Stretching, Crossing & Breaking Boundaries in the Administration of an Interdisciplinary Science Program

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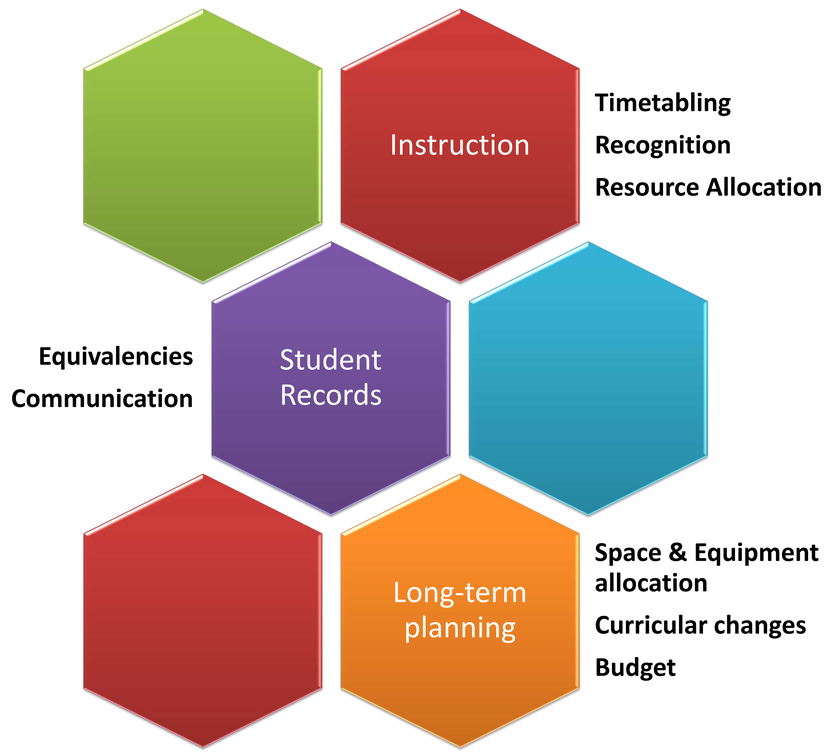
Honours Integrated Science

Honours Integrated Science (iSci) :
- 4 year research-based program
- Students learn essential scientific concepts & skills
- Relevance to range of science disciplines
- Project-based exploration of topics & themes

Meeting pedagogical needs within a University system

Pedagogical innovation may be suppressed by inflexible administrative systems & rigid boundaries such as :
- Instruction
- Student Records
- Long-term planning



Stretching the Boundaries of Instruction

Administration includes allocation & timetabling of teachers, class scheduling, allocation of lab & class resources, and room assignments.

Boundaries:
- Coordination of class & lab delivery
- Coordination of multiple instructors
- Coordination across multiple departments
- Accurate recognition & reporting of instructional roles
- Resource allocation in lab & classroom

Regular team meetings ensure fair allocation of instructional time as well as resource allocation to laboratories & classroom activities.

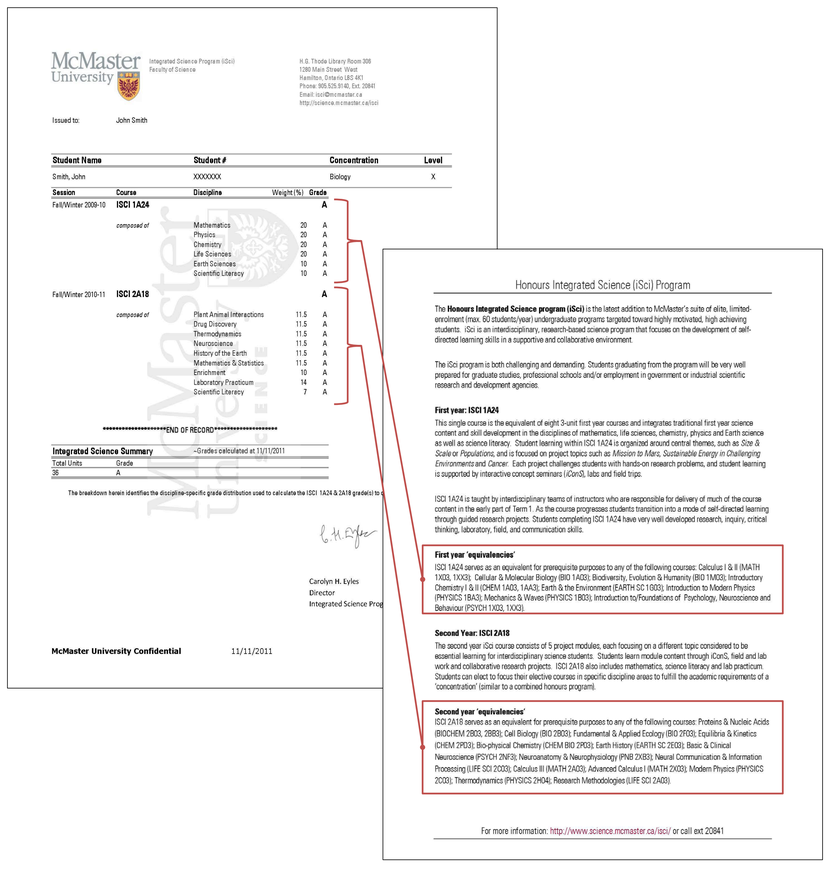
Instructors receive recognition for an 'equivalent' number of units to a 'normal' course for tenure & promotion purposes.

Schedule for ISCI 1A24, 2A18, & 3A12 Research Projects

	Week	Level I	Level II		Level III	
1.1	8-9 Sept 11	Basic Training / RPO	Plant-Animal Interactions	Intro to Level II	Wine	Intro to Level III
1.2	12 Sept 11					
1.3	19 Sept 11			Drug Discovery		Light, the Universe, and Everything
1.4	26 Sept 11					
1.5	3 Oct 11					
1.6	10 Oct 11					
1.7	17 Oct 11	Exam week	Exam week		Exam week	
1.8	24 Oct 11	Mars	Why Things Happen	Drug Discovery	Wine	Light, the Universe, and Everything
1.9	31 Oct 11					
1.10	7 Nov 11					
1.11	14 Nov 11	Drugs				
1.12	21 Nov 11					
1.13	28 Nov 11					
1.14	5 Dec 11	Review	Review			
Exams	7-21 Dec 11	Exams	Exams			
2.1	3-6 Jan 12	Energy	Neuroscience		Climate Change	Individual Research Project
2.2	9 Jan 12			History of the Earth		
2.3	16 Jan 12					
2.4	23 Jan 12					
2.5	30 Jan 12					
2.6	6 Feb 12					
2.7	13 Feb 12	Cancer	Enrichment			
	20 Feb 12					
2.8	27 Feb 12	Cancer	Enrichment	History of the Earth	Climate Change	Individual Research Project
2.9	5 Mar 12					
2.10	12 Mar 12					
2.11	19 Mar 12					
2.12	26 Mar 12		Conference		Conference	
2.13	2-4 Apr 12	Conference				
Exams	7-25 Apr 12	Exams	Exams			

Crossing the Boundaries of Student Records

Administration of student records in this interdisciplinary program requires:
- Continuous tracking and clear communication of course equivalencies
- Interaction between students, departments and administration
- Communication within the institution
- Communication with external stakeholders



McMaster University — Integrated Science Program (iSci), Faculty of Science

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Issued to: John Smith

Student Name	Student #	Concentration	Level
Smith, John	XXXXXXX	Biology	X

Session	Course	Discipline	Weight (%)	Grade
Fall/Winter 2009-10	**ISCI 1A24**			**A**
	composed of	Mathematics	20	A
		Physics	20	A
		Chemistry	20	A
		Life Sciences	20	A
		Earth Sciences	10	A
		Scientific Literacy	10	A
Fall/Winter 2010-11	**ISCI 2A18**			**A**
	composed of	Plant Animal Interactions	11.5	A
		Drug Discovery	11.5	A
		Thermodynamics	11.5	A
		Neuroscience	11.5	A
		History of the Earth	11.5	A
		Mathematics & Statistics	11.5	A
		Enrichment	10	A
		Laboratory Practicum	14	A
		Scientific Literacy	7	A

**********END OF RECORD**********

Integrated Science Summary —Grades calculated at 11/11/2011

Total Units	Grade
36	A

The breakdown herein identifies the discipline-specific grade distribution used to calculate the ISCI 1A24 & 2A18 grade(s) to

Carolyn H. Eyles
Director
Integrated Science Prog

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Honours Integrated Science (iSci) Program

The **Honours Integrated Science program (iSci)** is the latest addition to McMaster's suite of elite, limited-enrollment (max. 60 students/year) undergraduate programs targeted toward highly motivated, high achieving students. iSci is an interdisciplinary, research-based science program that focuses on the development of self-directed learning skills in a supportive and collaborative environment.

The iSci program is both challenging and demanding. Students graduating from the program will be very well prepared for graduate studies, professional schools and/or employment in government or industrial scientific research and development agencies.

First year: ISCI 1A24

This single course is the equivalent of eight 3-unit first year courses and integrates traditional first year science content and skill development in the disciplines of mathematics, life sciences, chemistry, physics and Earth science as well as science literacy. Student learning within ISCI 1A24 is organized around central themes, such as *Size & Scale* or *Populations*, and is focused on project topics such as *Mission to Mars*, *Sustainable Energy in Challenging Environments* and *Cancer*. Each project challenges students with hands-on research problems, and student learning is supported by interactive concept seminars (*iConS*), labs and field trips.

ISCI 1A24 is taught by interdisciplinary teams of instructors who are responsible for delivery of much of the course content in the early part of Term 1. As the course progresses students transition into a mode of self-directed learning through guided research projects. Students completing ISCI 1A24 have very well developed research, inquiry, critical thinking, laboratory, field, and communication skills.

First year 'equivalencies'

ISCI 1A24 serves as an equivalent for prerequisite purposes to any of the following courses: Calculus I & II (MATH 1X03, 1X03); Cellular & Molecular Biology (BIO 1A03); Biodiversity, Evolution & Humanity (BIO 1M03); Introductory Chemistry I & II (CHEM 1A03, 1AA3); Earth & the Environment (EARTH SC 1G03); Introduction to Modern Physics (PHYSICS 1BA3); Mechanics & Waves (PHYSICS 1B03); Introduction to/Foundations of Psychology, Neuroscience and Behaviour (PSYCH 1X03, 1XX3).

Second Year: ISCI 2A18

The second year iSci course consists of 5 project modules, each focusing on a different topic considered to be essential learning for interdisciplinary science students. Students learn module content through iConS, field and lab work and collaborative research projects. ISCI 2A18 also includes mathematics, science literacy and lab practicum. Students can elect to focus their elective courses in specific discipline areas to fulfill the academic requirements of a 'concentration' (similar to a combined honours program).

Second year 'equivalencies'

ISCI 2A18 serves as an equivalent for prerequisite purposes to any of the following courses: Proteins & Nucleic Acids (BIOCHEM 2B03, 2BB3); Cell Biology (BIO 2B03); Fundamental & Applied Ecology (BIO 2F03); Equilibria & Kinetics (CHEM 2PD3); Bio-physical Chemistry (CHEM BIO 2P03); Earth History (EARTH SC 2E03); Basic & Clinical Neuroscience (PSYCH 2NF3); Neuroanatomy & Neurophysiology (PNB 2X83); Neural Communication & Information Processing (LIFE SCI 2O03); Calculus III (MATH 2A03); Advanced Calculus I (MATH 2X03); Modern Physics (PHYSICS 2D03); Thermodynamics (PHYSICS 2H04); Research Methodologies (LIFE SCI 2A03).

For more information: http://www.science.mcmaster.ca/isci/ or call ext 20841

Breaking the Boundaries of Long-term planning

Long-term planning is essential to the survival of this program.
Boundaries that could inhibit this include:
- Traditional timetabling
- Traditional recognition of teaching load
- Traditional allocation of resources within and across Faculties
- Traditional curriculum planning

We stretch the boundaries of long-term planning in many ways:

Instruction:
- Communication between departments and understanding of contributions to this program
- Communication & coordination across departments for teaching assistants
- Communication & coordination across departments for laboratory and field equipment
    - Sharing of equipment & space across departments and courses

Resource allocation:
- Cross-program and cross-department appointments of staff and instructors

Pedagogical innovations:
- Creation of new courses across Faculties that offer experiential and community-driven opportunities
- Creation of co-curricular Leadership and Mentorship opportunities for students
- Creation of a longitudinal program of research to understand the success of this program

Key Players in the System