



ACADEMIC AFFAIRS GUIDELINES

Section 2:	Programs and Curriculum		
Title:	Collaborative Physics Graduate Program Administration Guidelines		
Number (Current Format)	Number (Prior Format)	Date Last Revised	
2.19.C	N/A	07/2021	
Reference:			
Related Form(s):			

1. Collaborative Purpose

The ability to maintain a vibrant set of Physics degree program options for students in South Dakota continues to be of critical interest to the South Dakota Board of Regents (SDBOR). As a result, the SDBOR has established a framework within both policy and guidelines to encourage institutions to identify collaborative opportunities that will allow for the sharing of faculty resources, expertise and infrastructure to improve efficiencies and reduce unnecessary duplication. Specifically [Program Productivity](#)¹ and [Section Size](#)² policies and guidelines have created exemptions to foster an environment for faculty across institutions to collaborate on common degree programs. Within this context, the purpose of the Collaborative Physics Graduate Program is to provide a framework for the common delivery of Physics programs (both face-to-face and via distance) by the South Dakota School of Mines & Technology (SDSMT) and the University of South Dakota (USD). The participating institutions have shared courses since the inception of the programs (see Appendix A).

2. Partners & Institutional Leads

- 2.1. Participating Institutions: South Dakota School of Mines & Technology and the University of South Dakota.
- 2.2. Each participating institution will identify a designated institutional representative appointed by the Chief Academic Affairs Officer who will be responsible for coordinating activities with the other partner institution pursuant to the terms of this agreement.
- 2.3. Changes to the agreement may be made from time-to-time and must be agreed upon the designated institutional representatives.

3. Common Assessment Structure

¹ Section 3 of the Program Productivity Review Guidelines establishes that degree programs flagged for review may explore options for degree program consolidation. When this coordination occurs and institutions can provide “Evidence that multi-institution collaboration will meet graduate production thresholds,” benchmarks can be achieved by the sum of all graduates at the participating institutions.

² Section 2.6 of current AAC Section Size Guidelines established that “Collaborative courses with a selected instructional method code that result from a shared program agreement among Regental institutions shall be excluded.”

- 3.1. Students will demonstrate that they possess the knowledge associated with graduates of a high quality graduate physics Master's or PhD program across the broad spectrum of fundamental subfields of physics. They will be tested in their individual courses and be also be tested in their thesis or final project defense.
 - 3.1.1. Students in the PhD program will also be assessed by a Qualifying Exam and Comprehensive Exam and are strongly encouraged to obtain a Masters' degree en-route to their PhD. The Qualifying Exam tests their understanding of core physics concepts and are administered in a joint fashion between the two institutions. The Comprehensive Exam tests their level of preparation for research including understanding of their field of specialization. The PhD assessment criteria are the same for both institutions.
- 3.2. Students will contribute to original research, and thus enhance research activities within South Dakota. They participate in research either through a thesis, dissertation, or a research project.
- 3.3. Representatives from each institution will meet every other year to assess the program and student success levels.

4. Curriculum - Masters

- 4.1. A common curriculum will be used by participating institutions that includes a requirement of 32 total credits. The common curriculum is maintained in the USD and SDSMT catalogs. (See Appendix B for a snapshot of the catalogs for the 2020-2021 academic year.) All major course requirements are currently and will remain common courses. Aside from courses for which facility requirements prevent sharing, all elective courses are currently shared between participating institutions. Participating institutions will continue to share future courses as either common courses or cross-linked courses using PHYS-792 Topics where institutional facilities allow. To support the differing career arcs of students, participating institutions will retain the flexibility to implement course substitutions and allow additional courses as electives as allowed at their local institution.
- 4.2. Depending on the qualification and specific needs, a student may work on a specific project or produce a thesis. These are:
 - 4.2.1. PHYS 788 - Research in Physics, 1 to 5 cr hrs (Research/Design Paper, 2 credit hours required for the non-thesis option)
 - 4.2.2. PHYS 798 – Thesis, 1 to 9 cr hrs (7 credit hours required for the thesis option)
 - 4.2.3. Advisor approved elective, 1-5 cr hrs
- 4.3. The rotation will include the delivery of courses offered during the Fall and Spring terms, and ensure an equitable distribution of course offerings across institutions that also ensures that students may successfully complete the degree requirements in a timely fashion.
- 4.4. USD also offers a Master's Degree with a specialization in Analytics for Large Data Sets that utilizes common courses covered by this agreement as well as courses from other departments including Computer Science and Mathematics. USD retains the right to alter the specialization program requirements.
- 4.5. Faculty members from each institution have status that enables them to serve on the thesis and dissertation committees of students from the other institution.

5. Curriculum – PhD

- 5.1. A common curriculum will be used by participating institutions that includes a requirement of 72 total credits. The common curriculum is maintained in the USD and SDSMT catalogs. (See Appendix B for a snapshot of the catalogs for the 2020-2021 academic year.) All major course requirements are currently and will remain common courses. Aside from courses for which

facility requirements prevent sharing, all elective courses are currently shared between participating institutions. Participating institutions will continue to share future courses as either common courses or cross-linked courses using PHYS-792 Topics where institutional facilities allow. To support the differing career arcs of students, participating institutions will retain the flexibility to implement course substitutions and allow additional courses as electives as allowed at their local institution.

5.2. All students are required to work on a dissertation:

5.2.1. PHYS 898D – Dissertation, 36 credit hours required

5.3. The rotation will include the delivery of courses offered during the Fall and Spring terms, and ensure an equitable distribution of course offerings across institutions that also ensures that students may successfully complete the degree requirements in a timely fashion.

5.4. Faculty members from each institution have status that enables them to serve on the thesis and dissertation committees of students from the other institution. Each PhD student will have a faculty member from the other institution as a member of their PhD dissertation committee.

6. **Textbook & Instructional Resources**

6.1. Consistent with [BOR Policy 1:11 – Academic Freedom and Responsibility](#) institutional faculty are given academic freedom to select textbook and instructional materials they deem appropriate for graduate coursework delivered through the consortium.

6.2. Since all the classes are shared between the two institutions, the textbooks chosen by the faculty would automatically be the common textbook.

7. **Funding Model**

7.1. Tuition revenue generated by the institution offering the course will remain with that institution. For shared courses separate sections will be created at each institution, with the institution's students registering for its section, and so with tuition revenue going to the student's institution.

7.2. Students pursuing the completion of the degree at a main campus location will be assessed the on-campus rate approved by the SDBOR.

Students not enrolled in coursework at a main campus location will be assessed the established off-campus rate approved by the SDBOR.

Appendix A

Approved Course Rotation for Collaboratively-Delivered Courses

The participating institutions have shared courses since the inception of the programs. This appendix contains a listing of the recently shared courses and forthcoming ones. Representatives from each institution will meet periodically as needed to extend the course rotation.

Fall 2019

Spring 2020

Fall 2020

Spring 2021

Graduate Distance Courses

PHYS 771 SDSMT	PHYS 773 SDSMT	PHYS 721 USD	PHYS 723 USD
PHYS 743 USD	PHYS 761 USD	PHYS 751 SDSMT	PHYS 785 SDSMT
PHYS 790 USD	PHYS 790 SDSMT	PHYS 790 USD	PHYS 790 SDSMT
PHYS 733 SDSMT	PHYS 786 - SDSMT		PHYS 764 -SDSMT

Fall 2021

Spring 2022

Fall 2022

Spring 2023

Graduate Distance Courses

PHYS 771 USD	PHYS 773 USD	PHYS 721 SDSMT	PHYS 723 SDSMT
PHYS 743 SDSMT	PHYS 761 SDSMT	PHYS 751 USD	PHYS 733 USD
PHYS 790 USD	PHYS 790 SDSMT	PHYS 790 USD	PHYS 790 SDSMT
PHYS 763 SDSMT	PHYS 739 SDSMT	PHYS 765 SDSMT	PHYS 783 SDSMT

Fall 2023

Spring 2024

Fall 2024

Spring 2025

Graduate Distance Courses

PHYS 771 USD	PHYS 773 USD	PHYS 721 SDSMT	PHYS 723 SDSMT
PHYS 743 SDSMT	PHYS 761 SDSMT	PHYS 763 USD	PHYS 739
PHYS 790 USD	PHYS 790 SDSMT	PHYS 790 USD	PHYS 790 SDSMT
PHYS 764 SDSMT	PHYS 785 USD	PHYS 765 SDSMT	PHYS 786 USD

Sample Catalogs for the 2020-2021 Academic Year

Below are the sample catalogs. Note: the (C) in the USD catalogs denotes common courses.

SDSMT – Masters Catalog (Thesis)

Core requirements

- [PHYS 721 Electrodynamics I](#) Credits: (3-0) 3
- [PHYS 723 Electrodynamics II](#) Credits: (3-0) 3
- [PHYS 743 Statistical Mechanics](#) Credits: (3-0) 3
- [PHYS 751 Classical Mechanics](#) Credits: (3-0) 3
- [PHYS 771 Quantum Mechanics I](#) Credits: (3-0) 3
- [PHYS 773 Quantum Mechanics II](#) Credits: (3-0) 3
- [PHYS 790 Seminar](#) Credits: 1 to 3 *

* One (1) credit of PHYS 790 is required.

Research or project requirements

The completion of a master's thesis, approved by the student's graduate advisory committee and the Dean of Graduate Education, is required for this degree.

- [PHYS 798 Thesis](#) Credits: 1 to 9 **

** At least 7 credits of PHYS 798 are required. No more than 7 credits of PHYS 798 may be counted toward the degree.

Elective requirements

All elective courses must be approved by the student's graduate advisor. Electives may be chosen from the list below. At least 6 credits of approved electives must be earned.

- [PHYS 433/533 Nuclear and Elementary Particle Physics](#) Credits: (3-0) 3
- [PHYS 439/539 Condensed Matter Physics](#) Credits: (4-0) 4
- [PHYS 481/581 Mathematical Physics](#) Credits: (4-0) 4
- [MES 603 Condensed Matter Physics](#) Credits: (4-0) 4
- [PHYS 683 Mathematical Physics II](#) Credits: (3-0) 3
- [PHYS 691 Independent Study](#) Credits: 1 to 3
- [PHYS 692 Topics](#) Credits: 1 to 3
- [PHYS 739 Condensed Matter Physics I](#) Credits: (3-0) 3
- [PHYS 749 Condensed Matter Physics II](#) Credits: (3-0) 3
- [PHYS 761 Nuclear and Particle Physics](#) Credits: (3-0) 3
- [PHYS 763 Advanced Particle Physics](#) Credits: (3-0) 3
- [PHYS 764 Physics of Neutrinos](#) Credits: (3-0) 3

- [PHYS 765 Advanced Nuclear Physics](#) Credits: (3-0) 3
- [PHYS 775 General Relativity](#) Credits: (3-0) 3
- [PHYS 777 Introduction to Quantum Information](#) Credits: (3-0) 3
- [PHYS 779 Group Theory](#) Credits: (3-0) 3
- [PHYS 783 Quantum Field Theory](#) Credits: (3-0) 3
- [PHYS 784 Advanced Quantum Field Theory](#) Credits: (3-0) 3
- [PHYS 785 Astrophysics and Cosmology](#) Credits: (3-0) 3
- [PHYS 786 Nuclear Astrophysics and the Origin of the Elements](#) Credits: (3-0) 3
- [PHYS 791 Independent Study](#) Credits: 1 to 3
- [PHYS 792 Topics](#) Credits: 1 to 3

SDSMT – Masters Catalog (non-Thesis)

Core requirements

-
- [PHYS 721 Electrodynamics I](#) Credits: (3-0) 3
 - [PHYS 723 Electrodynamics II](#) Credits: (3-0) 3
 - [PHYS 743 Statistical Mechanics](#) Credits: (3-0) 3
 - [PHYS 751 Classical Mechanics](#) Credits: (3-0) 3
 - [PHYS 771 Quantum Mechanics I](#) Credits: (3-0) 3
 - [PHYS 773 Quantum Mechanics II](#) Credits: (3-0) 3
 - [PHYS 790 Seminar](#) Credits: 1 to 3 *

* One (1) credit of PHYS 790 is required.

Research or project requirements

The completion of a master's project, approved by the student's graduate advisor, is required for this degree.

- [PHYS 788 Master's Research Problems/Projects](#) Credits: 1 to 5

Elective requirements

All elective courses must be approved by the student's graduate advisor. Electives may be chosen from the list below.

- [PHYS 433/533 Nuclear and Elementary Particle Physics](#) Credits: (3-0) 3
- [PHYS 439/539 Condensed Matter Physics](#) Credits: (4-0) 4
- [PHYS 481/581 Mathematical Physics](#) Credits: (4-0) 4
- [MES 603 Condensed Matter Physics](#) Credits: (4-0) 4
- [PHYS 683 Mathematical Physics II](#) Credits: (3-0) 3
- [PHYS 691 Independent Study](#) Credits: 1 to 3
- [PHYS 692 Topics](#) Credits: 1 to 3
- [PHYS 739 Condensed Matter Physics I](#) Credits: (3-0) 3
- [PHYS 749 Condensed Matter Physics II](#) Credits: (3-0) 3

- [PHYS 761 Nuclear and Particle Physics Credits: \(3-0\) 3](#)
- [PHYS 763 Advanced Particle Physics Credits: \(3-0\) 3](#)
- [PHYS 764 Physics of Neutrinos Credits: \(3-0\) 3](#)
- [PHYS 765 Advanced Nuclear Physics Credits: \(3-0\) 3](#)
- [PHYS 775 General Relativity Credits: \(3-0\) 3](#)
- [PHYS 777 Introduction to Quantum Information Credits: \(3-0\) 3](#)
- [PHYS 779 Group Theory Credits: \(3-0\) 3](#)
- [PHYS 783 Quantum Field Theory Credits: \(3-0\) 3](#)
- [PHYS 784 Advanced Quantum Field Theory Credits: \(3-0\) 3](#)
- [PHYS 785 Astrophysics and Cosmology Credits: \(3-0\) 3](#)
- [PHYS 786 Nuclear Astrophysics and the Origin of the Elements Credits: \(3-0\) 3](#)
- [PHYS 791 Independent Study Credits: 1 to 3](#)
- [PHYS 792 Topics Credits: 1 to 3](#)

SDSMT – PhD Catalog

Core requirements

- [PHYS 721 Electrodynamics I Credits: \(3-0\) 3](#)
- [PHYS 723 Electrodynamics II Credits: \(3-0\) 3](#)
- [PHYS 743 Statistical Mechanics Credits: \(3-0\) 3](#)
- [PHYS 751 Classical Mechanics Credits: \(3-0\) 3](#)
- [PHYS 771 Quantum Mechanics I Credits: \(3-0\) 3](#)
- [PHYS 773 Quantum Mechanics II Credits: \(3-0\) 3](#)
- [PHYS 761 Nuclear and Particle Physics Credits: \(3-0\) 3](#)
- [PHYS 790 Seminar Credits: 1 to 3 *](#)

* A total of 3 credits of PHYS 790, taken over up to three semesters, is required. Permission of instructor is required to take more than one credit of PHYS 790 in a given semester.

Research requirements

The completion of a doctoral dissertation, approved by the student's graduate advisory committee and the Dean of Graduate Education, is required for this degree.

- [PHYS 898D Dissertation Credits: 1 to 9 **](#)

** A minimum of 36 credit hours of PHYS 898 is required for the degree. No more than 36 credits of PHYS 898 may be counted toward the degree.

Elective requirements

All elective courses must be approved by the student's graduate advisor. A total of 12 credit hours of elective courses is required. Courses may be chosen from the following list.

- [PHYS 683 Mathematical Physics II Credits: \(3-0\) 3](#)
- [PHYS 691 Independent Study Credits: 1 to 3](#)

- [PHYS 692 Topics Credits: 1 to 3](#)
- [PHYS 733 Experimental Particle Physics: Principles, Data Analysis, and Simulation Credits: \(3-0\) 3](#)
- [PHYS 739 Condensed Matter Physics I Credits: \(3-0\) 3](#)
- [PHYS 749 Condensed Matter Physics II Credits: \(3-0\) 3](#)
- [PHYS 763 Advanced Particle Physics Credits: \(3-0\) 3](#)
- [PHYS 764 Physics of Neutrinos Credits: \(3-0\) 3](#)
- [PHYS 765 Advanced Nuclear Physics Credits: \(3-0\) 3](#)
- [PHYS 775 General Relativity Credits: \(3-0\) 3](#)
- [PHYS 777 Introduction to Quantum Information Credits: \(3-0\) 3](#)
- [PHYS 779 Group Theory Credits: \(3-0\) 3](#)
- [PHYS 783 Quantum Field Theory Credits: \(3-0\) 3](#)
- [PHYS 784 Advanced Quantum Field Theory Credits: \(3-0\) 3](#)
- [PHYS 785 Astrophysics and Cosmology Credits: \(3-0\) 3](#)
- [PHYS 786 Nuclear Astrophysics and the Origin of the Elements Credits: \(3-0\) 3](#)
- [PHYS 791 Independent Study Credits: 1 to 3](#)
- [PHYS 792 Topics Credits: 1 to 3](#)

USD – Masters Catalog (Thesis)

Major Area Coursework

- [PHYS 721 - Electrodynamics I \(C\)](#) 3 cr hrs
- [PHYS 723 - Electrodynamics II \(C\)](#) 3 cr hrs
- [PHYS 743 - Statistical Mechanics \(C\)](#) 3 cr hrs
- [PHYS 751 - Classical Mechanics \(C\)](#) 3 cr hrs
- [PHYS 771 - Quantum Mechanics I \(C\)](#) 3 cr hrs
- [PHYS 773 - Quantum Mechanics II \(C\)](#) 3 cr hrs
- [PHYS 790 - Seminar \(C\)](#) 1-3 cr hrs (**1 credit hour required**)
- [PHYS 798 - Thesis \(C\)](#) 1 to 9 cr hrs (**7 credit hours required**)

Select 6 credit hours from the following electives:

- [PHYS 533 - Nuclear and Elementary Particle Physics \(C\)](#) 3 cr hrs
- [PHYS 539 - Solid State Physics \(C\)](#) 3 to 4 cr hrs
- [PHYS 554 - Semiconductor Materials: Fundamentals and Fabrication](#) 3 cr hrs
- [PHYS 554L - Semiconductor Materials: Fundamentals and Fabrication Lab](#) 1 cr hrs
- [PHYS 556 - Radiation Detection](#) 3 cr hrs
- [PHYS 556L - Radiation Detection Lab](#) 1 cr hrs
- [PHYS 581 - Mathematical Physics I \(C\)](#) 3 cr hrs
- [PHYS 592 - Topics in Physics \(C\)](#) 1 to 3 cr hrs
- [PHYS 683 - Mathematical Physics II \(C\)](#) 3 cr hrs
- [PHYS 733 - Experimental Particle Physics](#) 3 cr hrs
- [PHYS 739 - Condensed Matter Physics I \(C\)](#) 3 cr hrs
- [PHYS 761 - Nuclear and Particle Physics \(C\)](#) 3 cr hrs
- [PHYS 763 - Advanced Particle Physics \(C\)](#) 3 cr hrs

- [PHYS 765 - Advanced Nuclear Physics \(C\)](#) 3 cr hrs
- [PHYS 775 - General Relativity \(C\)](#) 3 cr hrs
- [PHYS 779 - Group Theory \(C\)](#) 3 cr hrs
- [PHYS 783 - Quantum Field Theory \(C\)](#) 3 cr hrs
- [PHYS 785 - Astrophysics and Cosmology \(C\)](#) 3 cr hrs
- [PHYS 788 - Research in Physics \(C\)](#) 1 to 5 cr hrs
- [PHYS 791 - Independent Study in Physics \(C\)](#) 1 to 3 cr hrs
- [PHYS 792 - Topics \(C\)](#) 1 to 3 cr hrs
- PHYS 798 - THESIS (C) 1 to 9 cr hrs (in addition to required hours)

Note:

Additional courses, including those from other departments, would be allowed as electives with approval from the department and graduate school.

USD – Masters Catalog (non-Thesis)

Major Area Coursework

- [PHYS 721 - Electrodynamics I \(C\)](#) 3 cr hrs
- [PHYS 723 - Electrodynamics II \(C\)](#) 3 cr hrs
- [PHYS 743 - Statistical Mechanics \(C\)](#) 3 cr hrs
- [PHYS 751 - Classical Mechanics \(C\)](#) 3 cr hrs
- [PHYS 771 - Quantum Mechanics I \(C\)](#) 3 cr hrs
- [PHYS 773 - Quantum Mechanics II \(C\)](#) 3 cr hrs
- [PHYS 790 - Seminar \(C\)](#) 1-3 cr hrs (**1 hour required**)

Select 2 credit hours of the following:

- [PHYS 788 - Research in Physics \(C\)](#) 1 to 5 cr hrs (**Research/Design Paper**)
- Advisor approved elective 1-5cr hrs

Select 11 credit hours from the following electives:

- [PHYS 533 - Nuclear and Elementary Particle Physics \(C\)](#) 3 cr hrs
- [PHYS 539 - Solid State Physics \(C\)](#) 3 to 4 cr hrs
- [PHYS 554 - Semiconductor Materials: Fundamentals and Fabrication](#) 3 cr hrs
- [PHYS 554L - Semiconductor Materials: Fundamentals and Fabrication Lab](#) 1 cr hrs
- [PHYS 556 - Radiation Detection](#) 3 cr hrs
- [PHYS 556L - Radiation Detection Lab](#) 1 cr hrs
- [PHYS 581 - Mathematical Physics I \(C\)](#) 3 cr hrs
- [PHYS 592 - Topics in Physics \(C\)](#) 1 to 3 cr hrs
- [PHYS 683 - Mathematical Physics II \(C\)](#) 3 cr hrs
- [PHYS 733 - Experimental Particle Physics](#) 3 cr hrs
- [PHYS 737 - Theory of Solids](#) 3 cr hrs
- [PHYS 739 - Condensed Matter Physics I \(C\)](#) 3 cr hrs
- [PHYS 761 - Nuclear and Particle Physics \(C\)](#) 3 cr hrs
- [PHYS 763 - Advanced Particle Physics \(C\)](#) 3 cr hrs
- [PHYS 765 - Advanced Nuclear Physics \(C\)](#) 3 cr hrs

- [PHYS 775 - General Relativity \(C\)](#) 3 cr hrs
- [PHYS 779 - Group Theory \(C\)](#) 3 cr hrs
- [PHYS 783 - Quantum Field Theory \(C\)](#) 3 cr hrs
- [PHYS 785 - Astrophysics and Cosmology \(C\)](#) 3 cr hrs
- PHYS 788 - RESEARCH IN PHYSICS 1 to 5 cr hrs (in addition to 2 required hours above)
- [PHYS 791 - Independent Study in Physics \(C\)](#) 1 to 3 cr hrs
- [PHYS 792 - Topics \(C\)](#) 1 to 3 cr hrs
- Advisor approved elective 1-5cr hrs

Note: Additional courses, including those from other departments, would be allowed as electives with approval from the department and graduate school.

USD – PhD Catalog

Major Area Coursework

- [PHYS 721 - Electrodynamics I \(C\)](#) 3 cr hrs
- [PHYS 723 - Electrodynamics II \(C\)](#) 3 cr hrs
- [PHYS 743 - Statistical Mechanics \(C\)](#) 3 cr hrs
- [PHYS 751 - Classical Mechanics \(C\)](#) 3 cr hrs
- [PHYS 771 - Quantum Mechanics I \(C\)](#) 3 cr hrs
- [PHYS 773 - Quantum Mechanics II \(C\)](#) 3 cr hrs
- [PHYS 761 - Nuclear and Particle Physics \(C\)](#) 3 cr hrs
- [PHYS 790 - Seminar \(C\)](#) 1-3 cr hrs (**3 credit hours required**)
- [PHYS 898D - Dissertation \(C\)](#) 1-9 cr hrs (**36 credit hours required**)

Electives-select 12 credit hours from the following:

- [PHYS 533 - Nuclear and Elementary Particle Physics \(C\)](#) 3 cr hrs
- [PHYS 539 - Solid State Physics \(C\)](#) 3 to 4 cr hrs
- [PHYS 554 - Semiconductor Materials: Fundamentals and Fabrication](#) 3 cr hrs
- [PHYS 554L - Semiconductor Materials: Fundamentals and Fabrication Lab](#) 1 cr hrs
- [PHYS 556 - Radiation Detection](#) 3 cr hrs
- [PHYS 556L - Radiation Detection Lab](#) 1 cr hrs
- [PHYS 581 - Mathematical Physics I \(C\)](#) 3 cr hrs
- [PHYS 683 - Mathematical Physics II \(C\)](#) 3 cr hrs
- [PHYS 733 - Experimental Particle Physics](#) 3 cr hrs
- [PHYS 739 - Condensed Matter Physics I \(C\)](#) 3 cr hrs
- [PHYS 763 - Advanced Particle Physics \(C\)](#) 3 cr hrs
- [PHYS 765 - Advanced Nuclear Physics \(C\)](#) 3 cr hrs
- PHYS 769 Methods of Experimental Particle Physics 3 cr hrs ## Pending BOR Approval
- [PHYS 775 - General Relativity \(C\)](#) 3 cr hrs
- [PHYS 779 - Group Theory \(C\)](#) 3 cr hrs
- [PHYS 783 - Quantum Field Theory \(C\)](#) 3 cr hrs
- [PHYS 784 - Advanced Quantum Field Theory \(C\)](#) 3 cr hrs

- [PHYS 785 - Astrophysics and Cosmology \(C\)](#) 3 cr hrs
- [PHYS 791 - Independent Study in Physics \(C\)](#) 1 to 3 cr hrs
- [PHYS 792 - Topics \(C\)](#) 1 to 3 cr hrs

Note: Additional courses, including those from other departments, would be allowed as electives with approval from the department and graduate school.