

BS IN INTEGRATED SCIENCE AND BUSINESS - COLLEGES OF SCIENCE AND BUSINESS

Goals and Justification

Today, technology impacts almost every aspect of society. In order to join tomorrow's workforce, graduates need to be versatile and adaptable. Managerial positions in technology-oriented industries require the integration and understanding of relevant scientific principles with basic management skills. The Integrated Science and Business program (ISB) is designed to equip students to compete and prosper in the new technology-intensive work place.

The ISB combines the disciplines of science and business into an interdisciplinary degree program. Unlike a dual major wherein students independently complete requirements for both programs, the ISB fuses the two programs together through the addition of bridging courses such as entrepreneurship for scientists, the use of social media, team management, negotiating, and marketing.

ISB graduates will know more about business and management issues than a typical science graduate, and will have a broader understanding of science and technology than most business majors. In the long term, the ISB prepares students for careers as entrepreneurs, scientists starting new businesses, or managers operating in technology-based industries. The ISB breaks down traditional disciplinary barriers and will provide students with first-rate preparation for a major in any of the core scientific disciplines while adding an array of relevant business courses that prepare the students for science in the business world. The curriculum is founded on the expectation that much of the deployment of scientific knowledge in societies occurs in a business setting. The ISB program is suitable for any undergraduate considering concentrating in one of the sciences or mathematics. The fusion of a classical science major with the critical foundational elements of a business degree is perfect preparation for a very broad range of careers, both within and outside science. The curriculum is especially valuable for students interested in bridging the traditional barriers between the sciences and the business world.

There are many reasons why such a program is beneficial. These include:

- MBAs with a science or technical background are in greater demand than MBAs with purely a business background.
- There is greater awareness today of the benefits of a person having both hard and soft skills.
- Analytical skills provided by coursework in the sciences complement the intuitive, human-oriented skills provided by coursework in business.

As an example of the market demand for people with integrated science and business skills, a recent (December 2014) position¹ advertisement includes the following skill requirements:

- Minimum 3 years of experience in B2B business development/sales, cameras and/or sensory components used in industrial sectors (manufacturing, surveillance, remote sensing) is preferred.
- Requires a BS degree in a technical field (physics, mechanical or electrical engineering) with good understanding of optics and image sensors.
- Experience including engineering and project management with strong business acumen, including negotiation, financial, and contract language.
- Experience managing partner/customer relationships
- Entrepreneurial mindset to identify and develop new business opportunities

This list demonstrates that the ability to work with clients, manage a business and have command of a technical area is important work requirements. These types of requirements can be better met with an education that fuses science with business.

Description of the Program

The ISB is an innovative and interdisciplinary degree program involving RIT's College of Science and the Saunders College of Business. The ISB offers students an opportunity to complete a technical course of study while complementing the technical study with skills needed in business and entrepreneurship. It is open to a select group of students, both incoming and upper-class students, who possess exceptional scientific and mathematical aptitude, are strongly motivated to succeed academically, and are especially eager to study an integration of a discipline of science and mathematics with business studies within the context of a liberal arts and sciences education. The Office of Undergraduate Admissions will work with the College of Science to determine appropriate academic profile parameters for entering students with final authority for admission decisions resting in the Office of Undergraduate Admissions.

Candidates can be admitted into the program by either declaring it as a major upon matriculation at RIT. Upper class students may submit a formal application for transfer to the ISB. Those transferring in to the ISB will work with an academic advisor to develop a study plan for the balance of their undergraduate education.

ISB students will pursue and complete a major program of study in one of the disciplines within the RIT College of Science. They will complete (or be on course to complete) two College of Science foundation courses that are part of a two semester sequence in one of the following disciplines: Biology, Chemistry, Physics or Imaging Science; and a foundation sequence in Mathematics, all from a predetermined selection of foundation courses. As proposed, the Program offers the flexibility of being applicable to the integration of business with any science or math major.

To get a BS in Integrated Science and Business, students must complete:

- 60 credit hours of General Education
- 30 credit hours in a selected Science or Mathematics major
- 27 credit hours of Business education, including:

Course number	Title	Credit Hours
ACCT-110	Financial Accounting	3
DECS-310	Operations Management	3
MGMT-215	Organizational Behavior	3
MKTG-230	Principles of Marketing	3
FINC-220	Corporate Finance	3
MGMT-101	Entrepreneurship	3

Students will also have an opportunity to choose from a selection of electives, including Applied Entrepreneurship/Commercialization, Engineering Management, Negotiation, Economics 101/102, Management 340, Communications 253 and others. Students will be required to complete two coops during the program, one in a science-based position related to their major, and one in a business setting. Students will be admitted upon the approval of the ISB committee (consisting of the heads of the involved schools or their designees and the ISB Director). Students accepted into the ISB will be assigned an advisor in their primary COS discipline and an academic advisor in the ISP. They will complete the University's General Education requirements while pursuing their degree. In addition to the courses required by the student's selected minors, if any, and those required by General Education, the ISB will offer special topics courses selected from offerings across the University. These special topics may cover, for example, the use of social media and other topics as ISB student interests dictate.

Fit with RIT's Mission and Strategic Directions

The ISB will complement RIT's Vision, Mission and Strategic Direction through the implementation of an academic program that enables students, with the direct participation of faculty, to define a personal, rigorous course of study that will integrate one science discipline with a curriculum in business. By its very nature, the ISB will offer a rigorous RIT education that fuses a degree in one of the science disciplines with an education in the primary components of a business degree. The ISB will develop and deliver curricula that provide students with the preparation needed for careers that span both their chosen science major and business skills, including entrepreneurship, program management, and the operation of startup businesses.

The ISB directly addresses RIT's stated Guiding Principle: "*Interdisciplinary academic programs will be encouraged*". Moreover, the ISB enables RIT, with minimal risk and investment, to fulfill its mission to "*rigorously pursue new and emerging career areas*" and in its capacity to "*develop and deliver curricula and advance scholarship and research relevant to emerging technologies*"².

Synergy with Other Programs

The ISB will work with the student's selected major discipline in the College of Science and the Saunders College of Business to create an educational program that prepares students for careers in today's entrepreneurial world. Graduates with a degree in ISB will have:

- A rigorous technical degree in a selected discipline in the College of Science.
- A complementary education in key skills taught in the Saunders College of Business, such as knowledge of the entrepreneurship process through completion of the core business courses in SCB and technical communication skills (two courses in English, one of which must be Writing Seminar and oral presentations at a monthly ISB seminar).

In time, the program could be considered for expansion to include other colleges.

Administrative Structure

The ISB will be housed within the College of Science. The main governance will be a Program Director who will be selected from the faculty engaged in the program. The 3-year appointment of the Director will involve the Dean of the College of Science (COS) and the Dean of the Saunders College of Business, in consultation with the heads of their academic units. ISB Director will report directly to the COS Dean and will work with the relevant academic discipline heads (or their appointees) to create an integrated science and business curriculum for each student admitted into the program by using electives from the related discipline major to create an achievable technical education that spans the major and the ISB courses in Saunders. The Director will advocate for the program, will work with academic advisors to monitor students' progress, will allocate teaching responsibilities, will work with the department heads and school heads of the constituent faculty to provide feedback as to the contributions of their faculty to the program, and will oversee the budget of the program, student recruitment, and delivery of the curriculum. The Director will track the effectiveness and enrollment of the program and provide an annual report to the Deans of the Colleges of Science and to the Dean of the Saunders College of Business.

Enrollment Management Expectations and Sustainment

RIT's Office of Enrollment Management has confirmed enrollment projections for this program (see link to attached letter at the end of this concept paper). Integrated Science and Business Programs have been implemented and are operating successfully at many leading universities, including the University of

Wisconsin³, LaSalle University⁴, James Madison University⁵, the University of Illinois⁶, Rutgers University⁷, and more. Communication with the Director of the ISB program at UWW shows that the program has enjoyed a strong and growing enrollment⁸ since its inception eight years ago, currently graduating 25 to 35 students per year. Demand for these graduates is strong and they have no trouble getting jobs. The proposed ISB would allow RIT to step forward and announce the availability of an attractive new educational program that combines our technical depth and breadth while giving the gifted student the opportunity to master invaluable business skills for entrepreneurship and science management. This synthesis of a science degree with business, combined with RIT's technical reputation and academic rigor, is expected to draw additional highly-qualified students to RIT, increase enrollment, and to create a new graduating student population that will have superior training as they compete for subsequent employment. Academic excellence will be maintained through the personal mentoring of each student by faculty appointed in their selected disciplines and the College of Business, and through the collective guidance of the student by the ISB office. The additional educational enrichment provided by the ISB program through courses in project management, entrepreneurship, self-organization and teamwork is also expected to create increased enrollment in the program. Using the ISB as a framework, RIT can begin marketing the new degree program quickly to new incoming classes of students, and establish a presence in this growing educational segment. RIT's Office of Enrollment Management projects initial enrollment in the ISB at 10 new freshmen and 5 new transfers for the first year, growing to a total enrollment of 55 by the fifth year.

Impact on Resources

The proposed ISB carries the following impacts:

- RIT resources (faculty, staff and space)
 - The Program uses existing majors, combined within a student's educational plan, to produce a technical education in an interdisciplinary science and mathematics field. The Program would require the appointment of a fulltime Director, a part time staff support person, part time support from an academic advisor, and associated office space. (500 sq ft).
 - Faculty support in the participating departments
 - The ISB would require an initial operating budget to cover:
 - An annual student dinner or similar recognition event
 - Development and distribution of marketing material to advertise the program
 - The ISB would require resources for teaching courses in Project Management, Entrepreneurship, and Interdisciplinary Teamwork to the extent that these courses are unavailable elsewhere on campus.
- A likely increase in RIT enrollment due to an expanded educational offering
- The immediate expansion of RIT's educational offerings into new areas without sacrificing technical excellence.

Conclusion

There is an increasing demand for graduates with both technical depth and excellence in a science, as well as a command of fundamental business concepts, processes, and skills. In order to remain competitive in both research and academics and offer state-of-the-art degrees that enable additional career paths for our graduates, RIT must offer educational programs that fuse science degrees with business.

This concept paper proposes the creation of the Integrated Science and Business Program (ISB) within the College of Science at RIT. It is based on two guiding principles: (1) that many of the most important future scientific advances, although based in conventional disciplines, will demand skills in business, and (2) a rigorous education across those disciplines will increase the likelihood of a student's future success. This program is an innovative curricular program that offers students options for such a fusion, and is not

currently offered by any other program at RIT. The ISB is designed to broaden and enrich the study of the science disciplines while developing a rigorous depth of knowledge in business principles. It will augment a student's science and business studies with additional courses that fuse these two fields within the context of a liberal arts and sciences education.

The ISB will include training in project management, critical thinking, problem solving, teamwork, entrepreneurship, and scientific writing. It will be supported by a broad, solid educational foundation in science and business courses by both the College of Science the Saunders College of Business.

References:

- (1) http://www.careerbuilder.com/jobseeker/jobs/jobdetails.aspx?sc_cmp1=js_jrp_jobclick&APath=2.21.0.0.0&job_id=J3F5DV62VP813QVDMP0&showNewJDP=yes&IPath=QHKV0V
- (2) <http://www.rit.edu/president/mission.html>
- (3) <http://www.uww.edu/academics/departments-and-majors/integrated-science-business>
- (4) <http://www.lasalle.edu/isbt/>
- (5) <http://bsisat.jmu.edu/faq.html>
- (6) <http://news.illinois.edu/ii/08/0417/psm.html>
- (7) <http://mbs.rutgers.edu>

Evidence of Enrollment:

John Ejnik, Director, ISBP, U. Wisconsin Whitewater: <http://goo.gl/oa8c6f>
Edward Lincoln, Asst. V.P. Enrollment Management, RIT: <http://goo.gl/862Mnv>

Letters of Support:

Letter of Support, Dean's Office, Saunders College of Business: <http://tinyurl.com/o66pd93>
Ashok Robin, Saunders: <http://goo.gl/x9z4lR>
Jeffrey Harris, Xerox: <http://goo.gl/YTJSi4>
Ken Reed, COS Advisory Board: <http://goo.gl/yIDrfX>
Nancy Fein, Toyota: <http://goo.gl/JrgBre>
Roger Kuntz, COS Advisory Board: <http://goo.gl/pK9Csd>
Ted Dziuba, COS Advisory Board: <http://goo.gl/jPEOul>

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February 28, 2015

Dr. Sophia Maggelakis
Dean, College of Science
Rochester Institute of Technology

Dear Dr. Maggelakis:

On behalf of the Saunders College of Business, I would like to provide our enthusiastic support for the proposed degree program, BS in Integrated Science and Business. RIT is uniquely positioned to deliver this interdisciplinary program, which builds upon the strengths of both colleges. As your concept paper indicates, this program would provide students with scientific depth and breadth as well as invaluable business management skills, a combination that is highly sought after by industry.

While Saunders College is supportive of this concept and currently has the faculty expertise to deliver the required coursework, it would be imperative that the University provide the appropriate faculty resources, including tenure-track faculty (TT), in order to be able to continue to meet AACSB guidelines with respect to the required participating faculty (i.e., T/TT) in the college.

We look forward to working with you on the development of a full proposal.

Regards,



Jacqueline R. Mozrall, Ph.D.
Interim Dean

**BS Integrated Science and Business
SUMMARY REPORT**

Fiscal Year	2017	2018	2019	2020	2021	Total
Avg Enrollment: Students (FT + PT)	10	24	38	51	55	178
Part-time Faculty expense	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Full-time faculty expense	\$ 133,589.78	\$ 272,523.15	\$ 416,960.43	\$ 567,066.18	\$ 578,407.50	\$ 1,968,547.04
Total Expenses	\$ 252,283.55	\$ 483,543.17	\$ 687,477.80	\$ 879,052.87	\$ 885,986.86	\$ 3,188,344.26
Revenue (Net of Aid)	\$ 245,486.21	\$ 619,950.86	\$ 997,711.83	\$ 1,378,838.27	\$ 1,491,790.87	\$ 4,733,778.04
CONTRIBUTION MARGIN Surplus/(Deficit)	\$ (6,797.34)	\$ 136,407.69	\$ 310,234.02	\$ 499,785.39	\$ 605,804.01	\$ 1,545,433.78

Note : This sheet is password protected to maintain the formulas.