SOUTH DAKOTA MINES
An engineering, science and technology university

NORTHERN

Associate to Bachelors (A2B) Articulation Agreement

Prescribed Curriculum: Northern State University

Associate of Arts – General Studies (Chemical Engineering Track)

General Education Courses			**27** CREDIT HOURS
	Credit Hours	**Course No.**	**Course Title or Category**
Written Communication	3	ENGL 101	Composition I
	3	ENGL 201	Composition II
Oral Communication	3	CMST 101	Fundamentals of Speech (or CMST 215 Public Speaking)
Social Sciences	3	Select 1 Course From	SGR #3 list of approved courses
Arts/Humanities	3	Select 1 Course From	SGR #4 list of approved courses
Mathematics	4	MATH 123	Calculus I
Natural Sciences	4	CHEM 112/112L	General Chemistry I w/Lab
	4	CHEM 114/114L	General Chemistry II w/Lab

Required Elective Courses			**25** CREDIT HOURS
	Credit Hours	**Course No.**	**Course Title**
Math and Science	4	MATH 125	Calculus II
	4	PHYS 211*	University Physics I
	4	PHYS 213*	University Physics II
	4	CHEM 326/326L	Organic Chemistry I w/Lab
	4	MATH 225	Calculus III
	3	MATH 321	Differential Equations
Other	2	FYS190 (or IDL 190)	Seminar

**Courses have accompanying labs (PHYS 211L, PHYS 213L); students are welcome to take these labs; however, the credits for the lab courses will not apply toward the Bachelor of Science degree requirements.*

SDSMT Courses Taken While Jointly Enrolled at Northern State Univ.			**9** CREDIT HOURS
SDSMT Course ID	**Course Title**	**Credit Hours**	**Note**
CBE 217*	Chemical Engineering Materials Balances	3	Pre-requisites: CHEM 114 and MATH 123
CBE 218*	Chemical Engineering Mass Transfer	3	Pre-requisites: MATH 125 and PHYS 211
CBE 222*	Chemical Engineering Process Thermodynamics	3	Pre-requisites: CHEM 114 and MATH 125

**Courses are offered online through South Dakota Mines.*

Associate of Arts – General Studies (Chemical) Total:	**61 CREDIT HOURS**

Post-Associate Degree Prescribed Curriculum: South Dakota Mines

Bachelor of Science – Chemical Engineering

General Education Courses			6 CREDIT HOURS
	Credit Hours	**Course No.**	**Course Title or Category**
Arts & Humanities	3	Select 1 course from	General Education Arts and Humanities (Goal 4) courses
Social Sciences – Civics	3	Select 1 course from	CIV 100, HIST 151, HIST 152, POLS 100, or POLS 210

Major Required Courses			33 CREDIT HOURS
	Credit Hours	**Course No.**	**Course Title**
Chemical Engineering	1	CBE 117L	Programming for Chemical & Biological Engineering
	2	CBE 250	Computer Applications in Chemical Engineering
	3	CBE 317	Chemical Engineering Heat Transfer
	3	CBE 321	Chemical Engineering Equilibrium Thermodynamics
	2	CBE 333/333L	Process Measurements & Control w/Lab
	1	CBE 361L	Chemical Engineering Fluid Laboratory
	3	CBE 318	Chemical Engineering Mass Transfer
	3	CBE 343	Chemical Kinetics and Reactor Design
	1	CBE 362L	Chemical Engineering Heat Transfer Lab
	2	CBE 417	Chemical Engineering Equilibrium Separations
	3	CBE 433	Process Control
	1	CBE 461L	Chemical Engineering Mass Transfer & Reaction Engineering Lab
	3	CBE 463	Process Design and Economics for Chemical Engineering
	2	CBE 465	Chemical Process Safety
	1	CBE 487	Global and Contemporary Issues in Chemical Engineering
	2	CBE 466 or CBE 467	Capstone Design for Chem Eng or Process/Product Design for CBE

Other Required Courses			14 CREDIT HOURS
	Credit Hours	**Course No.**	**Course Title**
Science	3	BIOL 341	Microbial Processes in Engineering and Natural Sciences
	3	CHEM 332/332L	Analytical Chemistry w/Lab
	3	CHEM 328	Organic Chemistry II
	2	CHEM 342	Physical Chemistry I
	3	CHEM 344/344L	Physical Chemistry II w/Lab

Elective Courses			16 CREDIT HOURS
	Credit Hours	**Course No.**	**Course Title**
Electives	8	Select from list	Chemical Engineering Elective
	1	Select from list	Chemical Engineering Lab Elective
	3	Select with Advisor	Engineering Elective (non-Chemical Engineering)
	4	Select with Advisor	Department Approved Elective

Post-Associate Degree Total:	**69 CREDIT HOURS**
Bachelor of Science – Chemical Engineering Total:	**130 CREDIT HOURS**

A2B Articulation Agreement Guarantees & Limitations

GUARANTEES

Students who:

1. complete the Associate of Arts - General Studies degree prescribed curriculum at Northern State University exactly as it is identified in this articulation agreement, **and**
2. have the degree conferred on their education record at Northern State University (post high school graduation)**, and**
3. earn a minimum cumulative grade point average (GPA) of 2.75 at the Northern State University, **and**
4. pass all 61 credits for the associate degree, earning a grade C- or higher in each course

are **guaranteed** the following at the South Dakota School of Mines and Technology (South Dakota Mines):

1. junior standing at South Dakota Mines with no more than 69 remaining credits to meet the graduation requirements for the Bachelor of Science degree in Chemical Engineering.
2. admission to South Dakota Mines
3. admission to the Bachelor of Science degree in Chemical Engineering.

LIMITATIONS

1. This agreement is between the Associate of Arts - General Studies degree at Northern State University and the Bachelor of Science degree in Chemical Engineering at South Dakota Mines only.
2. Students must meet all admission and application requirements at South Dakota Mines, including the submission of all required documentation by stated deadlines. Students are advised to contact the Office of Admissions at the South Dakota Mines early in their transfer planning.
3. Student must have a cumulative grade point average (GPA) at the Northern State University of 2.75 or higher **and** only courses with grades of C- or higher are guaranteed to be accepted in transfer by South Dakota Mines.
4. The credit and course transfer guarantees described in this agreement apply to the Associate of Arts – General Studies degree at Northern State University and the Bachelor of Science degree in Chemical Engineering at South Dakota Mines. If the student changes majors at Northern State University or at South Dakota Mines, the student is no longer covered by this Articulation Agreement and none of the Guarantees of the Agreement apply.
5. Students utilizing any form of transfer credit, including but not limited to credit awarded from other higher education institutions, standardized exam (CLEP, AP, DSST, etc.), prior learning assessment (military, certifications, ACE recommended credit, portfolio, challenge exam, work experience equivalent credit, etc.) to satisfy any Associate degree requirements will have those credits evaluated by South Dakota Mines. Should South Dakota Mines not accept the transfer credits accepted by Northern State University, the student will be required to make up the credit deficiency at South Dakota Mines.
6. No course substitutions are allowed for the courses listed in the Prescribed Curriculum for the associate degree at Northern State University.

A2B CONTACT INFORMATION

South Dakota Mines
Office of the Provost
605.394.2256
Provost@sdsmt.edu

Northern State University
College of Arts and Sciences
605.626.2602
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RENEWAL, REVISION, and TERMINATION

1. This Associate to Bachelor Articulation Agreement (A2B) shall be in effect July 1 – June 30 each year and will automatically renew annually unless action is taken by South Dakota Mines or Northern State University to terminate or modify it.
2. The South Dakota Mines Office of the Provost and the Northern State University College of Arts and Sciences will collaborate to coordinate a review the content of the associate and bachelor degrees on a three-year cycle to ensure this A2B is still appropriate.
3. South Dakota Mines and Northern State University each reserve the right to seek revision of this agreement at any time.
4. Revision of any content of the agreement (except Appendices content) will be approved by each institution and result in a new agreement being signed, with copies retained by each institution.
    a. Revision to any Appendices will be communicated to each institution, but do not need to be approved by each institution and will not result in a new agreement being signed by each institution.
5. South Dakota Mines and Northern State University each reserve the right to seek termination of this agreement at any time.
6. Should the agreement be terminated, each institution agrees to collaborate and engage in appropriate plans to notify and work with impacted students, providing a minimum one-year advance notice of termination.

APPROVALS

Signed by:
Brian Tande
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Appendix A: Course Sequence

Course Sequence: Northern State University

General Studies (A.A.) Chemical Engineering Track – Option 1: Calculus I Ready

Semester	Course No.	Course Title	Credit Hours	Completed
Freshman Year FALL	IDL/FYS 190	Seminar	2	
	ENGL 101	Composition I	3	
	CHEM 112/112L	General Chemistry I w/ Lab	4	
	MATH 123	Calculus I	4	
	SGR #4	Humanities – Civics Course General Education (see SGR #4)	3	
		Total Credits	***16***	

Semester	Course No.	Course Title	Credit Hours	Completed
Freshman Year SPRING	ENGL 201	Composition II	3	
	MATH 125	Calculus II	4	
	CMST 101	Fundamentals of Speech (or CMST 215 Public Speaking)	3	
	CHEM 114/114L	General Chemistry II w/Lab	4	
		Total Credits	***14***	

Semester	Course No.	Course Title	Credit Hours	Completed
Sophomore Year FALL	MATH 225	Calculus III	4	
	PHYS 211	University Physics I	4	
	CBE 217	Chemical Engineering Materials Balances*	3	
	CHEM 326/326L	Organic Chemistry I w/Lab	4	
	MATH 321	Differential Equations	3	
		Total Credits	***18***	

Semester	Course No.	Course Title	Credit Hours	Completed
Sophomore Year SPRING	PHYS 213	University Physics II	4	
	CBE 218	Chemical Engineering Fluid Mechanics*	3	
	CBE 222	Chemical Engineering Process Thermodynamics*	3	
	SGR #3	Social Science General Education (see SGR #3)	3	
		Total Credits	***13***	

**Courses taken online through South Dakota Mines*

General Education Coursework Total:	27 credit hours
Major and Elective Coursework Total:	34 credit hours
Northern State University Coursework Total:	**61 CREDIT HOURS**

Course Sequence: Northern State University

General Studies (A.A.) Chemical Engineering Track – Option 2: College Algebra Ready

Semester	Course No.	Course Title	Credit Hours	Completed
Freshman Year FALL	MATH 114	College Algebra*	3	
	IDL/FYS 190	Seminar	2	
	ENGL 101	Composition I	3	
	SGR #4	Humanities – Civics Course General Education (see SGR #4)	3	
	SGR #3	Social Science General Education (see SGR #3)	3	
		Total Credits	***14***	

Semester	Course No.	Course Title	Credit Hours	Completed
Freshman Year SPRING	MATH 120	Trigonometry*	3	
	ENGL 201	Composition II	3	
	CMST 101	Fundamentals of Speech (or CMST 215 Public Speaking)	3	
	CHEM 112/L	General Chemistry I w/ Lab	4	
		Total Credits	***13***	

Semester	Course No.	Course Title	Credit Hours	Completed
Freshman Year SUMMER	MATH 123	Calculus I	4	
	CHEM 114/114L	General Chemistry II w/Lab	4	
		Total Credits	***8***	

Semester	Course No.	Course Title	Credit Hours	Completed
Sophomore Year FALL	MATH 125	Calculus II	4	
	PHYS 211	University Physics I	4	
	CHEM 326/326L	Organic Chemistry I w/Lab	4	
	CBE 217	Chemical Engineering Materials Balances**	3	
		Total Credits	***15***	

Semester	Course No.	Course Title	Credit Hours	Completed
Sophomore Year SPRING	MATH 225	Calculus III	4	
	MATH 321	Differential Equations	3	
	PHYS 213	University Physics II	4	
	CBE 218	Chemical Engineering Fluid Mechanics**	3	
	CBE 333	Chemical Engineering Process Thermodynamics**	3	
		Total Credits	***17***	

**Courses do not apply toward BS degree requirements*

*** Courses taken online with South Dakota Mines*

General Education Coursework Total:	27 credit hours
Major and Elective Coursework Total:	34 credit hours
Northern State University Coursework Total:	**61 CREDIT HOURS**

Course Sequence: South Dakota Mines – Fall Semester Start

Chemical Engineering (B.S.)

Semester	Course No.	Course Title	Credit Hours	Completed
Junior Year First Semester - FALL	CHEM 328	Organic Chemistry II	3	
	CBE 321	Chemical Engineering Equilibrium Thermodynamics	3	
	CBE 361L	Chemical Engineering Fluid Laboratory	1	
	CBE 333	Process Measurements and Controls	1	
	CBE 333L	Chemical Engineering Process Control Lab	1	
	CHEM 332/332L	Analytical Chemistry w/Lab	3	
	CHEM 342	Physical Chemistry I	2	
	Select 1 course from	CIV 100, HIST 151, HIST 152, POLS 100, or POLS 210	3	
		Total Credits	***17***	

Semester	Course No.	Course Title	Credit Hours	Completed
Junior Year Second Semester - SPRING	CBE 117L	Programming for Chemical & Biological Engineering	1	
	CBE 250	Computer Applications in Chemical Engineering	2	
	CBE 417	Chemical Engineering Equilibrium Separations	2	
	CBE 343	Chemical Kinetics and Reactor Design	3	
	CBE 318	Chemical Engineering Mass Transfer	3	
	CBE 362L	Chemical Engineering Heat Transfer Laboratory	1	
	CHEM 344/344L	Physical Chemistry II w/Lab	3	
		Engineering Elective	3	
		Total Credits	***18***	

Semester	Course No.	Course Title	Credit Hours	Completed
Senior Year First Semester - FALL	CBE 317	Chemical Engineering Heat Transfer	3	
	CBE 461L	Chemical Engineering Mass Transfer and Reaction Eng Lab	1	
	CBE 463	Process Design and Economics for Chemical Engineers	3	
	CBE 465	Chemical Process Safety	2	
	CBE 433	Process Control	3	
	BIOL 341	Microbial Process in Engineering & Natural Science	3	
		Chemical Engineering Elective	3	
		Total Credits	***18***	

Semester	Course No.	Course Title	Credit Hours	Completed
Senior Year Second Semester - SPRING	CBE 487	Global and Contemporary Issues in Chemical Engineering	1	
	Select 1 course from	CBE 466 or CBE 467	2	
	Select 1 course from	General Education Social Science (Goal 4) courses	3	
		Chemical Engineering Elective	5	
		Chemical Engineering Lab Elective	1	
		Department Approved Elective	4	
		Total Credits	***16***	

General Education Coursework Total:	6 credit hours
Major and Elective Coursework Total:	63 credit hours
South Dakota Mines Coursework Total:	**69 CREDIT HOURS**