MINNESOTA STATE COLLEGES AND UNIVERSITIES* ARTICULATION AGREEMENT BETWEEN	Normandale Community College AND St. Cloud State University
*The Board of Trustees of the Minnesota State Colleges and Universities is authorized by Minnesota Statutes, Chapter 136F to enter into Agreements and has delegated this authority to colleges and universities.	

This Agreement is entered into between Normandale Community College] (hereinafter sending institution), and St. Cloud State University (hereinafter receiving institution). This Agreement and any amendments and supplements, shall be interpreted pursuant to the laws of the State of Minnesota.

The sending institution has established an **Associate of Arts with Emphasis in Physics** (hereinafter sending program), and the receiving institution has established a **Bachelor of Science in Physics** (hereinafter receiving program), and will facilitate credit transfer and provide a smooth transition from one related program to another. It is mutually agreed:

Admission and Graduation Requirements

A. The receiving institution's admission and program admission requirements apply to both direct entry students and to students who transfer under this agreement.
B. Students must fulfill the graduation requirements at both institutions.
C. Students must complete the entire sending program and meet the receiving institution's admission requirements for the agreement to apply.

Transfer of Credits

A. The receiving institution will accept 60 credits from the sending program. A total of 60 credits remain to complete the receiving program.
B. Courses will transfer as described in the attached Program Articulation Table. For system institutions, once the courses are encoded, they will transfer as described in the uSelect Audit.

Implementation and Review

A. The Chief Academic Officers or designees of the parties to this agreement will implement the terms of this agreement, including identifying and incorporating any changes into subsequent agreements, assuring compliance with system policy, procedure and guidelines, and conducting a periodic review of this agreement.
B. This Articulation Agreement is effective on 09/05/2019 and shall remain in effect until the end date of 09/04/2024 or for five years, whichever occurs first, unless terminated or amended by either party with 90 days prior written notice.
C. The college and university shall work with students to resolve the transfer of courses should changes to either program occur while the agreement is in effect.
D. This Articulation Agreement will be reviewed by both parties beginning 03/31/2023 (within six months of the end date).
E. When a student notifies the receiving institution of their intent to follow this agreement, the receiving institution will encode course waivers and substitutions.

PROGRAM ARTICULATION TABLE

	College (sending)	University (receiving)
Institution	Normandale Community College	Saint Cloud State University
Program name	Physics	Physics
Award Type (e.g., AS)	Associate of Arts with Emphasis in Physics	Bachelor of Science in Physics
Credit Length	60	120
CIP code (6-digit)	40.080100	40.080100
Describe program admission requirements (if any)	None	1. Completion of at least 16 credits 2. Completion of PHYS 235 3. 2.50 or higher GPA in all PHYS, ASTR, and ENGR classes 4. 2.50 or higher GPA overall

Instructions

- List all required courses in both academic programs.
- MnTC goal areas transfer to the receiving institution according to the goal areas designated by the sending institution.
- Do not indicate a goal area for general education courses that are not part of the MnTC.
- For restricted or unrestricted electives, list number of credits.
- Credits applied: the receiving institution course credit amount may be more or less than the sending institution credit amount. Enter the number of credits that the receiving institution will apply toward degree completion.
- Show equivalent university-college courses on the same row to ensure accurate DARS encoding.
- Equiv/Sub/Wav column: If a course is to be encoded as equivalent, enter Equiv. If a course is to be accepted by the university as a "substitution" only for the purposes of this agreement, enter Sub. If a course requirement is waived by the receiving institution, enter Wav. If a course is to be accepted by the university as a MnTC goal area, restricted elective or unrestricted elective, leave the cell blank.

(To add rows, place cursor outside of the end of a row and press enter.)

SECTION A - Minnesota Transfer Curriculum-General Education

College (sending)			University (receiving)			
course prefix, number and name	Goal(s)[1]	Credits	course prefix, number and name	Goal(s)[1]	Credits Applied	Equiv Sub Wav
Minnesota Transfer Curriculum-General Education						
PHYS 1121 Physics 1 for Scientist and Engineers	3	5	PHYS 234 Classical Physics 1	3	5	E
PHYS 1122 Physics 2 for Scientist and Engineers	3	5	PHYS 235 Classical Physics 2		5	E
CHEM 1061 Principles of Chemistry 1	3	5	CHEM 210 General Chemistry 1	3	5	E
MATH 1510 Calculus 1	4	5	MATH 221 Calculus 1	4	5	E
MATH 1520 Calculus 2	4	5	MATH 222 Calculus 2		5	E
Remaining Liberal Education Program Areas	Goals 1,5-10	19 min.	Remaining Liberal Education Program Areas	Goals 1,5-10		
Health	(AA)	1-3				
Exercise Science	(AA)	1-3				
MnTC/General Education Total		46-50				

Special Notes, if any:

[1] MnTC goal areas transfer to the receiving college/university according to the goal areas designated by the sending college/university

SECTION B - Major, Emphasis, Restricted and Unrestricted Electives or Other

(pre-requisite courses, required core courses, required courses in an emphasis, or electives (restricted or general) within the major). Restricted electives (in Major) fulfill a specific requirement within a major. Example A: "Chose two of the following three courses;" Example B: A Biology degree may require 40 science credits (20 credits of required courses + 20 credits of listed related courses, such as botany, genetics, sociobiology, etc. which students can select).

Major, Emphasis, Restricted, Unrestricted Electives or Other Courses				
MATH 2510 Calculus 3 Multivariable Calculus *and* MATH 2520 Calculus 4 Diff. Eq. with Lin. Alg.	10	MATH 321 Vector and Multivariable Calculus *and* MATH 327 Differential Equations	10 (5 each)	E
PHYS 2250 Modern Physics	4	PHYS 328 Modern Physics 1	4	E
Restricted elective credits - list courses (if none enter 0)	0			
Unrestricted elective credits (if none enter 0)	0	College's unrestricted elective credits accepted in transfer (if none enter 0)		
Major, Emphasis, Unrestricted Electives Total	14	**Total College Credits Applied (sum of sections A and B)**	60	

SECTION C - Remaining University (receiving) Requirements

course prefix, number and name	Credits
PHYS 329 Modern Physics 2	3
PHYS 333 Optics	3
PHYS 334 Thermodynamics	3
PHYS 338 Electromagnetic Fields	4
PHYS 346 Applications in Theoretical Physics	3
PHYS 430 Advanced Physics Laboratory	2
PHYS 431 Introduction to Quantum Mechanics	3
PHYS 432 Advanced Quantum Mechanics	2
PHYS 440 Classical Mechanics	4
**CSCI 260 Programming in C *or* ECE 102 Engineering Problem Solving	2 or 3
**ENGR 332 Electronics	3
At least 9 credits from one of the following tracks, with no more than 3 credits of PHYS 415:	
Professional Physics Track: (9-11 cr)	
PHYS 415 Undergraduate Research	1-3
PHYS 450-455 Special Topics in Physics	1-3
ENGR 335 Digital Electronics Measurements	2
MATH 427 Partial Differential Equations	3
Astrophysics Track: (13-19 cr)	
PHYS 415 Undergraduate Research	1-3
ENGR 447 Optical Design	3
MATH 427 Partial Differential Equations	3
At least six credits from the following:	
ASTR 311 Solar System Astronomy	3
ASTR 312 Stellar Astronomy	3
ASTR 323 Observational Astronomy	3
ASTR 427 Galaxies and Cosmology	3
Engineering Science Track: (9-11 cr)	
PHYS 415 Undergraduate Research	1-3
ENGR 335 Digital Electronics Measurements	2
ENGR 425 Optical Communication	3
**ECE 201 Circuit Analysis 1	3
Mathematical Physics Track: (9-12)	
PHYS 415 Undergraduate Research	1-3
PHYS 450-455 Special Topics in Physics	1-3
MATH 423 Complex Variables 1	3
MATH 427 Partial Differential Equations	3
Electro-Optics Track: (9-15)	
PHYS 445 Electro-optics	3

	At least six credits from the following:	
	PHYS 415 Undergraduate Research	1-3
	PHYS 435 Laser Optics	3
	PHYS 436 Advanced and Fourier Optics	3
	ENGR 425 Optical Communication	3
	ENGR 447 Optical Design	3
	Self Selection Track:	
	At least 9 credits selected under the supervision of the physics major advisor. Courses must be selected from within the College of Science and Engineering	
	University unrestricted elective credits not counted elsewhere (if none enter 0)	12-22
	Total Remaining University Credits	60

Special Notes, if any:

**Equivalents or substitutions for these courses may be taken at the sending institution:

- CSCI 1111 Intro to Programming in C (equivalent) or CSCI 1113 Intro to C/C++ Programming for Scientists and Engineers (substitution) may be taken for CSCI 260 Programming in C
- ENGR 2001 Circuits with Electronics may be taken for either ECE 201 Circuit Analysis 1 (equivalent) or ENGR 332 Electronics (substitution), but not both.

SECTION D - Summary of Total Program Credits

College (sending) Credits		University (receiving) Requirements	
MnTC/General Education	46-50		
Major, Emphasis, Unrestricted Electives or Other	14		
Total College Credits (Minimum)	60	**Total College Credits Applied**	60
		Remaining credit to be taken at the university (receiving institution)	60
		Total Program Credits	120

Special Notes, if any:

College	Name	Signature	Date
Chief Academic Officer	Kristina Keller	Kristina Keller	10/10/19
Title			
University	**Name**	**Signature**	**Date**
Chief Academic Officer	Dr. Daniel Gregory		10/7/19
Title			
DARS Encoder	Ashley Livingood	Ashley Livingood	10-3-19

Date when equivalencies were encoded in DARS by the receiving MnSCU institution.