FINAL ASSESSMENT REPORT

Institutional Quality Assurance Program (IQAP) Review

HONOURS INTEGRATED SCIENCE (UG) PROGRAM

Date of Review: January 17 – 18, 2023

In accordance with the University Institutional Quality Assurance Process (IQAP), this final assessment report provides a synthesis of the external evaluation and the internal response, and assessments of the undergraduate program delivered by the Honours Integrated Science program. This report identifies the significant strengths of the program, together with opportunities for program improvement and enhancement, and it sets out and prioritizes the recommendations that have been selected for implementation.

The report includes an Implementation Plan that identifies who will be responsible for approving the recommendations set out in the Final Assessment Report; who will be responsible for providing any resources entailed by those recommendations; any changes in organization, policy or governance that will be necessary to meet the recommendations and who will be responsible for acting on those recommendations; and timelines for acting on and monitoring the implementation of those recommendations.

Executive Summary of the Review

In accordance with the Institutional Quality Assurance Process (IQAP), the Faculty of Science submitted a self-study in January 2023 to the Vice-Provost (Teaching and Learning) to initiate the cyclical program review of the Honours Integrated Science undergraduate program. The approved self-study presented program descriptions, learning outcomes, and analyses of data provided by the Office of Institutional Research and Analysis.

Two arm's length external reviewers and one internal reviewer were endorsed by the Dean, Faculty of Science and selected by the Vice-Provost (Teaching and Learning). The review team reviewed the self-study documentation and then conducted an in-person site visit on January 17-18, 2023. The visit included interviews with the Vice-Provost (Teaching and Learning), Deputy Provost, Dean of the Faculty of Science, Director of the program, Associate Dean, and Acting Associate Dean (Academic) and meetings with groups of current students, full-time faculty, and support staff.

The Dean of the Faculty of Science, Professors and the Program Coordinator of the Honours Integrated Science undergraduate program submitted responses to the Reviewers' Report. The initial response was prepared by the program in May 2023, and finalized by the Dean in May 2024. Specific recommendations were discussed, and clarifications and corrections were presented. Follow-up actions and timelines were included.

Strengths

The reviewers praised many elements of the Program. Science Literacy was singled out as a signature element, and we recognise the compliment that the review team pays us by suggesting that this element is extended across the Faculty of Science. Overall, the key aims, structures, and methods of the Program were all well supported in the comments, suggesting that the original design brief and the overall shape of the Program are still more than fit for purpose and are, for the most part, suiting students well in their academic careers and beyond.

Areas for Improvement

The reviewers identified some administrative areas that can be tidied up (course conflicts, transcripts, Director's Fund access, and our ongoing struggles with SAS support). The instructional team is excited to improve our Program in the areas of equity, diversity, and inclusion (EDI) and programming/coding, both of which are aims we recognise and have already started towards improving, and to reach outwards with our experience in helping students learn about research and gain confidence in science literacy. The Recommendations also detail some areas that are heavier pressure points. Instructional and service workload is a problem that has become much larger in the last three years, and feeds into several of the other areas for improvement. Workload is a challenge in addressing Recommendations 3.1, 3.2, 3.3, 5.2, 5.4, 5.5, 5.7, 7.1, 9.1, and 9.2 – and many of these points are interlinked, with faculty time, effort, and mental health being bombarded with emerging problems such as the exponential increases in McMaster Student Absence Forms (MSAFs) (absences), accommodations, and academic dishonesty threats – none of which are unique to iSci but many of which can be magnified by the iSci environment.

Implementation Plan

Summary of the Reviewers' Recommendations with the Department's and Dean's Responses

Recommendation	Proposed Follow-Up	Responsibility for Leading Follow-Up	Timeline for Addressing Recommendation
2.1 Resolution of Scheduling Conflicts Students should not be allowed to unenroll from the iSci program unless approved by the iSci Program Coordinator or their designate. We understand that the designated iSci advisor can process iSci conflicts and registration permissions directly in MOSAIC. This access should continue to minimize impacts on student registration.	To prevent students from unenrolling in the Program (under the mistaken belief that this will be helpful to them in avoiding conflicts), a "no drop without consent" feature must be turned on in Mosaic. This process has been initiated and steps have also been identified to raise awareness in the students as to this issue.	Academic Department Manager	May 2024
2.2 iSci Program applicant acceptance rate ISci continue to monitor acceptance offer rates and to increase offers as needed to maintain their target enrollment of 64.	Maintenance of acceptance rate depends on many factors beyond the control of the faculty teaching and managing the Program or the Leadership of the School. Informed by our Supplementary Application process, the Associate Dean (Undergraduate Studies) decides on the annual number of offers based on yield and target projections informed by previous years' data and information.	Associate Dean (Undergraduate Studies)	Cyclical, every April

3.1 Greater emphasis on Equity, Diversity, and Inclusion Move toward greater emphasis on Equity, Diversity, and Inclusion within the iSci Program: Further develop curriculum around equity, diversity, and inclusion	Use the current School of Interdisciplinary Science (SIS) Garden Grant support to encourage instructors to increase emphasis on diverse points of view, inclusive topics and methods, and space for student expression. A pinch point in being able to address this recommendation is faculty workload (Recommendation 5.4 below). To be able to enhance, modify and add to curriculum instructors need support to manage workload given the increased demand to manage accommodations and student absences. The first intake with the Equitable Admissions for Black Applicants (EABA) process will be welcomed in Sept 2023. EABA and other EDI initiatives across the program, will be evaluated on an ongoing basis. In future years, we will also request that the new course, SCIENCE 2AR3 which focuses on EDI in Science, is conflict- free with ISCI 2A18 and/or 3A12. The Faculty of Science access and outreach officer as offer holders in iSci will now newly have an opportunity to meet with Aaron Parry to learn about resources on campus should they choose to come to iSci/ Faculty of Science/ McMaster.	The Instructional Team, with steering from the Program Coordinator in consultation with the Associate Dean Equity, Diversity, Inclusion and Indigeneity SIS Academic Program Advisor	Immediate start, and ongoing nurture. Re-evaluation after three years. Summer 2024

3.2 Planning for needs of iSci Program year 3 students to carry out independent research studies. A committee involving iSci faculty, representatives of the Dean's office and faculty external to the iSci Program who have supervised Independent Research Projects for iSci students, explore strategies for enhancing recruitment of FOC supervisors for iSci Independent Projects.	Leadership of the Level III Independent Projects (IPs) could be assisted by a system for potential Faculty of Science (FoS) supervisors to indicate a time and method of approach that would best suit them, and by raising awareness of the rewards and advantages of supervising iSci students, especially to recently recruited faculty who may not be aware of this option. Colleagues across FoS could be instrumental by highlighting to their postdocs and senior graduate students that supervision of undergraduate students is an opportunity to develop mentorship skills. This would have to be supported by either increased administrative support or a higher recognition of the teaching load that running the IPs entails. The Office of Undergraduate Research (OUR) website can be leveraged to make student-supervisor connections: e.g., students seeking supervisors can post research interests and project ideas; content from past iSci student projects can be featured	Independent Project Coordinator, SIS Director via Faculty Council. OUR Director and Program Manager.	Jan 2025

3.3 Review of Programming Instruction There should be a review of how programming instruction is being presented. There should be a thorough set of basic programming tutorials.	The math component leaders in Levels I and II are, ideally, the leaders of programming integration in the Program. Currently, programming provision is sensitive to changes in the math instruction personnel. We propose that our incoming new faculty member (as part of their 6 units of iSci teaching) should be involved in introducing, supporting, and developing relevant skills alongside all instructors, across most projects in both ISCI 1A24 and ISCI 2A18. This would give the math team, the research project leaders, and other instructors an additional resource to support use of Python and R in a wider portion of the Program.	The Instructional Team	Sept 2023
3.4 Group dynamics – concerns over 'hustle culture' That a small committee composed of iSci instructors, students and counseling staff consider strategies to increase awareness of how a culture in which overwork and hustle are prized can impact student mental health, and to suggest how student wellness can be enhanced.	Create the committee/working group suggested by the review team, with a voluntary membership informed by the student body, iSci Society, and alumni. Students tend to take advice from people closer in age and experience to themselves.	Program Coordinator, Student Success Academic Skills team	Committee set up in September 2024 and reviewed annually

4.1 Communication of the structure, benefits, and uniqueness of the iSci Program Materials or stories that clearly and concisely communicate the structure, benefits, and uniqueness of iSci should be developed, especially given the strong alignment with McMaster's Mission and teaching,and learning strategy. Stories that profile iSci activities or students should be supported through the top levels of the university, and communications office.	Create an iSci "infographic" including narratives, fictional vignettes, and information that can be accessed online and distributed as printed material. As the reviewers suggest, we would use this as an elective assignment, in association with input from the instructional and recruitment teams.	Science Literacy instructional team	Sept 2024
4.2 Scope of research projects The scope of the research projects across years be more clearly articulated to further convey that students are building toward independent research.	This recommendation can be addressed within each Project Pack, highlighting the steps of the research process that each project is highlighting.	All research project leads	Sept 2024
5.1 iSci Program Director's Fund Include all iTeach members in finalizing the iSci Program Director's Fund terms of reference.	Finalize the "Terms of Reference" for accessing Director's Fund money.	Program Coordinator	January 2024

5.2 Faculty retreat iSci should hold a short retreat in which Faculty workload is critically evaluated.	Workload will be a topic in the current year's retreat. We will require some guidance from outside the Program on the feasibility of recommendations stemming from this exercise, given the broader context of instructional workload in the Faculty currently. See also Recommendation 5.4.	Program Coordinator & SIS Director	Retreat scheduled during summer 2023.
5.3 Discussions with the Office of Undergraduate Research iSci Faculty should be included in discussions with the anticipated Office of Undergraduate Research. ISci faculty are experts in mentoring and training undergraduate students in undergraduate research – including as undergraduate research supervisors if teaching professors are eventually supported in this endeavor.	We are looking forward to working with this Office, whose aims and goals seem very much in harmony with iSci's pedagogical focus.	Office of Undergraduate Research	From Fall 2023

5.4 Development of new courses Discussion between iSci Faculty and the Dean's Office should be undertaken with the aim of ensuring that there is sufficient free time for iSci faculty to develop new courses.	For core iSci instructors, the provision of teaching units for developing and offering a fourth-year seminar in an area of their research focus has just recently been possible. For the wider instructional team to be able to develop and rethink their iSci teaching with Recommendations 3.1 and 3.3 at the forefront, dedicated time is required. The increased workload flowing from the demands posed by accommodations, students stress and absenteeism is now unconducive to creative work outside the minimum necessary for keeping teaching and assessment moving.	SIS Director	Already achieved Unknown
5.5 Faculty succession planning Based on iTeach team feedback we recommend hiring a physical scientist to ensure strength in the Physics/Math aspects of the program.	The recommendation to hire a physical scientist is dependent on School-wide consultation process to identify priority areas for faculty hires. Normally, FoS undertakes a transparent competitive process to allocate faculty positions to academic units. Therefore, this is another threshold that needs to be	SIS Director	Sept 2024

	overcome to recruit program specific faculty. Currently faculty renewal is paused due to the budgetary constraints faced by FoS. The workload of iSci Program Coordinator is considerable and unique given the demands posed by the integration approach. Support to this administrative position can be provided through teaching release and/ or additional admin support from instructional and administrative assistant staff. We are undergoing a re- evaluation of SIS governance structure and By-Laws that may allow for the implementation of teaching release for Program coordinators. In addition, we would like to investigate the possibility of a redefinition of instructional staff workload that could free up time to be reallocated to support program administration. As one measure, which will require resourcing in the form of teaching units, is the creation of a Level I coordinator role, preferably a faculty member, would make the biggest positive difference to the Program's pedagogic delivery capacity. It would also mean that a key iSci role would be available to experienced iSci instructors from beyond SIS.		

5.6 Program-level transcripts in MOSAIC Establishing student access to program-level transcripts in MOSAIC in a seamless way should continue to be a priority	This highly desirable outcome is on its way, dependent on the Registrar and the Mosaic team. First stages are ready for Spring/Summer 2023 – Registrar-housed portal for 'iSci Transcript Supplement' (formerly the iSci Transcript). Issue to still address is that the external proprietor charges for each transcript, which we are problem-solving to negate for the 'iSci Transcript Supplement.'	Academic Department Manager	April 2024

5.7 Student Accessibility Services interface The resourcing issues at Student Accessibility Services must be addressed at the highest level of the university to ensure that students are not unfairly disadvantaged. Faculty should not be overburdened with insurmountable workloads associated with navigating student accommodations within a broken system.	Here, we cannot do better than quote the Reviewers directly: "The resourcing issues at Student Accessibility Services must be addressed at the highest level of the university to ensure that students are not unfairly disadvantaged. Faculty should not be overburdened with insurmountable workloads associated with navigating student accommodations within a broken system." We have and will continue to advocate for a better understanding of the problems faced by our students which is reflected in increased anxiety, mental distress, accommodations, and absenteeism. To continue to do business as usual and simply add processes and more staff without a deep understanding of the source of these issues is not effective to say the least. There are opportunities to engage with the Faculty of Science Accessibility and Accommodation Officer (FAAO), especially after the recent review of the Student Accessibility Services. *A review of SAS was conducted in 2023 after the site visit.	Work with the Director, Student Accessibility Service and Faculty of Science Accessibility and Accommodation Officer (FAAO)	September 2023
5.8 Office space A committee should address current and anticipated office space needs for iSci faculty	Office space allocation across	SIS Director	Ongoing

and staff while preparing for arrival of additional hires	SIS (in Arthur Bourns Building (ABB) and General Science Building (GSB) is under constant review as SIS personnel change.		
5.9 Student iStudy space Dedicated study space for ISci students should be retained.	We have no plans to change our student study space and will happily keep iStudy. Our use of the iStudy and the ThInK Space is dependent on an agreement between the FoS and the Library.	University Librarian, Director of SIS and Dean of Science	Annual review of MOU
5.10 Student ABB space The Faculty of Science continue to explore opportunities for iSci study space in ABB, within the School of Integrated Science.	We agree that provision of ABB Program study space adjacent to SIS offices would be excellent, but this would be dependent on the plans of the Faculty of Engineering who currently occupy the space and provision of budget from the Faculty of Science.	Dean of Science and Director of SIS	No timeline

7.1 Expansion of Teaching of Scientific Literacy across the Faculty of Science The teaching of scientific literacy (writing, citing, editing and presentation skills) in the broader Faculty of Science be reviewed and modified as needed to fully incorporate the best practices developed in the iSci program. This might mean the modification or enhancement of an existing course or the preparation of new offerings, preferably at both introductory and more advanced levels in the curriculum. More specifically, this might mean that some present iSci instructors serve on committees with other colleagues from outside of iSci to develop the new or revised course offerings that focus on development of scientific literacy skills. Initially these might be piloted with a more restricted set of students, e.g., students in honours BSc programs, before launching versions oriented to the needs of general students.	iSci's strong focus on science literacy has become the most distinctive feature of the Program. The School has a continuing focus on one aspect, science communication, which has been heavily emphasised in our sister program Honours Life Science. iSci instructors have also been active in developing SCIENCE 1A03, an open course for Faculty of Science students. We would hope to play an important part in any additional initiatives to increase science literacy across the Faculty.	Dean of Science and Associate Dean Undergraduate	This would require at least a two-year development, implementation, and evaluation cycle.

9.1 Library needs Faculty of Science level discussions with McMaster libraries to identify Faculty of Science library needs and develop a strategy or staffing plan to strengthen connections between libraries and science and enhance program delivery.	Develop an ongoing staffing plan for sustainable Library input into the Program and more, broadly, across the Faculty of Science.	Dean of Science and University Librarian	Jan 2025
9.2 New MoU with contributing Faculty of Science units A new Memorandum of Understanding (MOU) regarding iSci should be presented in Faculty Council. The aim of this exercise should be a renewal of commitment from Faculty of Science units to ISci.	The process of re-affirming Faculty of Science academic unit's commitments to iSci via Faculty Council and a renewed or new MOU has been initiated.	SIS Director	April 2025

Dean's Response, Faculty of Science:

I sincerely thank all three Reviewers for their thorough and constructive review of the Honours Integrated Science (iSci) undergraduate program. It was extremely beneficial to have External Reviewers with knowledge and experience of the structure and content of Interdisciplinary Science programs at other institutions. I would also like to thank the members of the IQAP group from the School of Interdisciplinary Science representing the iSci program for preparing the Program response to the report. The Reviewers' report highlights many strengths of this unique program at McMaster, as well as numerous recommendations to address the challenges presented.

Together with the Associate Dean Undergraduate (Dr. Rosa da Silva) and the Associate Dean Equity, Diversity, Inclusion and Indigeneity (Dr. Kalai Saravanamuttu) have reviewed the program's response to the review and agree with proposed plans and timelines for improvement and enhancement. Given the extensive list of recommendations, I have organized my response according to the major categories identified by the Reviewers in their review document.

Program Summary (2.1-2.2)

The IQAP reviewers noted students' concerns and difficulties managing iSci courses and

In line with Recommendation 2.2, the Associate Dean's (Undergraduate Studies) Office will continue to carefully monitor program offer and acceptance data and adjust program offer projections with a goal to maintain the target enrollment of 64 students per year. The Science Recruitment team will also work with the iSci admissions review team to discuss strategies for promoting the program to international students.

Curriculum (3.1-3.4)

The Faculty of Science, through its strategic planning initiatives in Equity, Diversity, Inclusion, and Indigeneity (EDII) supports the iSci program in its efforts to integrate content and culture emphasizing EDII in the iSci curriculum and operations. A Garden Grant, awarded to SIS in 2022, affords iSci instructors additional specific supports to encourage goal-directed changes to course content and instructional activities in a manner that is manageable for them. The Reviewers' recommendations to incorporate EDI discussions into collaborative group work and peer mentoring are excellent and encouraged. The Faculty and University have applauded and supported the implementation of iSci's Equitable Admissions for Black Applicants (EABA) process. Together with SIS, the Faculty is monitoring the EABA process in iSci with the goal of implementing similar Equitable Admission processes broadly across the Faculty of Science.

The Faculty is sensitive to the needs of iSci students in Level 3 to engage in independent research projects and promoting the unique training and capacity of iSci students to potential supervisors across academic units in the Faculty of Science. In addition to the iSci program's efforts to connect students with Researchers across the Faculty, the newly created Office of Undergraduate Research https://our.science.mcmaster.ca will facilitate iSci independent projects and other student research opportunities through a variety of supports including an interactive website to increase awareness of and access to research labs and resources as well as connections with faculty, post-doctoral fellows, and graduate students.

The Faculty recognizes the historical dependence of the iSci program on Math instructional personnel for teaching programming and supports their strategy to assign a faculty member responsibilities to lead integration of programming skills into Level 1 and Level 2 iSci courses going forward. The Department of Physics and Astronomy has recently carried out a review of computing and programming needs both within the Faculty and with feedback from our alumni. When this report becomes available in the coming months, the Faculty plans to engage in evidence-based efforts to further support development and integration of programming training within the Faculty of Science curriculum.

The Faculty acknowledges the Reviewers' concerns regarding the 'hustle culture' in iSci and its potential challenges to student wellness and supports the proposal to create an internal iSci program committee comprised of faculty, students, and consultants from the Student Success Centre to assess the prevailing culture, make recommendations, and facilitate actions to modify the culture and student behaviours to prioritize positive mental health and well-being.

Teaching & Assessment (Recommendations 4.1-4.2)

The Reviewers' suggestions to promote the uniqueness of the iSci program and the iSci student experience are well taken. The Faculty supports the School's proposal to create authentic information and program promotion materials (infographics, vignettes) as a collaboration between students and faculty with support from the Faculty of Science Recruitment team.

These efforts will bolster the Faculty's commitment to showcase the iSci program. Recently, the Faculty Communications team seized a unique opportunity to spotlight the experiences of an iSci student (Taren Ginter), who was member of the McMaster NEUDOSE space satellite launch team, in our monthly publication: Science Matters (March 2023) and again when Taren represented iSci as a Class of 2023 Valedictorian in the University Daily News (June 2023).

The engaging, challenging, and progressive scope of research projects across the years in iSci is vital to communicate effectively to students. The Faculty supports the iSci team in their refinement of Project Pack information to highlight the project research process to students through the project leaders.

Resources to meet Program Requirements (Recommendations 5.1-5.10)

The Reviewers' recommendations to finalize the terms of reference for the iSci Director's fund and to hold a retreat to evaluate faculty workload are already in process. The Faculty is sensitive to the demands of workload in the iSci unit as well as throughout the Faculty at large and open to engaging with academic unit leaders to discuss programming and pedagogical challenges (e.g., generative AI) that require supports or temporary reallocation of existing resources to best support operational needs at the unit level. The retreat in Summer 2023 helped facilitate discussion and identification of iSci's priority concerns and potential avenues to address them.

Together with the Reviewers, the Faculty encourages the iSci program to engage with the Office of Undergraduate Research (OUR). Since its inception in January 2023, the program manager of the OUR has been communicating with unit leaders and researchers in Science to assess capacities and needs to inform strategies and actions for the OUR to develop and operate in ways that will optimize students' research opportunities and experiences in Science.

Conversations with iSci faculty, who are experts in interdisciplinary research will be extremely valuable.

The Faculty appreciates the Reviewers' recommendations to negotiate time for faculty to reflect on and make refinements to the integrated course curriculum of the iSci program. The SIS leadership has already allocated support for instructors to develop research seminars in Level 4. The iSci team was encouraged to have initial conversations about their curriculum refinement ideas and potential actions at the Summer 2023 retreat to assist in determining what resources may be necessary to actualize their plans.

The Faculty acknowledges the Reviewers' recommendation for faculty succession planning. As noted in the Department's response, prioritization of new faculty appointments is guided by transparent processes that may include IQAP reviewers' suggestions but are ultimately determined by a considerate and consultative needs assessment at both the Academic unit and Faculty levels.

The integrated nature of the courses in the iSci program can create confusion when interpreting students' transcripts. The Faculty is happy to see the SIS Academic Department Manager has made progress to have the 'iSci Transcript Supplement' functionally integrated into the MOSAIC infrastructure to enable students to better communicate their iSci program progress for a variety of important purposes.

The Student Accessibility Services (SAS) unit has experienced exponential demand that has challenged its operational effectiveness at times in the past two years. However, these issues are being addressed by the central unit administrative teams in that area and an external review of the SAS was recently conducted and the report with recommendations was widely circulated. The iSci program instructors are encouraged to consult with the Faculty Accessibility and Accommodation Officer in the Associate Dean's (Undergraduate Studies) Office to discuss their challenges and needs and determine ways to facilitate a functional relationship with the SAS that will allow students to access the supports they need and instructors to best utilize their time and resources.

The Faculty takes note of the Reviewers' recommendations regarding office and student (iStudy, ThInK) space and the unit response indicating these issues are being managed effectively. Considering students' current access to devoted spaces in Thode library and constraints on available space in the ABB (adjacent to Thode) a recommendation for additional devoted study space for iSci students in the SIS office area seems unrealistic to support currently, particularly given the fact that most other undergraduate students in the Faculty of Science do not have access to a similar space dedicated to their program.

Expansion of Teaching Scientific Literacy (Recommendation 7.1)

Library Needs (Recommendation 9.1)

New MOU with FoS units (Recommendation 9.2)

The Faculty joins the Reviewers in their acknowledgment of the iSci program instructors' expertise in teaching science literacy and their contributions to courses in areas outside of iSci. However, this recommendation relates more to Faculty operations rather than the iSci program. While all units in the Faculty of Science actively engage students in Science literacy, the recommendation of a Faculty-wide review to assess existing strengths and challenges is welcomed and may be explored in the future. Similarly, Faculty-level consultations with the University Libraries relate to the iSci program but are largely beyond the parameters of this IQAP review. The Reviewers can be assured the Faculty of Science engages in regular communications with the University Libraries teams to identify needs and ways in which they can best support the Faculty and Academic units.

As noted in the Program response, iSci is in the process of revisiting the terms of the MoU with the other Academic units in the Faculty of Science.

Quality Assurance Committee Recommendation:

McMaster's Quality Assurance Committee (QAC) reviewed the above documentation at the June 19, 2024, meeting. The committee recommends that the **Honours Integrated Science (iSci)** undergraduate program should follow the regular course of action with an 18-month progress report and subsequent full external cyclical review to be conducted no later than eight years after the start of the last review.