Week 14: Full Cohort Meeting #4**

- iCons Senior Expo