

Rochester INSTITUTE OF TECHNOLOGY

Minor Program proposal form

**The Center for Multidisciplinary Studies (CMS)**

**Name of Minor:** Innovation Minor

**Brief description of the minor to be used in university publications**

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| The Innovation Minor enables RIT students from all colleges to develop the necessary skills, knowledge, and experiences to become innovators in areas of interest related to their individual academic and professional goals. The core of the minor helps students to define innovation; understand past and current trends in innovation, as well as the processes and practical considerations for innovating; and gain experience at innovating through project-based, interdisciplinary experiential learning and collaborative activities. Students who select the minor will also “specialize” by taking innovation elective courses with the aim of exploring an area of personal and/or professional interest within the boundaries of the larger minor.  The Innovation Minor is inter-disciplinary in its approach and fosters multi-college collaboration as it allows students to select discipline-specific courses, sourced from across the university, as their innovation elective courses. |

**1.0 Minor Program Approvals**

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| Committee: | Approval request date: | Approval granted date: |
| Academic Unit Curriculum Committee | 4/9/2013 | 4/9/2013 |
| College Curriculum Committee | 4/15/2013 | 5/6/13 |
| Inter-College Curriculum Committee | 4/2/2015 | 4/15/15 |

**2.0 Rationale:**

A minor at RIT is a related set of academic courses consisting of no fewer than 15 semester credit hours leading to a formal designation on a student's baccalaureate transcript

How is this set of academic courses related?

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| Developing creative and innovative graduates is central to RIT’s mission; and Creative and Innovative Thinking is among the five essential program outcomes for all RIT degrees. RIT aspires to be an Innovation University, and is rich with curricula and expertise that help students explore and develop their capacity for technical, commercial, artistic, and social innovation. We therefore are proposing an Innovation Minor designed to capitalize on this richness while providing both the structure and means for students (and faculty) to collaborate on multidisciplinary teams.  The Innovation Minor is a project-intensive, interdisciplinary program that can be customized to suit the individual academic and professional goals of RIT students. Such flexibility will be inherent to the minor itself, which can evolve and stay relevant through future trends and changing student needs and pursuits. Students with interests in new product development, social entrepreneurship, and system theory and change currently have no clear opportunity to transcript developmental efforts to become expert in the practice of innovation. The minor is an opportunity to bring together hands-on activities in an idea lab-like environment with more reflective and theoretical work.  The core of the minor is built upon three required courses that share three overarching objectives: to define innovation; to understand past and current trends in innovation, as well as the processes and practical considerations for innovating; and to gain experience at innovating through project-based experiential learning and collaborative activities. Yet, the design of the minor remains flexible by building on the core with the requirement that students “specialize” and take two innovation elective courses with the aim of exploring an area of personal and/or professional interest within the boundaries of the larger minor. In order to offer a meaningful pool of elective courses and to engender broader interest in the Innovation Minor at RIT, elective courses will be sourced from across the campus. As such, a distinguishing feature of this minor is that it fosters and embraces multi-college collaborations.  The Simone Center for Student Innovation and Entrepreneurship at RIT currently offers a number of innovation (problem solving/solution realization) activities that are not currently integrated into an appropriate minor.  One example is the IdeaLab@RIT program, which identifies organizational specific “problems” from a variety of companies/non-profits and then arranges teams of technology, design and business students to develop potential solutions. If the client organization and the student team agree on a solution, the participating students are provided course credit (through the I-Lab course) to create the appropriate product or service. Another example is the National Collegiate Inventors and Innovators Alliance E-grant program.  Over the past two years, three student teams have received NCIIA grants to advance their innovations. These teams work through the I-Lab course to integrate this experience into their curriculum.  The pedagogical design of the Innovation Minor is intended to allow students to earn the minor in a variety of ways. In the broadest sense, the learning outcomes are related to (1) Innovation processes—mental and behavioral models and tools for approaching problems through divergent and convergent thinking; and (2) Innovation practices—experience and expertise applying the models and tools to the development of innovations. These learning outcomes are assumed to occur in a collaborative context of RIT peers (and faculty), but could also involve collaborative work with individuals and teams external to RIT. More specifically, the defined learning outcomes are:   * Define and distinguish innovation from related concepts such as creativity, discovery, and invention; * Define and describe characteristics, processes, advantages, and disadvantages of closed and open innovation; * Understand entrepreneurialism as a strategy for implementation/commercialization of innovations; * Identify stages and examples of innovation processes to solve problems; * Analyze, and describe multidisciplinary aspects of a problem and identify required skills for addressing it; * Enumerate advantages and challenges in creating, leading, and working in interdisciplinary teams; * Describe the process of finding applications and markets for inventions and innovative ideas; * Discuss and analyze case studies involving ramifications of innovations with social values and intended and unintended social consequences; * Contrast and compare methods of incentivizing and rewarding innovation; * Demonstrate the ability to contribute to the analysis and solution of novel problems as a member of an interdisciplinary team; * Gain experience working on complex, non-trivial societal problems in cross-disciplinary student teams in an effort to find real solutions. |

**3.0 Multidisciplinary involvement:**

If this is a multidisciplinary minor spanning two or more academic units, list the units and their role in offering and managing this minor.

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| **The Center for Multidisciplinary Studies (CMS)**  CMS is the certifying academic unit for the minor. The three required courses for the minor come from the CMS course catalog and will be taught by CMS faculty members. In addition to maintaining the quality and integrity of the minor courses, CMS will also retain oversight for determining which courses can act as electives for the minor. Advising support for elective selection will be provided by the professional advisors in CMS in consultation with the faculty members teaching the three required minor courses.  The Executive Director of CMS will be the authorized signature for approving elective courses and certifying the minor upon completion.  **Simone Center for Student Innovation and Entrepreneurship,**  **The RIT Laboratory for Media, Arts, Games, Interaction, and Creativity**  In order to promote a wider variety of pedagogical approaches (e.g., teams, labs, workshops, and demonstrations), faculty and students will have as a resource the premier facility of the Simone Center for Student Innovation and Entrepreneurship, as well as the RIT Laboratory for Media, Arts, Games, Interaction, and Creativity. Additionally, the final course in the minor, CMS-CMDS-511 Innovation Lab will be delivered, in a workshop format, using the Simone Center for Student Innovation and Entrepreneurship.  **Faculty members and Departments from across RIT**  Although CMS will have responsibility to determine which courses can act as electives for the minor, elective selection is not intended to be a closed process, and so faculty members and academic units from across RIT are actively encouraged to propose, using a set of publically available policies and procedures, new or existing courses for consideration as elective courses. The majority of innovation electives approved for the minor will come from outside of CMS. |

**4.0 Students ineligible to pursue this minor:**

The purpose of the minor is both to broaden a student's college education and deepen it in an area outside the student’s major program. A minor may be related to and complement a student’s major, or it may be in a completely different academic/professional area.   It is the responsibility of the academic unit proposing a minor and the unit’s curriculum committee to indicate any home programs for which the minor is not a broadening experience.

Please list below any home programs whose students will not be allowed to pursue this minor, provide the reasoning, and indicate if this exclusion has been discussed with the affected programs:

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| None. The Innovation Minor is open to all RIT undergraduate students with second year standing or higher. This minor cannot be completed by CMS students who are pursuing a concentration in Innovation. |

**5.0 Minor Program Structure, Sequence and Course Offering Schedule:**

Describe the structure of the proposed minor and list all courses, their anticipated offering schedule, and any prerequisites.

* All minors must contain at least fifteen semester credit hours;
* Minors may be discipline-based or interdisciplinary;
* In most cases, minors shall consist of a minimum of two upper division courses (300 or above) to provide reasonable breadth and depth within the minor;
* As per New York State requirements, courses within the minor must be offered with sufficient frequency to allow students to complete the minor within the same time frame allowed for the completion of the baccalaureate degree;
* Provide a program mask showing how students will complete the minor.

Narrative of Minor Program Structure:

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| **Overview**  The Innovation Minor is a project-intensive, interdisciplinary program that can be customized to suit the individual academic and professional goals of RIT students. The core of the minor consists of three required courses, two of which are 300 level or higher, and two innovation electives. Electives are selected with advisor and department approval from a list of pre-approved courses sourced from across the university. CMS will ensure that sections of the three required minor courses are made available at least once annually. Under this model, students can complete this minor within 4 semesters.  **Program mask**  (***Please note****. This is an ideal sequencing and the actual order in which students take the two required Innovation elective courses will be determined by the availability of those courses as determined by the scheduling policies of the colleges in which the courses originate, the student’s larger plan of study, and any prerequisite requirements associated the courses.*)   |  |  |  | | --- | --- | --- | | **Level:** | **Fall:** | **Spring:** | | Freshman |  |  | | Sophomore | CMS-CMDS-211: Exploring Innovation | CMS-CMDS-211: Exploring Innovation | | Junior | CMS-CMDS-411: The Practice of Innovation and Invention  TBD: Innovation Elective 1 | CMS-CMDS-411: The Practice of Innovation and Invention  TBD: Innovation Elective 2 | | Senior | CMS-CMDS-511: Innovation Lab | CMS-CMDS-511: Innovation Lab |   **Additional policies and requirements specific to the Innovation Minor:**   * Students requesting the minor need to have a Minor Authorization Form signed by the Program Chair in CMS. Students should submit completed forms to their home department for processing; * 9-semester credit hours from the required courses approved for the minor, as well as an additional 6-semester credit hours earned from any two of the approved elective courses for the minor;   **Innovation Minor, Required Courses**  (See the Course Outline Forms that accompany this document for additional details.)  **CMS-CMDS-211 Exploring Innovation**  Innovation of some type occurs in all fields and disciplines. This course, which helps students develop an *innovative mind set*, discusses the nature of innovation, including what innovation is, the goals and objectives of innovation, how innovation happens, and reasons that innovations succeed or fail. Case studies in a variety of disciplines are explored to further understanding of innovation (Pre-requisite: Second year standing or permission of instructor).  Class 3, Credit 3 (Fall, Spring)  **CMS-CMDS-411 The Multidisciplinary Practice of Innovation and Invention**  This course comprehensively examines how innovation translates new ideas or inventions into practical use in the form of products, markets or services, concepts or systems. The practice of innovation requires understanding different innovation paradigms; the role of creativity, discovery and invention; entrepreneurialism as an implementation strategy; intellectual property issues; team building and collaboration; and experience. Selected case studies and exemplary problems are explored to illustrate the principles and to acquire the skills of innovation. (Pre-requisite: CMDS-211 Exploring Innovation or permission of instructor)  Class 3, Credit 3 (Fall, Spring)  **CMS-CMDS-511 Innovation Lab**  This course builds on the skills and knowledge gained in CMDS-211 Exploring Innovation and CMDS-411 The Practice of Innovation and Invention. In the course students engage as members of an interdisciplinary project team exploring a complex, non-trivial problem for which an innovation in science, technology, design, business, artistic expression, etc., could be significant for working toward a resolution of the problem. Problems may be proposed by students or by faculty mentors, or derived from external sources. After selecting a problem, each team works throughout the semester designing a solution, culminating in a formal written report and oral presentation at the conclusion of the project. (Pre-requisite: CMDS-411 The Practice of Innovation and Invention or permission of instructor) Workshop format Class 3, Credit 3 (Fall, Spring)  **Innovation Minor, Elective Courses**  **IGME-581 Innovation & Invention**  In this course, students explore the process and products of innovation and invention. Each term a multi-disciplinary team of students conceives and develops a different "outside the box" project. Readings, projects, scholarly term papers, and pragmatic challenges of collaboration and communication across disciplines provides direct experience of the interplay of technology, human nature, and a human environment in which emerging technologies and new modes of interaction are pervasive and ubiquitous. Artists, natural scientists, social scientists, and technologists are guided through a series of collaborative experiences inventing, designing, implementing and studying emerging technologies. Presentations, projects and individually-written research papers are required. The faculty staff and resources of the Center for Student Innovation are significant assets for this course. (Third Year Standing & First & Second Year Core Completion) Class 3, Credit 3 (Fall, Spring), General Education Elective  **MGMT-330 Design Thinking and Concept Development**  Design thinking is a process that aids collaboration among designers, technologists, and business professionals. The process provides a structured creative process for discovering and developing products, services, and systems for profit and non-profit applications. Students will apply a wide range of design tools in a hands-on project. Topics include problem-framing, end-user research, visualization, methods for creative idea generation, and prototyping. (Junior status)  Class 3, Credit 3 (Fall, Spring), General Education Elective  **CMDS-333 Wicked Problems**   |  |  | | --- | --- | |  | This course will expose students to approaching and working on “wicked” problems - unstructured, multidisciplinary issues lacking clear “right or wrong” answers.  The course will introduce key skills for handling unstructured problems such as whole systems thinking, estimation and assumptions, valuation, and problem solving techniques, with the majority of the semester focused on a specific topic (wicked problem) and team case study.  Students will work in teams to research and address one aspect or subset of the “wicked” problem at hand to join collectively with the results of all teams to form a more complete overall solution to the wicked problem.  (Third year standing) Workshop 4, Credit 3 (Fall, Spring), General Education Elective |   **CMDS-441 Creative Critical Thinking and Problem Solving**  An interdisciplinary approach to the generation and evaluation of ideas and solutions. Includes analysis of the conditions limiting creativity and the development of a "toolkit" of strategies and techniques for discovering, inventing and assessing new, unique and  useful ideas, applications and solutions. Applicable to a range of life and work situations, from complex environmental concerns to competitive business challenges to family disputes. (Prerequisites: Third year standing or permission of instructor)  Class 3, Credits 3, (Spring, Summer), General Education Elective  **ENGL-419 Literature and Technology** Surveying the rise of computing technologies, information theories, and information economies in the last century, this course considers their impact on literature, culture and knowledge-formation. In particular, we will reflect on topics such as the relations between social and technological transformation, literary print and digital cultures and electronic literature. Part of the science, technology and society minor; the science writing minor; the literary and cultural studies concentration and minor; and may also be taken as an elective.  Class 3, Credit 3 (offered annually), General Education Elective  **ENGL-450 Free & Open Source Culture** This course charts the development of the Free Culture movement by examining the changing relationship between authorship and cultural production based on a variety of factors: law, culture, commerce and technology. In particular, we will examine the rise of the concept of the individual author during the last three centuries. Using a variety of historical and theoretical readings, we will note how law and commerce have come to shape the prevailing cultural norms surrounding authorship, while also examining lesser known models of collaborative and distributed authoring practices. This background will inform our study of the rapid social transformations wrought by media technologies in last two centuries, culminating with the challenges and opportunities brought forth by digital media, mobile communications and networked computing. Students will learn about the role of software in highlighting changing authorship practices, facilitating new business and economic models and providing a foundation for conceiving of open source, open access, participatory, peer-to-peer and “Free (as in speech, not beer)” cultures. (Prerequisites: Completion of First Year Writing (FYW) requirement is required prior to enrolling in this class.)  Class 3, Credit 3 (offered annually), General Education Elective |

**Criteria for student petition for a particular elective course or courses:**

1. does not duplicate a required course in the minor
2. enhances coherence or provides disciplinary or professional depth
3. student has adequate preparation to be successful in the course

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| **Course Number & Title** | **SCH** | **Required** | **Fall** | **Spring** | **Annual** | **Pre-req** | **Point of Contact** |
| **CMDS-211: Exploring Innovation** | 3 | Yes | X | X | Yes |  | James Hall |
| **CMDS-411: The Practice of Innovation and Invention** | 3 | Yes | X | X | Yes | CMDS-211 | James Hall |
| **2 Electives from the following list:** | | | | | | | |
| IGME-581: Innovation & Invention | 3 |  | X | X | Yes | 3rd yr. | Tona Henderson |
| MGMT-330: Design Thinking and Concept Development | 3 |  | X | X | Yes | 3rd yr. | Robert Barbado  Richard Demartino |
| CMDS-333: Wicked Problems | 3 |  | X |  | Yes | 3rd yr. | James Hall |
| CMDS-441: Creative Critical Thinking and Problem Solving | 3 |  |  | X | Yes |  | James Hall |
| ENGL-419: Literature and Technology | 3 |  | X | X | Yes |  | Lisa Hermsen |
| ENGL-450: Free & Open Source Culture | 3 |  |  | X | Yes |  | Lisa Hermsen |
|  | | | | | | | |
| **CMDS-511: Innovation Lab** | 3 | Yes | X | X | Yes | CMDS-211  CMDS-411 | James Hall |