



**SOUTH DAKOTA BOARD OF REGENTS
ACADEMIC AFFAIRS FORMS**

Substantive Program Modification Form

Use this form to request minor changes in existing programs (majors, minors, certificates, or specializations).

UNIVERSITY:	University of South Dakota
CURRENT PROGRAM TITLE:	Physics, M.S., Plan A (Thesis Option), Analytics for Large Data Sets Specialization
CIP CODE:	40.0801
UNIVERSITY DEPARTMENT:	Physics
UNIVERSITY DIVISION:	Arts & Sciences

University Approval

To the Board of Regents and the Executive Director: I certify that I have read this proposal, that I believe it to be accurate, and that it has been evaluated and approved as provided by university policy.

Elizabeth M. Freeburg 6/26/18
 Vice President of Academic Affairs or Date
 President of the University

1. This modification addresses a change in:

- | | |
|---|---|
| <input type="checkbox"/> Total credits required within the discipline | <input type="checkbox"/> Total credits of supportive course work |
| <input type="checkbox"/> Total credits of elective course work | <input type="checkbox"/> Total credits required for program |
| <input type="checkbox"/> Program name | <input type="checkbox"/> Existing specialization |
| <input type="checkbox"/> CIP Code | <input checked="" type="checkbox"/> Other (explain below) Addition of a fast-track program |

2. Effective date of change (enter catalog year): Fall 2018

3. Program Degree Level (place an "X" in the appropriate box):

Associate Bachelor's Master's Doctoral

4. Category:

Certificate Specialization Minor Major

5. If a name change is proposed, the change will occur (place an "X" in the appropriate box):

- On the effective date for all students
- On the effective date for students new to the program (enrolled students will graduate from existing program)

Proposed new name: _____

Reminder: Name changes may require updating related articulation agreements, site approvals, etc.

6. Primary Aspects of the Modification (add lines or adjust cell size as needed):

Existing Curriculum

Proposed Curriculum (highlight changes)

Prof.	Num.	Title	Cr. Hrs.	Prof.	Num.	Title	Cr. Hrs.
Master of Science, Physics Plan A (thesis)				Master of Science, Physics Plan A (thesis – no specialization)			
Major Area Coursework				Major Area Coursework			
PHYS	721	Electrodynamics I	3	PHYS	721	Electrodynamics I	3
PHYS	723	Electrodynamics II	3	PHYS	723	Electrodynamics II	3
PHYS	743	Statistical Mechanics	3	PHYS	743	Statistical Mechanics	3
PHYS	751	Classical Mechanics	3	PHYS	751	Classical Mechanics	3
PHYS	771	Quantum Mechanics I	3	PHYS	771	Quantum Mechanics I	3
PHYS	773	Quantum Mechanics II	3	PHYS	773	Quantum Mechanics II	3
PHYS	790	Seminar (1 cr. Required)	1-3	PHYS	790	Seminar (1 cr. Required)	1-3
PHYS	798	Thesis (7 cr. Required)	1-9	PHYS	798	Thesis (7 cr. Required)	1-9
Select 6 credit hours from the following electives:				Select 6 credit hours from the following electives:			
PHYS	533	Nuclear and Elementary Particle Physics	3	PHYS	533	Nuclear and Elementary Particle Physics	3
PHYS	539	Solid State Physics	3-4	PHYS	539	Solid State Physics	3-4
PHYS	581	Mathematical Physics I	3	PHYS	581	Mathematical Physics I	3
PHYS	683	Mathematical Physics II	3	PHYS	683	Mathematical Physics II	3
PHYS	739	Condensed Matter Physics I	3	PHYS	739	Condensed Matter Physics I	3
PHYS	775	General Relativity	3	PHYS	775	General Relativity	3
PHYS	779	Group Theory	3	PHYS	779	Group Theory	3
PHYS	761	Nuclear and Particle Physics	3	PHYS	761	Nuclear and Particle Physics	3
PHYS	783	Quantum Field Theory	3	PHYS	783	Quantum Field Theory	3
PHYS	785	Astrophysics and Cosmology	3	PHYS	785	Astrophysics and Cosmology	3
PHYS	788	Research in Physics	1-5	PHYS	788	Research in Physics	1-5
PHYS	791	Independent Study in Physics	1-3	PHYS	791	Independent Study in Physics	1-3
PHYS	798	Thesis (in addition to required hours)	1-9	PHYS	798	Thesis (in addition to required hours)	1-9
Total number of hours required for degree			32	Total number of hours required for degree			32
Master of Science, Physics Plan B (non-thesis)				Master of Science, Physics Plan B (non-thesis – no specialization)			
PHYS	721	Electrodynamics I	3	PHYS	721	Electrodynamics I	3
PHYS	723	Electrodynamics II	3	PHYS	723	Electrodynamics II	3
PHYS	743	Statistical Mechanics	3	PHYS	743	Statistical Mechanics	3
PHYS	751	Classical Mechanics	3	PHYS	751	Classical Mechanics	3
PHYS	771	Quantum Mechanics I	3	PHYS	771	Quantum Mechanics I	3
PHYS	773	Quantum Mechanics II	3	PHYS	773	Quantum Mechanics II	3
PHYS	788	Research in Physics (2 cr. Required)	1-5	PHYS	788	Research in Physics (2 cr. Required)	1-5
PHYS	790	Seminar (1 cr. Required)	1-3	PHYS	790	Seminar (1 cr. Required)	1-3
Select 11 credit hours from the following electives:				Select 11 credit hours from the following electives:			
PHYS	533	Nuclear and Elementary Particle Physics	3	PHYS	533	Nuclear and Elementary Particle Physics	3
PHYS	539	Solid State Physics	3-4	PHYS	539	Solid State Physics	3-4
PHYS	581	Mathematical Physics I	3	PHYS	581	Mathematical Physics I	3
PHYS	683	Mathematical Physics II	3	PHYS	683	Mathematical Physics II	3
PHYS	739	Condensed Matter Physics I	3	PHYS	739	Condensed Matter Physics I	3
PHYS	775	General Relativity	3	PHYS	775	General Relativity	3
PHYS	779	Group Theory	3	PHYS	779	Group Theory	3
PHYS	761	Nuclear and Particle Physics	3	PHYS	761	Nuclear and Particle Physics	3
PHYS	783	Quantum Field Theory	3	PHYS	783	Quantum Field Theory	3

PHYS	785	Astrophysics and Cosmology	3	PHYS	785	Astrophysics and Cosmology	3				
PHYS	788	Research in Physics (in addition to 2 required hours above)	1-5	PHYS	788	Research in Physics (in addition to 2 required hours above)	1-5				
PHYS	791	Independent Study in Physics	1-3	PHYS	791	Independent Study in Physics	1-3				
PHYS	792	Topics	1-3	PHYS	792	Topics	1-3				
Total number of hours required for degree			32	Total number of hours required for degree			32				
Masters of Science Degree (Plan A - Thesis)				Masters of Science Degree (Plan A – Thesis Analytics for Large Data Sets Specialization Only)							
Major Area Coursework				Major Area Coursework							
PHYS	721	Electrodynamics I	3	Delete							
PHYS	723	Electrodynamics II	3	Delete							
PHYS	743	Statistical Mechanics	3	Delete							
PHYS	751	Classical Mechanics	3	Delete							
PHYS	771	Quantum Mechanics I	3	Delete							
PHYS	773	Quantum Mechanics II	3	Delete							
				PHYS	543	Statistical Physics	2				
				PHYS	551	Classical Mechanics	4				
				PHYS	571	Quantum Mechanics	4				
PHYS	790	Seminar (1 credit hour required)	1-3	PHYS	790	Seminar (1 credit hr required)	1-3				
PHYS	798	Thesis (7 credit hours required)	7-9	PHYS	798	Thesis (6 credit hours required)	6				
		Subtotal	27			Subtotal Required	17				
				Analytics for Large Data Sets Specialization							
				CSC	785	Information Storage and Retrieval	3				
				CSC	721	Distributed Systems	3				
				MATH	792	Topics in Statistics	3				
				PHYS	792	Topics: Big Data and Data Analytics	3				
				CSC or CSC	586	Data Mining	3				
					548	Machine Learning					
						Subtotal	15				
Select 6 credit hours from the following electives:				Department-approved elective (4 credits)							
PHYS	533	Nuclear and Elementary Particle Physics	3	DELETE LIST							
PHYS	539	Solid State Physics	3								
PHYS	581	Mathematical Physics I	3								
PHYS	683	Mathematical Physics II	3								
PHYS	739	Condensed Matter Physics I	3								
PHYS	749	Condensed Matter Physics II	3								
PHYS	775	General Relativity	3								
PHYS	779	Group Theory	3								
PHYS	761	Nuclear and Particle Physics	3								
PHYS	783	Quantum Field Physics	3								
PHYS	785	Astrophysics and Cosmology	3								
PHYS	788	Research in Physics	1-5								
PHYS	791	Independent study in Physics	1-3								
PHYS	792	Topics	1-3								
		Subtotal	4					PHYS	7XX	Department-approved Electives	4
Total number of hours required for degree			36					Total number of hours required for degree			36
Accelerated Master's Program: BA or BS/MS (Plan A Analytics for Large Data Sets Specialization only) Up to 12 graduate credits applied toward the B.S. program may be used to satisfy graduate requirements. The following restrictions apply:											

			<p>a. Dual-listed courses taken at the 500-level can be applied to both the B.S. and M.S. degrees. Dual-listed courses must be taken at the 500-level.</p> <p>b. The student must apply to, and be admitted to, the accelerated program prior to taking courses to be credited toward the accelerated program.</p> <p>c. No courses taken prior to admission to the accelerated program may be counted toward an accelerated graduate degree. No exceptions to this policy will be approved.</p> <p>d. Courses that are "double counted" must be approved by the program coordinator for inclusion in the program of study prior to registration for the course or the credits will not be applied toward the accelerated graduate degree. No exceptions to this policy will be approved.</p> <p>e. Only courses taken at the student's home institution are eligible for dual credit. No transferred courses from other institutions will be allowed to count toward the accelerated master's degree.</p> <p>f. Students admitted to the accelerated M.S. Program may be allowed to register for all courses included on his/her program of study and these credit hours may apply to both undergraduate and graduate degree requirements.</p>
<p>Total number of hours required for degree</p>		<p>Total number of hours required for degree</p>	<p>36</p>

7. Explanation of the Change:

The addition of an accelerated option will allow undergraduate students who have completed a minimum of 90 credit hours and have been admitted to the Master's program to pursue the M.S. in Physics, Analytics for Large Data Sets Specialization with 500-level coursework.