

Rochester INSTITUTE OF TECHNOLOGY

Minor Program proposal form

COLLEGE OF SCIeNCE

**Name of Certifying Academic Unit:** Center for Imaging Science

**Name of Minor:** Minor in Optical Science

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

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| Optics and its interaction with light and matter includes fundamental processes that appear nearly everywhere in nature and form the basis for vision in animals. Optics is also a tool that we have harnessed and use daily, in cameras, automobile headlights, copiers, and many other important devices. This minor provides students with the opportunity to study Optical Sciences and related topics in order to build a secondary area of expertise in support of their program or as an additional area of interest. |

**1.0 Minor Program Approvals**

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| --- | --- | --- |
|  | Approval request date: | Approval granted date: |
| Academic Unit Curriculum Committee | 2/06/2012 | 3/8/2012 |
| College Curriculum Committee | 3/9/2012 | 3/13/12 |
| Inter-College Curriculum Committee | 4/16/2012 | 4/16/2012 |

**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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| All courses for this minor involve optics and are taught in closely related departments across the RIT campus. |

**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 Minor in Optical Science will be managed by the Center for Imaging Science in the College of Science.  Various departments and colleges across campus offer optics courses that are included as part of this minor. These include Physics, MicroElectronics Engineering, Photographic Sciences, Chemistry, Electrical Engineering, and Telecommunications Engineering Technology. |

**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:

|  |
| --- |
| None |

**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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| **Eligibility** Any student enrolled in a major at RIT may pursue this minor.  **Prerequisites**  A student must be matriculated in a baccalaureate program and must have successfully completed the following courses:   * Project Based Calculus I and II or equivalent * University Physics I and II or equivalent   **Requirements**   * A grade of a C or better must be attained in all courses applied to the minor. * All prerequisites must be met prior to taking courses that require them. * Nine (9) credits in the minor must be in courses not required by the student's home program and must be completed in residency at RIT. * One course from each of Groups A, B and C below * Any two courses from Group D |

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| --- | --- |
| **Total credit hours: 15** |  |

**Minor Course Conversion Table: Quarter Calendar and Semester Calendar Comparison**

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| **Directions: The tables on this page will be used by the registrar’s office to aid student’s transitioning from the quarter calendar to the semester calendar.**  **If this minor existed in the quarter calendar and is being converted to the semester calendar please complete the following tables.**  **If this is a new minor that did not exist under the quarter calendar do not complete the following tables.**  Use the following tables to show minor course comparison in quarter and semester calendar formats. Use courses in the (2011-12) minor mask for this table. Display all required and elective minor courses. If necessary clarify how course sequences in the quarter calendar convert to semesters by either bracketing or using some other notation. |

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| Name of Minor in Semester Calendar: | Minor in Optical Science |
| Name of Minor in Quarter Calendar: | Minor in Optical Science |
| Name of Certifying Academic Unit: | Center for Imaging Science |

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| **GROUP A** |  |  |  |  |  |  |  |
| **Course Number & Title** | **SCH** | **Required** | **Optional** | **Fall** | **Spring** | **Annual/** | **Prerequisites** |
| **Biennial** |  |
| IMGS-321 Geometric Optics | 3 |  | X | X |  | Annual | Concurrent in calculus, PHYS-211 |
| IMGS-322 Physical Optics  Or PHYS-365 Physical Optics | 3 |  | X |  | X | Annual | PHYS-212, IMGS-261 or both PHYS-283 and PHYS-320,  MATH-221 or MATH-219 |
| MCEE-515 Nanolithography Systems | 3 |  | X | X | X | Annual | MCEE-505 |
| PHPS-211 Photographic Optics | 3 |  | X |  | X | Annual | PHPS-107 |
| **TOTAL Group A credits required** | **3** |  |  |  |  |  |  |
| **GROUP B** |  |  |  |  |  |  |  |
| PHYS-408 Laser Physics | 3 |  | X | X |  | Annual | PHYS-365 or permission of instructor |
| IMGS-251 Radiometry | 3 |  | X |  | X | Annual | MATH-182 (or MATH-173), PHYS-212 |
| **Total Group B credits required** | **3** |  |  |  |  |  |  |
| **GROUP C** |  |  |  |  |  |  |  |
| IMGS-528 Design and Fabrication of a Solid State Camera | 3 |  | X | X |  | Annual | Fourth year standing in Imaging Science or permission of the instructor |
| IMGS-542 Testing of Focal Plane Arrays | 3 |  | X |  | X | Annual | Fourth year standing in Imaging Science or permission of the instructor |
| IMGS-451 Detectors | 3 |  | X |  | X | Annual | IMGS-251, IMGS-341 or equivalent |
| **Total Group C credits required** | **3** |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |
| **GROUP D** |  |  |  |  |  |  |  |
| **Course Number & Title** | **SCH** | **Required** | **Optional** | **Fall** | **Spring** | **Annual/ Biennial** | **Prerequisites** |
| IMGS-322 Physical Optics/PHYS-365 | 3 |  | X |  | X |  |  |
| Annual | PHYS-212, IMGS-261 or both PHYS-283 and PHYS-320 |
| IMGS-341 Interaction of Light and Matter | 3 |  | X | X |  | Annual | PHYS-213 |
| PHYS-213 Modern Physics I | 3 |  | X | X |  | Annual | PHYS-212 |
| CHMP-442 Quantum Chemistry | 3 |  | X |  | X | Annual | CHMP-441 and PHYS-212 |
| PHYS-412 Electricity and Magnetism II | 3 |  | X |  | X | Annual | PHYS-411 |
| EEEE-374 Electromagnetic Fields | 3 |  | X |  | X | Annual | MATH-231, PHYS-212 |
| MCEE-515 Microlithography Systems and Lab | 3 |  | X |  | X | Annual | MCEE-505 |
| IMGS-221 Vision and Psychophysics | 3 |  | X | X |  | Annual | Matriculation as Imaging Science or Digital Cinema or permission of instructor |
| IMGS-471 Modulation Transfer Function | 3 |  | X | X |  | Annual | IMGS-261, IMGS-365 IDL or equivalent programming experience |
| PHPS-316 Scanning Electron Microscopy | 3 |  | X |  | X | Annual | PHPS-202 |
| **TOTAL Group D required** | **6** |  |  |  |  |  |  |
| **TOTAL Minor Required** | **15** |  |  |  |  |  |  |

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| **Quarters** |  |  | **Semesters** | | |
| **Course #** | **Course Name** | **Credit Hours** | **Course #** | **Course Name** | **Credit Hours** |
| 0301-474 | Electromagnetic Fields | 5 | EEEE-374 | EM Fields and Transmission Lines | 4 |
| 0305-525 | Optics for Microelectronic Engineering | 4 | MCEE-515 | Nanolithography Systems | 3 |
| 1014-442 | Quantum Chemistry | 4 | CHMP-442 | Physical Chemistry II | 4 |
| 1017-314 | Modern Physics I | 4 | PHYS 213 | Modern Physics I | 3 |
| 1017-412 | Electricity and Magnetism II | 4 | PHYS-412 | Advanced Electricity And Magnetism | 3 |
| 1017-556 | Laser Physics | 4 | PHYS 408 | Laser Physics | 3 |
| 1017-559 | Quantum Optics | 3 | PHYS-559 | Quantum Optics | 3 |
| 1051-303 | Geometric Optics | 4 | IMGS-321 | Geometric Optics | 4 |
| 1051-313 | Interaction of Light and Matter | 4 | IMGS-341 | Interaction of Light and Matter | 4 |
| 1051-350 | Vision and Psychophysics | 4 | IMGS-221 | Vision and Psychophysics | 4 |
| 1051-370 | Radiometry | 4 | IMGS-251 | Radiometry | 4 |
| 1051-465 | Detectors | 3 | IMGS-451 | Detectors | 3 |
| 1051-452 | Modulation Transfer Function | 3 | IMGS-471 | Imaging Systems Analysis I | 3 |
| 1051-455 | Physical Optics | 4 | IMGS-322 | Physical Optics | 4 |
| 1051-528 | Design and Fabrication of a Solid State Camera | 3 | IMGS-528 | Design and Fabrication of a Solid State Camera | 3 |
| 1051-542 | Testing of Focal Plane Arrays | 3 | IMGS-542 | Testing of Focal Plane Arrays | 3 |
| 2076-303 | Photographic Optics | 4 | PHPS 211 | Advanced Principles of Photographic Technology | 3 |
| 2076-572 | Scanning Electron Microscopy | 4 | PHPS-316 | Scanning Electron Microscopy | 3 |

Policy Name: **D1.1 MINORS POLICY**

 1. Definition

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.

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.

In most cases, minors shall consist of a minimum of two upper division courses to provide reasonable breadth and depth within the minor.

2. Institutional parameters

1. Minors may be discipline-based or interdisciplinary;
2. Only matriculated students may enroll in a minor;
3. At least nine semester credit hours of the minor must consist of courses not required by the student's home program;
4. Students may pursue multiple minors.  A minimum of nine semester credit hours must be designated towards each minor; these courses may not be counted towards other minors;
5. The residency requirement for a minor is a minimum of nine semester credit hours consisting of RIT courses (excluding "X" graded courses);
6. Posting of the minor on the student's academic transcript requires a minimum GPA of 2.0 in each of the minor courses;
7. Minors may not be added to the student's academic record after the granting of the bachelor's degree.

3. Development/approval/administration processes

* 1. Minors may be developed by faculty at the departmental, inter-departmental, college, or inter-college level. As part of the minor development process:
     1. students ineligible for the proposed minor will be identified;
     2. prerequisites, if any, will be identified;
  2. Minor proposals must be approved by the appropriate academic unit(s) curriculum committee, and college curriculum committee(s), before being sent to the Inter-College Curriculum Committee (ICC) for final consideration and approval.
  3. The academic unit offering the minor (in the case of interdisciplinary minors, the designated college/department) is responsible for the following:
     1. enrolling students in the minor (as space permits);
     2. monitoring students progress toward completion of the minor;
     3. authorizing the recording of the minor's completion on student's academic records;
     4. granting of transfer credit, credit by exam, credit by experience, course substitutions, and advanced placement;
     5. responding to student requests for removal from the minor.
  4. 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.

4. Procedures for Minor revision

It is the duty of the college curriculum committee(s) involved with a minor to maintain the program’s structure and coherence.  Once a minor is approved by the ICC, changes to the minor that do not have a significant effect on its focus may be completed with the approval of the involved academic unit(s) and the college curriculum committee(s).  Significant changes in the focus of the minor must be approved by the appropriate academic unit(s) curriculum committee(s), the college curriculum committee(s) and be resubmitted to the ICC for final consideration and approval.