

The iCons Four-Year Curriculum Plan

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Fall 2015

The Program

The Integrated Concentration in Science Program (iCons) is a 20-credit undergraduate science program offered by the College of Natural Sciences at the University of Massachusetts, Amherst, providing integrative science education in the concentration areas of Renewable Energy and Biomedicine/Biosystems. iCons does not replace a major, it enhances a major by giving students the opportunity to work in interdisciplinary teams and apply their knowledge to existing problems of global significance. Past focal issues include the cholera epidemic in Haiti, endocrine disruptors, and developing biofuels from algae.

The iCons program is composed of three courses (one per year) and a yearlong research-based thesis project during senior year. The curriculum integrates science, technology, engineering, and mathematics (STEM) expertise across disciplines and offers students collaborative learning experiences, discovery-based projects, leadership development, and multidisciplinary analytical skills in the context of real world problems. The final iCons course satisfies UMass Amherst's new Integrative Experience (IE) general education requirement. Students choose a theme area before registering for the second-year courses, and are expected to join a lab by the spring semester of their Junior year. Most iCons courses fulfill other program or major requirements, as indicated below (for details, see: www.cns.umass.edu/icons-program/does-icons-count-for).

The iCons Courses At-A-Glance

iCons 1: Global Challenges and Scientific Solutions (4 credits)

- Introduction to attitudes and methods of integrated science
- Teamwork on case studies drawn from current topics
- Final Project in which student teams design new case studies

iCons 2: Integrative Science Communication (4 credits)

- Theme-specific sections (Renewable Energy and Biomedicine/Biosystems)
- Students engage with issues relevant to theme through writing, speaking, debating, and reading
- Individual and team assignments

iCons 3: Team Discovery Laboratory (4 credits)

- Theme-specific labs (Renewable Energy and Biomedicine/Biosystems)
- Student-team driven experiments
- Final project presentations

iCons 4: Interdisciplinary Research Project (4 credits in Fall, 4 credits in Spring)

- Each student designs his/her own interdisciplinary research project
- Student teams meet to support and integrate individual projects
- Students produce 60-second video abstracts to communicate impact of research
- Students complete Integrative Experience (IE) reflection
- Program culminates in Senior Research Exposition

The iCons Course Sequence At-A-Glance

FIRST YEAR	
Fall Semester	Spring Semester
<ul style="list-style-type: none"> ➤ Applications due ➤ Students selected for next cohort ➤ Orientation session early December 	<ul style="list-style-type: none"> ➤ iCons 1 -- NATSCI 189 H (4 credits): “Global Challenges, Scientific Solutions” <ul style="list-style-type: none"> • Counts as Gen Ed Interdisciplinary • Carries Honors credit ➤ Choose Theme Area: <ul style="list-style-type: none"> • Biomedicine/Biosystems (Biomed) • Renewable Energy (RE)
SECOND YEAR	
Fall Semester	Spring Semester
<ul style="list-style-type: none"> ➤ Community engagement activities ➤ Begin looking for research opportunities ➤ Take prerequisites for iCons 3 Biomed: <ul style="list-style-type: none"> • Bio 285 or BMB 275 with grade of “C” or higher ➤ Take prerequisites for iCons 3 RE: <ul style="list-style-type: none"> • Calculus 127/128 or Calculus 131/132 with a grade of “C” or higher • Science lab courses or science courses with associated labs from at least two different departments with grade of “C” or higher 	<ul style="list-style-type: none"> ➤ iCons 2 – NATSCI 289 H (4 credits): “Integrated Scientific Communication” <ul style="list-style-type: none"> Section 1 – Biomed theme Section 2 – RE theme • Satisfies Junior Year Writing requirement* • Carries Honors credit
*For most majors	
THIRD YEAR	
Fall Semester	Spring Semester
<ul style="list-style-type: none"> ➤ Community engagement activities ➤ Fulfill remaining pre-requisites for iCons 3 ➤ Find a research lab for iCons 4 ➤ Study abroad fits well here 	<ul style="list-style-type: none"> ➤ iCons 3 Biomed – Bio 383 H (4 credits): “Gene and Genome Analysis” <ul style="list-style-type: none"> • Carries Honors Credit • Counts for Upper Level Elective* • Satisfies Criteria 2 & 3 of Integrative Experience ➤ iCons 3 RE – NATSCI 389 H (4 credits): “Team Discovery Lab in Renewable Energy” <ul style="list-style-type: none"> • Carries Honors Credit • Counts for Upper Level Elective* • Satisfies Criteria 2 & 3 of Integrative Experience ➤ Consider joining a lab [396(H), 1-3 credits] to begin research
*For most majors	
FOURTH YEAR	
Fall Semester	Spring Semester
<ul style="list-style-type: none"> ➤ iCons 4 –NATSCI 490 FH (1 credit): “Integrative Team Science Seminar” <i>along with</i> ➤ Departmental 499 Y Research OR Senior Design Project I (3 credits): “iCons Advanced Study I” <ul style="list-style-type: none"> • Plan and perform research with peer support • Production of Student Showcase Video Abstracts 	<ul style="list-style-type: none"> ➤ iCons 4 – NATSCI 490 SH (1 credit): “Integrative Science Senior Exposition Seminar” <i>along with</i> ➤ Departmental 499 T Thesis OR Senior Design Project II (3 credits): “iCons Advanced Study II” <ul style="list-style-type: none"> • 499 T Satisfies Commonwealth Honors College Thesis • 490 SH Satisfies Criterion 1 of Integrative Experience

iCons Courses Fulfill Departmental Requirements As Follows (see key below):

as of Fall 2015

	iCons 1	iCons 2	iCons 3	iCons 4
College of Natural Sciences				
Astronomy	Y1	Y2		
BMB	Y1	Y2	Y3	Y4
Biology	Y1	Y2	Y3	Y4
Chemistry	Y1	Y2	Y3	Y4
Computer Science	Y1	Y2	Y3	Y4
Environmental Science Program	Y1	Y2	Y3	Y4
Food Science	Y1	Y2	Y3	Y4
Geosciences	Y1	Y2	Y3	Y4
Mathematics & Statistics	Y1	Y2		
Microbiology	Y1	Y2	Y3	Y4
Physics	Y1	Y2	Y3	Y4
Psychology	Y1	Y2	Y3	Y4
Veterinary & Animal Science	Y1	Y2	Y3	Y4
College of Engineering				
Chemical Engineering	Y1	Y2	Y3	Y4
Civil and Environmental Engineering	Y1	Y2	Y3	Y4
Electrical and Computer Engineering	Y1	Y2	Y3	Y4
Mechanical and Industrial Engineering	Y1	Y2	Y3	Y4
School of Public Health & Health Sciences				
Public Health	Y1	Y2*	Y3*	Y4*

Requirements Fulfilled by iCons Courses:

Y1: Fulfills Interdisciplinary Honors Gen Ed (for all majors)

Y2: Fulfills Honors Junior Year Writing

Y2*: Fulfills 4 Credits of Honors Lower-level Collateral Field

Y3: Fulfills Upper Level Honors Technical Elective

Y3*: Fulfills 4 Credits of Honors Upper-level Collateral Field

Y4: Fulfills either:

- Honors Research/Thesis for Commonwealth Honors College (CHC) students
- 6 Credits of Honors Independent Study for non-CHC students
- Something else, TBD

Y4*: Fulfills 6 Credits of Honors Upper-level Collateral Field