

DailyCollegian.com

[New sciences program, iCons, stresses problem solving](#)

By: [Alyssa Creamer](#) | September 13, 2010 | [Share This](#)

This spring, a program called iCons will launch its first course for freshmen enrolled in the University of Massachusetts' College of Natural Sciences' (CNS) majors looking to enhance their education in modern scientific procedures. According to one of its developers, UMass chemistry professor Scott Auerbach, the program is believed to be the first of its kind in the nation.

The program will be constructed of four courses offered over four years geared to teach students how to identify, research, debate and analyze data that will help solve major issues facing today's scientific world.

"I and other faculty members did a study during the past year into how 50 major universities and 30 colleges were conducting their integrated science program," said Auerbach. "And we found other universities were paying a lot of lip service, saying they had an integrated science program when they really didn't."

Auerbach explained that the point of iCons is to apply the idea of integrated sciences, where students will use their knowledge of the disciplines of sciences, biology, physics, chemistry and other subjects currently offered as courses at the University, simultaneously to solve real-world problems.

Auerbach believes that, as the current majors stand, at no point are majors in CNS taught how to integrate all the different fields of science.

However, iCons is not intended to replace a student's major, but rather to enhance it, and Auerbach has seen a great deal of interest from the student body and students around the country to whom he has explained the program.

Initially, students that complete the program will graduate with a concentration in either biomedicine or renewable energy, and the concentration will be recognized as a certification in the students' chosen field. Eventually, the professors creating the curriculum for the course also hope to offer students concentrations in clean water and climate change, in addition to the two other subjects.

The first iCons course, aptly called iCons 1, is titled Global Problems and Scientific Solutions. The course, according to Auerbach, will explore problems through looking at different kinds of case studies that are related to biomedicine, renewable energy, clean water and climate change.

“We picked these four topics,” Auerbach said. “Because they are the four biggest problems facing the scientific world.

“Case studies are a great way to teach integrated thinking,” continued Auerbach.

UMass students Carolina Adams, Buruk Aragawi, Shera Demchak, Erina Keefe, Matthew Liu and Rachel Roberts worked over the summer under a \$50,000 grant given by the Camille and Henry Dreyfus Foundation Special Grant Program in the Chemical Sciences to build the case studies for the first class.

“It was a lot of fun and very interesting to work over the summer,” Keefe said. “I would love to be able to take the course in the spring because it was our creation and it was us kids that made the material. I want to know what the reaction is going to be from the incoming freshman.”

“I am really excited for it. It’s a great concentration for the college of natural sciences,” Roberts said. “And I think it’s a great opportunity for the students to basically learn science in a new way. They’re learning it through the case studies themselves. As opposed to starting with the textbooks and scientific concepts, they start with real world problems and through the problems they find the scientific concepts.”

“It was a great opportunity for us on the development team,” she continued. “We got to choose a topic of interest to us and try to develop classroom activities through that. It was a lot harder than I thought it would be to set up the classroom activities. I liked it a lot, because students were developing the course and it’s hard for professors to remember what it was like to be a student, and therefore nice to have students developing work for students.”

Auerbach also explained that iCons gives students more of a hands-on approach to problem solving through these case studies that could also spark student interest in an area they have yet to explore.

“Let’s say you are a science major, and you’re attracted to the sciences because you want to solve a big problem like energy and you have to learn about elements,” said Auerbach of current science majors, “and you go around and around and around, and by the time you’re a junior you might start to learn about the thing you’re really interested in.”

“This gives students the juicy stuff right off the bat,” continued Auerbach, “but also gives it to them in a way that makes sense because you can’t expect a freshman to understand about solar energy at the deepest possible level, but you can teach them the basics.”

Because the program is currently only open to freshman, the idea is that the freshmen enrolled in the program will be required to pick out of the four concentrations offered before continuing into iCons' second course, as they may not yet fully know what field piques their interest. By designing iCons 1 to give students exposure to case studies in each of the subject areas, it will enable students to "rotate through all of them and get a flavor for the subjects," in Auerbach's words.

The program's developers are considering allowing a small number of sophomores to apply for slots in the program; however, it is likely these students would have to delay their graduation date in order to finish iCons' final course.

In the second course, iCons 2, titled Integrated Scientific Communication, students will read, write, speak and debate about the issues that are relevant to their particular concentration.

"So if students are interested in renewable energy, they would talk about recent developments in solar panels or the chemistry of trying to solve the oil spill in the Gulf," said Auerbach. "Whatever the topics that are relevant in the modern world and to the theme that the student is concentrating in will be looked at [in iCons 2]."

"It makes it very difficult [to have a definitive curriculum], because new problems are arising," Auerbach continued. "But that is what makes the program come to life."

Auerbach believes that by looking at today's topical problems, students will benefit because they are able to take on fresh issues as opposed to solely learning about "science that has been already worked out."

"Modern science involves a lot of complicated experiments," Auerbach said. "Students will learn through iCons that [the modern scientific process] involves a lot of data and discussion and not necessarily right or wrong answers."

Within a student's third year in the program, iCons 3, students will be working in laboratories doing either biomedicine or renewable energy research.

Students with a biomedical focus will work in teams to conduct experiments in an on-campus laboratory funded by the UMass biology department and the Howard Hughes Medical Institute. Lab work will heavily involve research on genetics.

There is another on-campus laboratory for students focusing in renewable energy to use. It is funded by the Massachusetts Center for Renewable Energy, Science and Technology (MassCREST), and students, according to Auerbach, are likely to research solar energy and materials and fuel cells.

Students will then complete the iCons program with a Capstone Experience, iCons 4.

Students within CNS often find it difficult to add extra courses to their schedule, and because of this, iCons 1 will also count as an interdisciplinary general education requirement, iCons 2 will count as a junior year writing course, iCons 3 will have the potential to count as an upper level elective, and iCons 4 will take the place of a student's capstone experience requirement.

iCons 1 will be taught by chemistry professor Justin Fermann, microbiology professor Sue Leschine, and Professor Steve Petsch of the geosciences department.

"We're excited about the chance to bring students together who are interested in science and do not have a completely crystallized in stone idea of what particular science to learn with each and from each other," Petsch said. "We're pretty excited about the novel approach to teaching this class. As best we can tell is pretty unprecedented across the country. It's a program that in contrast to a traditional classroom where a professor talks at you, what we're going to do is provide students with just a bit of inception material to get people interested in a real world science problem, and then allow people to recognize for themselves what are the questions we need to ask to assess this problem and to develop a solution to this problem."

According to Auerbach, employers working in the science fields are looking for people with identifiable skills and what he calls a "deep skill."

"They don't want a general science major who knows a little bit about a lot of things, they want someone who is essentially a card-carrying geoscientist, biologist or microbiologist who knows how to work well in teams, communicate well and who shows leadership," Auerbach said. "And those are exactly the extra skills that we do not teach currently."

"I will be proud when the first cohort of students graduate in the year 2014 as the first group of iCons scholars. And I will be proud when each and every one of them has been accepted into the top grad school of their choice or top job of their choice."

Students may currently apply for the iCons program, and applications, which can be found at <http://cns.umass.edu/iCons-program>, will be accepted until Oct. 17. The developers are looking to enroll approximately 60 students for the first course.

Alyssa Creamer can be reached at acreamer@student.umass.edu.