Health Sciences

Math and Science (ASMSAS)

Associate in Science Degree

Program Effective Term: Winter 2026

High Demand Occupation High Skill Occupation High Wage Occupation

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science, biology, chemistry, math, or pharmacy. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations. These concentrations may also list courses used to meet General Education requirements.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227 or BIO 237

Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra

Mathematics (MATH) MTH 160 or MTH 160X Basic Statistics MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations

Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III

Pre-Pharmacy (PPHA) Two Restricted Electives in Biology (see below) CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I PHY 122 General Physics II Biology Restricted Electives for Pre-Pharmacy (PPHA): BIO 111, BIO 161, BIO 162, BIO 208, BIO 237, BIO 215 or BIO 227 Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 160 or MTH 160X, MTH 192, along with other Biology restricted electives. See a program advisor to select appropriate Biology courses.

Articulation:

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of

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high school pre - The biology CEM 111.	e-calculus are recommended to prepare for this program. and chemistry concentrations require one year of high school chemistry or CEM 101 with a "C" or b	better to enroll in
Minimum Cor Select a concer	centration Credits Required for the Program: ntration for requirements and total credits required for program.	60
Math and Scie	ence Concentrations	
Biology/Pre-	Medicine (BMED)	(60 credits)
First Semeste	er	(17 credits)
BIO 162	General Biology II Cells and Molecules	4
MTH 176 or	College Algebra	
MTH 191	Calculus I*	4
Elective	Elective(s) to reach minimum 60 credits	<u> </u>
Second Seme	ster	(16 credits)
BIO 161	General Biology I Ecology and Evolution	2
CEM 122	General Chemistry II	2
ENG 1110		2
MTH 160 or	Basic Statistics**	
MTH 160X or	Basic Statistics**	
MTH 192	Calculus II	4
Third Semest	er	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
Elective	Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227 or BIO 237	4
Fourth Seme	stor	(13 credits)
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3
Minimum Cre	dits Required for the Concentration or Option: 60	
Chemistry/Pi	re-Medicine (CMED)	(60 credits)
First Semeste	er	(16 credits)
CEM 111	General Chemistry I	4
MTH 191	Calculus I	E
PHY 111 Elective	General Physics I Elective(c) to reach minimum 60 credite	4
LIECTIVE		
Second Seme	ster	(16 credits)
CEM 122	General Chemistry II	4
ENG 111 OF		
MTH 192	Calculus II	- 4
PHY 122	General Physics II	4
Third Semest	er	(14 credits)
CEM 211	Organic Chemistry I	2
Elective	Speech/Comp. Elective(s)	3
MTH 197	Linear Algebra	2
Fourth Seme	Elective(c) to reach minimum 60 credite	(14 credits)
CFM 222	Organic Chemistry II	1
Elective	Arts/Human. Elective(s) 1	
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3
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Minimum Credits Required for the Concentration or Option: 60

Mathematics ()		(CO and the)
Mathematics (MATH)-also avallable online	(60 creans)
First Semester		(15 credits)
Elective	Nat. Sci. Elective(s)	3
MTH 191	Calculus I	5
Elective	Select one course from the following: CPS 120, CPS 141, CPS 161 or CPS 171	3
ENG 111 or	Composition I	4
ENG IIIX	Composition 1	4
Second Semest	ter	(14 credits)
Elective	Nat. Sci. Lab Elective(s)	3
MTH 160 or	Basic Statistics	
MTH 160X	Basic Statistics	4
MIH 192	Calculus II Sec. Sci. Elective(c) 1	4
LIECTIVE	SUC. SCI. LIECUVE(S) 1	J
Third Semester	r	(17 credits)
Elective	Speech/Comp. Elective(s)	3
Elective	Elective(s) to reach minimum 60 credits	3
MTH 197	Linear Algebra	4
Flective	Calculus III Soc. Sci. Elective(s) 2	4
LIECTIVE	300. 301. Elective(3) 2	J
Fourth Semest	er	(14 credits)
MTH 295	Differential Equations	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Arts/Human. Elective(s) 2	3
Elective	Elective(s) to reach a minimum of 60 credits.	4
Minimum Cred	its Required for the Concentration or Ontion: 60	
	is required for the concentration of option. Go	
Pre-Actuarial S	cience (PRAS)-also available online	(60 credits)
Pre-Actuarial S	icience (PPAS)-also available online	(60 credits)
Pre-Actuarial S First Semester	icience (PPAS)-also available online	(60 credits) (16 credits)
Pre-Actuarial S First Semester ACC 111	Principles of Financial Accounting	(60 credits) (16 credits) 3
Pre-Actuarial S First Semester ACC 111 CPS 161	Principles of Financial Accounting An Introduction to Programming with Java	(60 credits) (16 credits) 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or	Principles of Financial Accounting An Introduction to Programming with Java Composition I	(60 credits) (16 credits) 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I	(60 credits) (16 credits) 3 4 4 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5 (16 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Principles of Managerial Accounting	(60 credits) (16 credits) 3 4 4 5 (16 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Election	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I Principles of Managerial Accounting Economic Principles I - Macro	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 3 4 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 4 3 4 3 4 3 3 4 3 3 4 3 3 3 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 192	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 3 4 3 4 3 (13 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 4 3 (13 credits) 3 4 2 3 4 3 4 3 4 3 4 3 3 4 3 4 3 4 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111 x MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s)	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 4 3 (13 credits) 3 4 3 4 3 4 3 2 2 2 2
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) 2+	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 4 4 3 (13 credits) 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) 2+ er	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 4 3 (13 credits) 3 4 4 3 (13 credits) 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 5 5 5 6 6 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ er Calculus III	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 (13 credits) 3 4 4 3 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 5 5 6 6 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 f Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) 2+ er Calculus III Arts/Human. Elective(s) 2++	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 (13 credits) 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 5 5 6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ Calculus II Arts/Human. Elective(s) 2+ Er Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 (13 credits) 4 3 4 3 4 3 4 3 4 3 5 (15 credits) 4 3 4 3 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective Elective Elective Elective Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 f Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ Calculus II Arts/Human. Elective(s) 2+ Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s) Elective(s) to reach minimum 60 credits	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 (15 credits) 4 3 3 4 3 4 3 3 (15 credits) 4 3 3 5

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Minimum Credits Required for the Concentration or Option: 60

Pre-Pharmacy	(РРНА)	(60 credits)
First Semester		(16 credits)
Elective	Biology Restricted Elective	4
CEM 111	General Chemistry I	4
MTH 191	Calculus I	5
Elective	Arts/Human. Elective(s)	3
Second Semest	ter	(15 credits)
Elective	Restricted Biology Elective	4
CEM 122	General Chemistry II	4
ENG 111 or	Composition I	
ENG 111X	Composition 1	4
Elective	Elective(s) to reach minimum 60 credits	3
Third Semeste	r	(17 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
PHY 111	General Physics I	4
Elective	Arts/Human. Elective(s) 2	3
Elective	Soc. Sci. Elective(s) 1	3
Fourth Semest	er	(12 credits)
CEM 222	Organic Chemistry II	4
PHY 122	General Physics II	4
Elective	Elective(s) to reach minimum 60 credits	1
Elective	Soc. Sci. Elective(s) 2	3
Minimum Credi	its Required for the Concentration or Option: 60	
Minimum Credi	its Required for the Program:	60

Minimum Credits Required for the Program:

Notes:

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191. **Students transferring to EMU as a biology major may substitute MTH 160 or MTH 160X or higher for MTH 192.

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

+See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the the EMU Diverse Word Requirements list.

Science, Computer Technology, Engineering & Math

Math and Science (ASMSAS)

Associate in Science Degree

Program Effective Term: Winter 2026

High Demand Occupation High Skill Occupation High Wage Occupation

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science, biology, chemistry, math, or pharmacy. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations. These concentrations may also list courses used to meet General Education requirements.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227 or BIO 237

Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra

Mathematics (MATH) MTH 160 or MTH 160X Basic Statistics MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations

Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III

Pre-Pharmacy (PPHA) Two Restricted Electives in Biology (see below) CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I PHY 122 General Physics II Biology Restricted Electives for Pre-Pharmacy (PPHA): BIO 111, BIO 161, BIO 162, BIO 208, BIO 237, BIO 215 or BIO 227 Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 160 or MTH 160X, MTH 192, along with other Biology restricted electives. See a program advisor to select appropriate Biology courses.

Articulation:

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of

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high school pre- - The biology a CEM 111.	calculus are recommended to prepare for this program. and chemistry concentrations require one year of high school chemistry or CEM 101 with a "C" or b	etter to enroll in
Minimum Cond Select a concen	centration Credits Required for the Program: tration for requirements and total credits required for program.	60
Math and Scie	nce Concentrations	
Biology/Pre-№	ledicine (BMED)	(60 credits)
First Semester	·	(17 credits)
BIO 162	General Biology II Cells and Molecules	4
CEM 111	General Chemistry I	4
MTH 176 or	College Algebra	
MTH 191	Calculus I*	4
Elective	Elective(s) to reach minimum 60 credits	5
Second Semes	iter	(16 credits)
BIO 161	General Biology I Ecology and Evolution	4
CEM 122	General Chemistry II	4
ENG 111 or	Composition I	
ENG 111X	Composition 1	4
MTH 160 Or	Basic Statistics**	
MTH 100X OF		1
1111 192		4
Third Semeste	r	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
Elective	Soc. Sci. Elective(s) 1	3
Elective	Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227 or BIO 237	4
Fourth Semest	ter	(13 credits)
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3
Minimum Crea	lits Required for the Concentration or Option: 60	
	Medicine (CNED)	(60 energine)
chemistry/Pro		(ou creatis)
First Semester	•	(16 credits)
CEM 111	General Chemistry I	4
MTH 191	Calculus I	5
PHY 111	General Physics I	4
Elective	Elective(s) to reach minimum 60 credits	3
Second Semes	ter	(16 credits)
CEM 122	General Chemistry II	4
ENG 111 or	Composition I	
ENG 111X	Composition 1	4
MTH 192	Calculus II	4
PHY 122	General Physics II	4
Third Semeste	r	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
MTH 197	Linear Algebra	4
Elective	Soc. Sci. Elective(s) 1	3
Fourth Some		(14 gradita)
Flective	Elective(s) to reach minimum 60 credits	(14 creatts)
CEM 222	Organic Chemistry II	1
Flective	Arts/Human, Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3
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		-

Minimum Credits Required for the Concentration or Option: 60

Mathematics ()		(CO and the)
Mathematics (MATH)-also avallable online	(60 creans)
First Semester		(15 credits)
Elective	Nat. Sci. Elective(s)	3
MTH 191	Calculus I	5
Elective	Select one course from the following: CPS 120, CPS 141, CPS 161 or CPS 171	3
ENG 111 or	Composition I	4
ENG IIIX	Composition 1	4
Second Semest	ter	(14 credits)
Elective	Nat. Sci. Lab Elective(s)	3
MTH 160 or	Basic Statistics	
MTH 160X	Basic Statistics	4
MIH 192	Calculus II Sec. Sci. Elective(c) 1	4
LIECTIVE	SUC. SCI. LIECUVE(S) 1	J
Third Semester	r	(17 credits)
Elective	Speech/Comp. Elective(s)	3
Elective	Elective(s) to reach minimum 60 credits	3
MTH 197	Linear Algebra	4
Flective	Calculus III Soc. Sci. Elective(s) 2	4
LIECTIVE	300. 301. Elective(3) 2	J
Fourth Semest	er	(14 credits)
MTH 295	Differential Equations	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Arts/Human. Elective(s) 2	3
Elective	Elective(s) to reach a minimum of 60 credits.	4
Minimum Cred	its Required for the Concentration or Ontion: 60	
	is required for the concentration of option. Go	
Pre-Actuarial S	cience (PRAS)-also available online	(60 credits)
Pre-Actuarial S	icience (PPAS)-also available online	(60 credits)
Pre-Actuarial S First Semester	icience (PPAS)-also available online	(60 credits) (16 credits)
Pre-Actuarial S First Semester ACC 111	Principles of Financial Accounting	(60 credits) (16 credits) 3
Pre-Actuarial S First Semester ACC 111 CPS 161	Principles of Financial Accounting An Introduction to Programming with Java	(60 credits) (16 credits) 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or	Principles of Financial Accounting An Introduction to Programming with Java Composition I	(60 credits) (16 credits) 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I	(60 credits) (16 credits) 3 4 4 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5 (16 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Principles of Managerial Accounting	(60 credits) (16 credits) 3 4 4 5 (16 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Election	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I Principles of Managerial Accounting Economic Principles I - Macro	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus I	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 3 4 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 4 3 4 3 4 3 3 4 3 3 4 3 3 3 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 192	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 3 4 3 4 3 (13 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 4 3 (13 credits) 3 4 2 3 4 3 4 3 4 3 4 3 3 4 3 4 3 4 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s)	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 4 3 (13 credits) 3 4 3 4 3 4 3 2 2 2 2
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) 2+	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 4 4 3 (13 credits) 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) 2+ er	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 (13 credits) 3 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 5 5 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ er Calculus III	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 (13 credits) 3 4 4 3 3 4 4 3 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 4 5 5 5 6 6 6 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 f Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ er Calculus III Arts/Human. Elective(s) 2++	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 (13 credits) 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 3 4 4 3 4 4 5 5 6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ Calculus II Arts/Human. Elective(s) 2+ Er Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 (13 credits) 4 3 4 3 4 3 4 3 4 3 5 (15 credits) 4 3 4 3 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective Elective Elective Elective Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 f Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ Calculus II Arts/Human. Elective(s) 2+ Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s) Elective(s) to reach minimum 60 credits	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 (15 credits) 4 3 3 4 3 4 3 3 (15 credits) 4 3 3 5

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Minimum Credits Required for the Concentration or Option: 60

Pre-Pharmacy	(РРНА)	(60 credits)
First Semester		(16 credits)
Elective	Biology Restricted Elective	4
CEM 111	General Chemistry I	4
MTH 191	Calculus I	5
Elective	Arts/Human. Elective(s)	3
Second Semest	ter	(15 credits)
Elective	Restricted Biology Elective	4
CEM 122	General Chemistry II	4
ENG 111 or	Composition I	
ENG 111X	Composition 1	4
Elective	Elective(s) to reach minimum 60 credits	3
Third Semeste	r	(17 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
PHY 111	General Physics I	4
Elective	Arts/Human. Elective(s) 2	3
Elective	Soc. Sci. Elective(s) 1	3
Fourth Semest	er	(12 credits)
CEM 222	Organic Chemistry II	4
PHY 122	General Physics II	4
Elective	Elective(s) to reach minimum 60 credits	1
Elective	Soc. Sci. Elective(s) 2	3
Minimum Credi	its Required for the Concentration or Option: 60	
Minimum Credi	its Required for the Program:	60

Minimum Credits Required for the Program:

Notes:

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191. **Students transferring to EMU as a biology major may substitute MTH 160 or MTH 160X or higher for MTH 192.

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

+See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the the EMU Diverse Word Requirements list.

Transfer

Math and Science (ASMSAS)

Associate in Science Degree

Program Effective Term: Winter 2026

High Demand Occupation High Skill Occupation High Wage Occupation

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science, biology, chemistry, math, or pharmacy. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations. These concentrations may also list courses used to meet General Education requirements.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227 or BIO 237

Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra

Mathematics (MATH) MTH 160 or MTH 160X Basic Statistics MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations

Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III

Pre-Pharmacy (PPHA) Two Restricted Electives in Biology (see below) CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I PHY 122 General Physics II Biology Restricted Electives for Pre-Pharmacy (PPHA): BIO 111, BIO 161, BIO 162, BIO 208, BIO 237, BIO 215 or BIO 227 Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 160 or MTH 160X, MTH 192, along with other Biology restricted electives. See a program advisor to select appropriate Biology courses.

Articulation:

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of

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high school pre-calculus are recommended to prepare for this program.

Program Information Report

Math and Sci	ence Concentrations	
Biology/Pre-	Medicine (BMED)	(60 credits)
First Semest	er	(17 credits)
BIO 162	General Biology II Cells and Molecules	2
CEM 111	General Chemistry I	2
MTH 176 or	College Algebra	
MTH 191	Calculus I*	4
Elective	Elective(s) to reach minimum 60 credits	5
Second Seme	ester	(16 credits)
BIO 161	General Biology 1 Ecology and Evolution	4
CEM 122	General Chemistry II	4
ENG 111 OF		/
MTH 160 or	Composition 1 Bacic Statistics**	4
MTH 160X or	Basic Statistics**	
MTH 192	Calculus II	4
Third Somes	tor	(14 credits)
CFM 211	Organic Chemistry I	
Elective	Speech/Comp. Elective(s)	3
Elective	Soc. Sci. Elective(s) 1	
Elective	Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227 or BIO 237	4
Fourth Seme	ster	(13 credits)
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3
Minimum Cre	dits Required for the Concentration or Option: 60	
Chemistry/P	re-Medicine (CMED)	(60 credits)
First Semest	er	(16 credits)
	General Cnemistry 1	4
	Calculus I Concrete Physics I	5
Elective	Elective(s) to reach minimum 60 credits	3
Second Come		(16 anodita)
CEM 122	General Chemistry II	(10 creats)
ENG 111 or	Composition I	7
ENG 111 0	Composition 1	4
MTH 192	Calculus II	4
PHY 122	General Physics II	4
Third Semest	ter	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
MTH 197	Linear Algebra	4
Elective	Soc. Sci. Elective(s) 1	3
Fourth Seme	ster	(14 credits)
Elective	Elective(s) to reach minimum 60 credits	1
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
-1		-
Elective	Arts/Human. Elective(s) 2	3

Minimum Credits Required for the Concentration or Option: 60

Mathematics ()		(CO and the)
Mathematics (MATH)-also avallable online	(60 creans)
First Semester		(15 credits)
Elective	Nat. Sci. Elective(s)	3
MTH 191	Calculus I	5
Elective	Select one course from the following: CPS 120, CPS 141, CPS 161 or CPS 171	3
ENG 111 or	Composition I	4
ENG IIIX	Composition 1	4
Second Semest	ter	(14 credits)
Elective	Nat. Sci. Lab Elective(s)	3
MTH 160 or	Basic Statistics	
MTH 160X	Basic Statistics	4
MIH 192	Calculus II Sec. Sci. Elective(c) 1	4
LIECTIVE	SUC. SCI. LIECUVE(S) 1	J
Third Semester	r	(17 credits)
Elective	Speech/Comp. Elective(s)	3
Elective	Elective(s) to reach minimum 60 credits	3
MTH 197	Linear Algebra	4
Flective	Calculus III Soc. Sci. Elective(s) 2	4
LIECTIVE	300. 301. Elective(3) 2	J
Fourth Semest	er	(14 credits)
MTH 295	Differential Equations	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Arts/Human. Elective(s) 2	3
Elective	Elective(s) to reach a minimum of 60 credits.	4
Minimum Cred	its Required for the Concentration or Ontion: 60	
	is required for the concentration of option. Go	
Pre-Actuarial S	cience (PRAS)-also available online	(60 credits)
Pre-Actuarial S	icience (PPAS)-also available online	(60 credits)
Pre-Actuarial S First Semester	icience (PPAS)-also available online	(60 credits) (16 credits)
Pre-Actuarial S First Semester ACC 111	Principles of Financial Accounting	(60 credits) (16 credits) 3
Pre-Actuarial S First Semester ACC 111 CPS 161	Principles of Financial Accounting An Introduction to Programming with Java	(60 credits) (16 credits) 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or	Principles of Financial Accounting An Introduction to Programming with Java Composition I	(60 credits) (16 credits) 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I	(60 credits) (16 credits) 3 4 4 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5 (16 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Principles of Managerial Accounting	(60 credits) (16 credits) 3 4 4 5 (16 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Election	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I Principles of Managerial Accounting Economic Principles I - Macro	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus I	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 3 4 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 4 3 4 3 4 3 3 4 3 3 4 3 3 3 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 192	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 3 4 3 3 4 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 4 3 (13 credits) 3 4 2 3 4 3 4 3 4 3 4 3 3 4 4 3 4 4 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 3 4 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s)	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 4 3 (13 credits) 3 4 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) 2+	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 4 4 3 (13 credits) 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) 2+ er	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 (13 credits) 3 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 5 5 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ er Calculus III	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 (13 credits) 3 4 4 3 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 3 4 4 5 5 6 6 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8 7 8
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 f Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) 2+ er Calculus III Arts/Human. Elective(s) 2++	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 (13 credits) 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 3 4 4 3 4 4 5 5 6 6 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 F Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ Calculus II Arts/Human. Elective(s) 2+ Er Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 (13 credits) 4 3 4 3 4 3 4 3 4 3 5 (15 credits) 4 3 4 3 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 or ENG 111X MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective Elective Elective Elective Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Composition 1 Calculus I ter Principles of Managerial Accounting Economic Principles I - Macro Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 f Economic Principles II - Micro Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ Calculus II Arts/Human. Elective(s) 2+ Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s) Elective(s) to reach minimum 60 credits	(60 credits) (16 credits) 4 4 5 (16 credits) 3 3 3 4 3 (15 credits) 4 3 3 4 3 4 3 3 (15 credits) 4 3 3 5

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Minimum Credits Required for the Concentration or Option: 60

Pre-Pharmacy	(РРНА)	(60 credits)
First Semester		(16 credits)
Elective	Biology Restricted Elective	4
CEM 111	General Chemistry I	4
MTH 191	Calculus I	5
Elective	Arts/Human. Elective(s)	3
Second Semest	ter	(15 credits)
Elective	Restricted Biology Elective	4
CEM 122	General Chemistry II	4
ENG 111 or	Composition I	
ENG 111X	Composition 1	4
Elective	Elective(s) to reach minimum 60 credits	3
Third Semeste	r	(17 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
PHY 111	General Physics I	4
Elective	Arts/Human. Elective(s) 2	3
Elective	Soc. Sci. Elective(s) 1	3
Fourth Semest	er	(12 credits)
CEM 222	Organic Chemistry II	4
PHY 122	General Physics II	4
Elective	Elective(s) to reach minimum 60 credits	1
Elective	Soc. Sci. Elective(s) 2	3
Minimum Credi	its Required for the Concentration or Option: 60	
Minimum Credi	its Required for the Program:	60

Minimum Credits Required for the Program:

Notes:

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191. **Students transferring to EMU as a biology major may substitute MTH 160 or MTH 160X or higher for MTH 192.

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

+See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the the EMU Diverse Word Requirements list.

Program Code: ASMSAS Current Program Nan Science	e: Math and	Effective Term: Winter 26		
Division Code: MSE Department: Chemistry				
 Directions: 1. Attach the current program listing from the WCC catalog or website and indicate any changes to be made. 2. Draw lines through any text that should be deleted and write in additions. Extensive narrative changes can be included on a separate sheet. 3. Check the boxes below for each type of change being proposed. Changes to courses, discontinuing a course, or adding new courses as part of the proposed program change, must be approved separately using CurricUNET, but should be submitted at the same time as the program change form. 4. If changes affect the program assessment plan or if program outcomes are updated, please submit a <u>Program</u> <u>Assessment Plan Change</u> form. These changes must be approved separately from the program change form and should be submitted at the same time. Current program assessment plans can be found on the <u>Curriculum and Assessment</u> 				
Requested Changes: Remove course(s): Add course(s): Advisors Program admission requirements Continuing eligibility requirements Show all changes on the catalog page you attach. * Please submit a Program Assessment Plan Change form.	 Program outcon removing or add Program assess Accreditation inf Other Note: A change to the of a new program program inactivation Curriculum & Assess 	nes (may also result from ding a course)* sment plan* formation Award Type requires the submission proposal form and a separate on form. Contact the Director of essment for more information.		
Rationale for proposed changes: They are moving away from the co-req model				
Financial/staffing/equipment/space implications: no List departments that have been consulted regarding	one ng their use of this pr	ogram.		

Signatures:

Reviewer	Print Name	Signature	Date		
Initiator	Steven Toth	Steven loth	Apr 17, 2025		
Department Chair	Breege Concannon	13 r	Apr 17, 2025		
Division Dean/Administrator	Tracy Schwab	Jracis S. Schwal	Apr 17, 2025		
Please return compl	eted form to the Office of	of Curriculum & Assessment, SC 257	,		
or by e-mail to curriculum.assessment@wccnet.edu					
Once reviewed by the appropriate faculty committees we will secure the signature of the VPI.					

PROGRAM CHANGE FORM

Reviewer	Print Name	Signature	Date
Curriculum Committee Chair	Randy Van Wagnen	RVanWagnen	6/10/25
Assessment Committee Chair	Jessica Hale	HAale	6/10/25
Executive Vice President for Instruction	Dr. Brandon Tucker	Brandon Roderick Digitally signed by Brandon Roderick Tucker PhD Date: 2025.06.12 09:26:57 -04'00'	6/12/25
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Reviewed by C&A Committee 5/29/25

Health Sciences

Math and Science (ASMSAS)

Associate in Science Degree

Program Effective Term: Winter 2025

High Demand Occupation High Skill Occupation High Wage Occupation

Program is also available online

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science, biology, chemistry, math, or pharmacy. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations. These concentrations may also list courses used to meet General Education requirements.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227 or BIO 237

Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra

Mathematics (MATH) MTH 160 or MTH 160X Basic Statistics MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations

Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III

Pre-Pharmacy (PPHA) Two Restricted Electives in Biology (see below) CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I PHY 122 General Physics II Biology Restricted Electives for Pre-Pharmacy (PPHA): BIO 111, BIO 161, BIO 162, BIO 208, BIO 237, BIO 215 or BIO 227 Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 160 or MTH 160X, MTH 192, along with other Biology restricted electives. See a program advisor to select appropriate Biology courses.

Articulation:

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of

Monday, October 21, 2024 2:49:7 p.m.

high school pre - The biology CEM 111.	e-calculus are recommended to prepare for this program. and chemistry concentrations require one year of high school chemistry or CEM 101 with a "C" or b	etter to enroll in
Minimum Con Select a concer	centration Credits Required for the Program: ntration for requirements and total credits required for program.	60
Math and Scie	ence Concentrations	
Biology/Pre-l	Medicine (BMED)	(60 credits)
First Semeste	ir	(17 credits)
BIO 162	General Biology II Cells and Molecules	4
CEM 111	General Chemistry I	4
MTH 176 or	College Algebra	
MTH 191	Calculus I*	4
Elective	Elective(s) to reach minimum 60 credits	5
Second Seme	ster	(16 credits)
BIO 161	General Biology I Ecology and Evolution	4
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
MTH 160 or	Basic Statistics**	
MIH 160X or	Basic Statistics**	
MIH 192		4
Third Semest	er	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
Elective	Soc. Sci. Elective(s) 1	3
Elective	Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227 or BIO 237	4
Fourth Semes	iter	(13 credits)
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3
Minimum Cre	dits Required for the Concentration or Option: 60	
Chemistry/Pr	e-Medicine (CMED)	(60 credits)
First Semeste	ir an	(16 credits)
CEM 111	General Chemistry I	4
MIH 191		5
PHY III Floctive	General Physics 1 Elective(s) to reach minimum 60 credits	4
LIECTIVE		C
Second Seme	ster	(16 credits)
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
MTH 192		4
PHY 122	General Physics II	4
Third Semest	er	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
MTH 197	Linear Algebra	4
Elective	Soc. Sci. Elective(s) 1	3
Fourth Semes	ster	(14 credits)
Elective	Elective(s) to reach minimum 60 credits	1
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3

Minimum Credits Required for the Concentration or Option: 60

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Mathematics (N	MATH)	(60 credits)
First Semester		(15 credits)
Elective	Nat. Sci. Elective(s)	3
MTH 191	Calculus I	5
Elective	Composition I	3
Second Semest		(14 credits)
Elective MTH 160 or	Nat. Sci. Lad Elective(S) Basic Statistics	3
MTH 160X	Basic Statistics	4
MTH 192	Calculus II	4
Elective	Soc. Sci. Elective(s) 1	3
Third Semester	•	(17 credits)
Elective	Speech/Comp. Elective(s)	3
Elective	Elective(s) to reach minimum 60 credits	3
MTH 293	Calculus III	4
Elective	Soc. Sci. Elective(s) 2	3
Fourth Semest	ar	(14 credits)
MTH 295	Differential Equations	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Arts/Human. Elective(s) 2	3
Elective	Elective(s) to reach a minimum of 60 credits.	4
Minimum Credi	ts Required for the Concentration or Option: 60	
Pre-Actuarial S	cience (PPAS)-also available online	(60 credits)
Pre-Actuarial S First Semester	cience (PPAS)-also available online	(60 credits) (16 credits)
Pre-Actuarial S First Semester ACC 111	cience (PPAS)-also available online Principles of Financial Accounting	(60 credits) (16 credits) 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111	cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java	(60 credits) (16 credits) 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191	cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191	Cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest	cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Principles of Managerial Accounting	(60 credits) (16 credits) 3 4 4 5 (16 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211	cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I er Principles of Managerial Accounting Principles of Economics I	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective	Cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I cer Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 CL	Cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Calculus I Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II At the first in (a) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 4 2 4 4 5 (16 credits) 3 4 4 5 (16 credits) 4 4 5 (16 credits) 3 4 4 5 (16 credits) 3 4 4 5 (16 credits) 3 4 4 5 (16 credits) 3 4 4 5 (16 credits) 3 4 4 5 (16 credits) 3 4 4 5 (16 credits) 3 3 4 4 5 (16 credits) 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Calculus I Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semester ACC 122 ECO 211 Elective MTH 192 Elective Third Semester	Cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Calculus I Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 4 3 (13 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197	Cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Calculus I Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Lineare Algebra	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 5 6 6 7 8 8 8 9 9 9 9 9 9 9 9 9 9 9 9 9
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective	Cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Calculus I Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 3 4 4 3 3 3 3 4 4 3 3 3 3 4 4 5 5 6 6 7 7 8 8 8 8 8 8 8 8
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Elective	Cience (PPAS)-also available online Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Calculus I Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semester ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elec	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 (15 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semester ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semester MTH 293	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I er Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ er Calculus II	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 (15 credits) 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semester ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semester MTH 293 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 (15 credits) 4 3 3 4 3 3 4 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 4 3 3 3 4 4 3 3 3 4 4 3 3 3 3 3 4 4 3 3 3 3 4 4 3 3 3 3 3 4 4 3 3 3 3 4 4 3 3 3 4 4 3 3 3 4 4 3 3 3 4 4 3 3 4 3 3 4 4 3 3 4 4 3 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 3 4 4 3 3 4 4 3 3 3 4 4 3 3 3 4 4 3 3 3 4 4 3 3 3 4 4 3 3 3 4 4 3 3 3 3 3 3 3 3 3 3 3 4 4 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semester MTH 293 Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++ Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 (16 credits) 3 4 3 (13 credits) 3 (15 credits) 4 3 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 3 4 4 3 3 4 5 5 5 6 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semester MTH 293 Elective Elective Elective Elective Elective Elective	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++ Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s) Elective(s) to reach minimum 60 credits	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 (15 credits) 4 3 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semester ECO 222 MTH 293 Elective E	Principles of Financial Accounting An Introduction to Programming with Java Composition I Calculus I er Principles of Managerial Accounting Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ er Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s) Elective(s) to reach minimum 60 credits its Required for the Concentration or Option: 60	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 (15 credits) 3 (15 credits) 4 3 5

First Semester		(16 credits)
Elective	Biology Restricted Elective	4
CEM 111	General Chemistry I	4
MTH 191	Calculus I	5
Elective	Arts/Human. Elective(s)	3

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Second Sem	ester	(15 credits)
Elective	Restricted Biology Elective	4
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
Elective	Elective(s) to reach minimum 60 credits	3
Third Semes	ster	(17 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
PHY 111	General Physics I	4
Elective	Arts/Human. Elective(s) 2	3
Elective	Soc. Sci. Elective(s) 1	3
Fourth Sem	ester	(12 credits)
CEM 222	Organic Chemistry II	4
PHY 122	General Physics II	4
Elective	Elective(s) to reach minimum 60 credits	1
Elective	Soc. Sci. Elective(s) 2	3
Minimum Cr	edits Required for the Concentration or Optio	n: 60
Minimum Cr	edits Required for the Program:	60

Minimum Credits Required for the Program:

Notes:

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191.

**Students transferring to EMU as a biology major may substitute MTH 160 or MTH 160X or higher for MTH 192.

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

+See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the the EMU Diverse Word Requirements list.

PROGRAM CHANGE FORM

Program Code: ASMSAS	Current Program Name: A in Science- Math and Scien	ssociate ce	Effective Term:	Winter 2025
Division Code: MSE	Department: All MSE Depart	ments		
 Directions: Attach the current program listing Draw lines through any text that on a separate sheet. Check the boxes below for each new courses as part of the propresubmitted at the same time as the same time as the separate sheet. If changes affect the program and Assessment Plan Change form be submitted at the same time. Program Information page. 	ng from the WCC catalog or well t should be deleted and write in h type of change being propose losed program change, must be he program change form. Issessment plan or if program o . These changes must be appro Current program assessment p	osite and indicate an additions. Extensive d. Changes to cours approved separately utcomes are updated ved separately from lans can be found or	y changes to be ma narrative changes es, discontinuing a y using CurricUNET d, please submit a <u>f</u> the program chang n the <u>Curriculum an</u>	ade. can be included course, or adding f, but should be <u>Program</u> e form and should <u>d Assessment</u>
Requested Changes: Remove course(s): MTH 1 Add course(s): MTH 160 or Program title (new title is _ Description Advisors Program admission require Continuing eligibility require Show all changes on the cataloo * Please submit a Program Asse	60 (alone) [MTH160X [) [ments ements g page you attach. ssmeet Plan Change form	 Program outcom removing or add Program assess Accreditation inf Other ote: A change to the of a new program program inactivatio Curriculum & Asse 	nes (may also res ding a course)* ment plan* formation Award Type require proposal form and a on form. Contact the essment for more in	ult from es the submission a separate e Director of formation.
Rationale for proposed chan	ges:			
These changes will correlate with	the changes in developmental	math.		
Financial/staffing/equipment N/A	/space implications:			
List departments that have b	een consulted regarding th	neir use of this pr	ogram.	
MSE				
Signatures:				
Reviewer	Print Name	Sigr	nature	Date
Initiator	Suzanne Albach	Syen or	H. Back	09/25/2024
Department Chair	Suzanne Albach	Som M	+ The A	09/25/2024
Division Dean/Administrator	Tracy Schwab	Tracy S. S	Schwale	9/25/24

Please return completed form to the Office of Curriculum & Assessment, SC 257 or by e-mail to curriculum.assessment@wccnet.edu Once reviewed by the appropriate faculty committees we will secure the signature of the VPI.

WASHTENAW COMMUNITY COLLEGE

PROGRAM CHANGE FORM

Reviewer	Print Name	Signature	Date
Curriculum Committee Chair	Randy Van Wagnen	Randy Van Wagnen Digitally signed by Randy Van Wagnen Date; 2024 10.18 08;52:17 -04'00'	
Assessment Committee Chair	Jessica Hale	Jessica Hale Digitally signed by Jessica Hale Date: 2024.10.18 13:38:51 -04'00	
Executive Vice President for Instruction	Dr. Brandon Tucker	Brandon Roderick Tucker Date: 2024.10.19 13:09:39 -04'00'	
Do not write in shaded area	Entered in: Banner	C&A Database Log File	· · · · · · · · · · · · · · · · · · ·

Reviewed by C&A Committees 10/3/24

Health Sciences

Math and Science (ASMSAS)

Associate in Science Degree

Program Effective Term: Fall 2021

High Demand Occupation High Skill Occupation High Wage Occupation

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science, biology, chemistry, math, or pharmacy. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations. These concentrations may also list courses used to meet General Education requirements.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227 or BIO 237

Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra

Mathematics (MATH) MTH 160 Basic Statistics <u>Change: MTH 160 or MTH 160X</u> MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III

MTH 295 Differential Equations Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra

MTH 293 Calculus III Pre-Pharmacy (PPHA) Two Restricted Electives in Biology (see below) CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I

Change: MTH 160 or MTH 160X

PHY 122 General Physics II Biology Restricted Electives for Pre-Pharmacy (PPHA): BIO 111, BIO 161, BIO 162, BIO 208, BIO 237, BIO 215 or BIO 227 Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 160, MTH 192, along with other Biology restricted electives. See a program advisor to select appropriate Biology courses.

Articulation: This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of

60

high school pre-calculus are recommended to prepare for this program.

- The biology and chemistry concentrations require one year of high school chemistry or CEM 101 with a "C" or better to enroll in CEM 111.

Student Records Office.

Program Admission Requirements:

Minimum Concentration Credits Required for the Program: Select a concentration for requirements and total credits required for program.

Math and Science Concentrations

Biology/Pre-Me	dicine (BMED)	(60 credits)
First Semester		(17 credits)
BIO 162	General Biology II Cells and Molecules	4
CEM 111	General Chemistry I	4
MTH 176 or	College Algebra	
MTH 191	Calculus I*	4
Elective	Elective(s) to reach minimum 60 credits	5
Second Semest		(16 credits)
BIO 161	General Bloogy I Ecology and Evolution	4
CEM 122	General Chemistry II	4
MTH 160 or	Bacic Statistics** Change: MTH 160 or MTH 160X	4
MTH 192	Calculus II	4
Third Semester		(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
Elective	Soc. Sci. Elective(s) 1	3
Elective	Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227 or BIO 237	4
Fourth Semeste	er	(13 credits)
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3
Minimum Credi	ts Required for the Concentration or Option: 60	
Chemistry/Pre-	Medicine (CMED)	(60 credits)
Chemistry/Pre- First Semester	Medicine (CMED)	(60 credits) (16 credits)
Chemistry/Pre- First Semester CEM 111	Medicine (CMED) General Chemistry I	(60 credits) (16 credits) 4
Chemistry/Pre- First Semester CEM 111 MTH 191	Medicine (CMED) General Chemistry I Calculus I	(60 credits) (16 credits) 4 5
Chemistry/Pre- First Semester CEM 111 MTH 191 PHY 111	Medicine (CMED) General Chemistry I Calculus I General Physics I	(60 credits) (16 credits) 4 5 4
Chemistry/Pre- First Semester CEM 111 MTH 191 PHY 111 Elective	Medicine (CMED) General Chemistry I Calculus I General Physics I Elective(s) to reach minimum 60 credits	(60 credits) (16 credits) 4 5 4 3
Chemistry/Pre- First Semester CEM 111 MTH 191 PHY 111 Elective Second Semest	Medicine (CMED) General Chemistry I Calculus I General Physics I Elective(s) to reach minimum 60 credits er	(60 credits) (16 credits) 4 5 4 3 (16 credits)
Chemistry/Pre- First Semester CEM 111 MTH 191 PHY 111 Elective Second Semest CEM 122	Medicine (CMED) General Chemistry I Calculus I General Physics I Elective(s) to reach minimum 60 credits er General Chemistry II	(60 credits) (16 credits) 4 5 4 3 (16 credits) 4
Chemistry/Pre- First Semester CEM 111 MTH 191 PHY 111 Elective Second Semest CEM 122 ENG 111 MTH 102	Medicine (CMED) General Chemistry I Calculus I General Physics I Elective(s) to reach minimum 60 credits er General Chemistry II Composition I Composition I	(60 credits) (16 credits) 4 5 4 3 (16 credits) 4 4
Chemistry/Pres	Medicine (CMED) General Chemistry I Calculus I General Physics I Elective(s) to reach minimum 60 credits er General Chemistry II Composition I Calculus II Cancel Physics I	(60 credits) (16 credits) 4 5 4 3 (16 credits) 4 4 4
Chemistry/Pres	Medicine (CMED) General Chemistry I Calculus I General Physics I Elective(s) to reach minimum 60 credits er General Chemistry II Composition I Calculus II General Physics II	(60 credits) (16 credits) 4 5 4 3 (16 credits) 4 4 4 4 4 4
Chemistry/Pres	Medicine (CMED) General Chemistry I Calculus I General Physics I Elective(s) to reach minimum 60 credits er General Chemistry II Composition I Calculus II General Physics II	(60 credits) (16 credits) 4 5 4 3 (16 credits) 4 4 4 4 4 4 4 4 4 4 4 4
Chemistry/Pres	Medicine (CMED) General Chemistry I Calculus I General Physics I Elective(s) to reach minimum 60 credits er General Chemistry II Composition I Calculus II General Physics II Organic Chemistry I	(60 credits) (16 credits) 4 5 4 3 (16 credits) 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
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MTH 192 Calculus II 4 Elective Arts/Human. Elective(s) 1 3 ECO 222 Principles of Economics II 3 MTH 197 Linear Algebra 4 Elective Nat. Sci. Lab Elective(s) 3 Elective Soc. Sci. Elective(s) 2+ 3 MTH 293 Calculus III 4 Elective Arts/Human. Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 5 3 Elective Speech/Comp. Elective(s) 5 5 Minimum Credits Required for the Concentration or Option: 60 60 Pre-Pharmacy (PPHA) (60 credits)	Elective	Nat. Sci. Elective(s)	3
Elective Arts/Human. Elective(s) 1 3 ECO 222 Principles of Economics II 3 MTH 197 Linear Algebra 4 Elective Nat. Sci. Lab Elective(s) 3 Elective Soc. Sci. Elective(s) 2+ 3 MTH 293 Calculus III 4 Elective Arts/Human. Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 5 3 Elective Elective(s) to reach minimum 60 credits 5 Minimum Credits Required for the Concentration or Option: 60 60 credits	MTH 192	Calculus II	4
ECO 222 Principles of Economics II 3 MTH 197 Linear Algebra 4 Elective Nat. Sci. Lab Elective(s) 3 Elective Soc. Sci. Elective(s) 2+ 3 MTH 293 Calculus III 4 Elective Arts/Human. Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 2++ 3 Elective Elective(s) 2++ 3 Elective Elective(s) 2++ 3 Elective Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 5 3 Elective Speech/Comp. Elective(s) 5 3 Elective Elective(s) to reach minimum 60 credits 5 Minimum Credits Required for the Concentration or Option: 60 60 credits Pre-Pharmacy (PPHA) (60 credits)	Elective	Arts/Human. Elective(s) 1	3
MTH 197 Linear Algebra 4 Elective Nat. Sci. Lab Elective(s) 3 Elective Soc. Sci. Elective(s) 2+ 3 MTH 293 Calculus III 4 Elective Arts/Human. Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 2++ 3 Minimum Credits Required for the Concentration or Option: 60 60 Pre-Pharmacy (PPHA) (60 credits)	ECO 222	Principles of Economics II	2
Elective Nat. Sci. Lab Elective(s) 3 Elective Soc. Sci. Elective(s) 2+ 3 MTH 293 Calculus III 4 Elective Arts/Human. Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 2++ 3 Minimum Credits Required for the Concentration or Option: 60 60 Pre-Pharmacy (PPHA) (60 credits)	MTH 197	Linear Algebra	4
Elective Soc. Sci. Elective(s) 2+ 3 MTH 293 Calculus III 4 Elective Arts/Human. Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 3 Elective Speech/Comp. Elective(s) 3 Elective Elective(s) to reach minimum 60 credits 3 Minimum Credits Required for the Concentration or Option: 60 Pre-Pharmacy (PPHA) (60 credits)	Elective	Nat. Sci. Lab Elective(s)	3
MTH 293 Calculus III 4 Elective Arts/Human. Elective(s) 2++ 33 Elective Speech/Comp. Elective(s) 33 Elective Elective(s) to reach minimum 60 credits 35 Minimum Credits Required for the Concentration or Option: 60 Pre-Pharmacy (PPHA) (60 credits)	Elective	Soc. Sci. Elective(s) 2+	3
First 255 Calculus III 4 Elective Arts/Human. Elective(s) 2++ 3 Elective Speech/Comp. Elective(s) 3 Elective Elective(s) to reach minimum 60 credits 3 Minimum Credits Required for the Concentration or Option: 60 60 Pre-Pharmacy (PPHA) (60 credits)		Calculus III	A
Elective Speech/Comp. Elective(s) 3 Elective Elective(s) to reach minimum 60 credits 5 Minimum Credits Required for the Concentration or Option: 60 Pre-Pharmacy (PPHA) (60 credits)	Flective	Arts/Human, Elective(s) 2++	4
Elective Elective(s) to reach minimum 60 credits 5 Minimum Credits Required for the Concentration or Option: 60 60 Pre-Pharmacy (PPHA) (60 credits)	Elective	Speech/Comp. Elective(s)	3
Minimum Credits Required for the Concentration or Option: 60 Pre-Pharmacy (PPHA) (60 credits)	Elective	Elective(s) to reach minimum 60 credits	5
Pre-Pharmacy (PPHA) (60 credits)			
	Minimum Cred	its Required for the Concentration or Option: 60	

			r
Elective	Biology Restricted Elective	4	ł
CEM 111	General Chemistry I	4	

Elective	Restricted Biology Elective	4
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
Elective	Elective(s) to reach minimum 60 credits	3
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
	3.3	

Minimum Credits Required for the Program:

Notes:

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191.

**Students transferring to EMU as a biology major may substitute 🖽 160 or higher for MTH 192. Change: MTH 160 or MTH 160X

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer. +See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the the EMU Diverse Word Requirements list.

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Health Sciences

Math and Science (ASMSAS)

Associate in Science Degree

Program Effective Term: Fall 2021

High Demand Occupation High Skill Occupation High Wage Occupation

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science, biology, chemistry, math, or pharmacy. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations. These concentrations may also list courses used to meet General Education requirements.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227 or BIO 237

Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra

Mathematics (MATH) MTH 160 Basic Statistics MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations

Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III

Pre-Pharmacy (PPHA) Two Restricted Electives in Biology (see below) CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I PHY 122 General Physics II Biology Restricted Electives for Pre-Pharmacy (PPHA): BIO 111, BIO 161, BIO 162, BIO 208, BIO 237, BIO 215 or BIO 227 Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 160, MTH 192, along with other Biology restricted electives. See a program advisor to select appropriate Biology courses.

Articulation:

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of

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high school pre-calculus are recommended to prepare for this program.

Program Information Report

- The biology CEM 111.	and chemistry concentrations require one year of high school chemistry or CEM 101 with a "C" or b	etter to enroll in
Minimum Cor Select a conce	ncentration Credits Required for the Program: ntration for requirements and total credits required for program.	60
Math and Sci	ence Concentrations	
Biology/Pre-	Medicine (BMED)	(60 credits)
First Semeste	er	(17 credits)
BIO 162	General Biology II Cells and Molecules	4
CEM 111	General Chemistry I	4
MTH 176 or	College Algebra	
MTH 191 Elective	Calculus I* Elective(s) to reach minimum 60 credits	4
Liective		5
Second Seme	ster	(16 credits)
BIO 161	General Biology I Ecology and Evolution	4
CEM 122	General Chemistry II	4
MTH 160 or	Composition 1 Basic Statistics**	4
MTH 192	Calculus II	4
-		
Third Semest	er Organia Chamistry I	(14 credits)
CEM 211 Elective	Organic Chemistry I Speech (Comp. Elective(c)	4
Elective	Soc Sci Elective(s)	3
Elective	Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227 or BIO 237	4
Fourth Seme	ster	(13 credits)
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3
Minimum Cre	dits Required for the Concentration or Option: 60	
Chemistry/P	re-Medicine (CMED)	(60 credits)
First Semeste	ar	(16 credits)
CEM 111	General Chemistry I	4
MTH 191	Calculus I	5
PHY 111	General Physics I	4
Elective	Elective(s) to reach minimum 60 credits	3
Second Seme	ster	(16 credits)
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
MTH 192	Calculus II	4
PHY 122	General Physics II	4
Third Semest	er	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
MTH 197 Elective	Linear Aigebra Soc. Sci. Elective(s) 1	4
		5
Fourth Seme	ster	(14 credits)
CEM 222	Elective(S) to reach minimum 60 credits Organic Chemistry II	1
Flective	Arts/Human Elective(s) 1	4
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3

Minimum Credits Required for the Concentration or Option: 60

Mathematics (I	MATH)	(60 credits)
First Semester		(15 credits)
Elective	Nat. Sci. Elective(s)	3
MTH 191	Calculus I	5
Elective	Select one course from the following: CPS 120, CPS 141, CPS 161 or CPS 171	3
ENG 111	Composition I	4
Second Semest	ter	(14 credits)
Elective	Nat. Sci. Lab Elective(s)	3
MIH 160	Basic Statistics	4
MIH 192		4
Elective	Soc. Sci. Elective(s) 1	3
Third Semester	r	(17 credits)
Elective	Speech/Comp. Elective(s)	3
Elective	Elective(s) to reach minimum 60 credits	3
MTH 197	Linear Algebra	4
MTH 293	Calculus III	4
Elective	Soc. Sci. Elective(s) 2	3
Fourth Semest		(14 credits)
MIH 295	Differential Equations	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Arts/Human. Elective(s) 2	3
Elective	Elective(s) to reach a minimum of 60 credits.	4
Minimum Cred	its Required for the Concentration or Option: 60	
Pre-Actuarial S	cience (PPAS)-also available online	(60 credits)
Pre-Actuarial S First Semester	cience (PPAS)-also available online	(60 credits) (16 credits)
Pre-Actuarial S First Semester ACC 111	Principles of Accounting I	(60 credits) (16 credits) 3
Pre-Actuarial S First Semester ACC 111 CPS 161	Principles of Accounting I An Introduction to Programming with Java	(60 credits) (16 credits) 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111	Principles of Accounting I An Introduction to Programming with Java Composition I	(60 credits) (16 credits) 3 4 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5 (16 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Drinciples of Accounting II	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Electivo	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Principles of Economics I	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 4 5 (16 credits) 3 4 4 5 (16 credits) 3 4 4 5 (16 credits) (16 credits) 3 4 4 5 (16 credits) (16 credits) 3 4 4 5 (16 credits) (16 credits) (16 credits) (17 credits) (17 credits) (17 credits) (17 credits) (17 credits) (18 cred
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 3 4 3 3 3 3 3 4 4 5 (16 credits) 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 5 5 6 6 6 6 6 7 6 7 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semester ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 3 3 4 4 3 3 3 3 3 3 3 4 4 3 3 3 3 3 3 4 4 3 3 3 3 3 3 3 4 3 3 3 3 3 3 3 4 3 3 3 3 3 3 3 4 3 3 3 3 3 3 3 3 4 3 3 3 3 3 3 3 4 3 3 3 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 3 3 3 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 3 3 3 3 4 3 3 4 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 (13 credits) 3 4 3 4 3 (13 credits) 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 5 5 (16 credits) 3 4 5 (16 credits) 3 4 5 (16 credits) 3 3 4 5 (16 credits) 3 3 4 5 (16 credits) 3 3 3 3 4 5 (16 credits) 3 3 3 3 4 3 3 3 3 3 3 3 4 3 3 3 4 3 3 5 (17 credits) 3 3 3 4 3 3 4 3 3 4 3 3 4 3 3 3 4 3 3 3 3 4 3 3 3 4 3 3 4 3 3 3 3 4 3 3 3 4 3 3 4 3 3 3 4 3 3 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 3 4 3 3 4 3 3 4 3 3 4 3 3 3 3 3 4 3 3 4 3 3 3 3 4 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 (13 credits) 3 4 3 (15 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ er Calculus III Arts/Human Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 (15 credits) 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++ er Calculus III Arts/Human. Elective(s) 2++	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 (15 credits) 4 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective Elective Elective Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++ er Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 4 3 (13 credits) 3 4 3 (15 credits) 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 3 4 3 3 4 3 3 3 4 3 3 3 4 3 3 3 4 3 3 3 3 3 4 3 3 3 3 3 4 3 3 3 4 3 3 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective Elective Elective Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++ er Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s) Elective(s) to reach minimum 60 credits	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 (15 credits) 4 3 5

Pre-Pharmacy (PPHA)		(60 credits)
	have a second	
FIRST Semes	ter	(16 credits)
Elective	Biology Restricted Elective	4
CEM 111	General Chemistry I	4
MTH 191	Calculus I	5
Elective	Arts/Human. Elective(s)	3

Second Semest	rer de la constant de	(15 credits)
Elective	Restricted Biology Elective	4
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
Elective	Elective(s) to reach minimum 60 credits	3
Third Semester		(17 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
PHY 111	General Physics I	4
Elective	Arts/Human. Elective(s) 2	3
Elective	Soc. Sci. Elective(s) 1	3
Fourth Semeste	er	(12 credits)
CEM 222	Organic Chemistry II	4
PHY 122	General Physics II	4
Elective	Elective(s) to reach minimum 60 credits	1
Elective	Soc. Sci. Elective(s) 2	3
Minimum Credi	ts Required for the Concentration or Option: 60	

Minimum Credits Required for the Program:

Notes:

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191. **Students transferring to EMU as a biology major may substitute MTH 160 or higher for MTH 192.

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

+See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the the EMU Diverse Word Requirements list.

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Science, Computer Technology, Engineering & Math

Math and Science (ASMSAS)

Associate in Science Degree

Program Effective Term: Fall 2021

High Demand Occupation High Skill Occupation High Wage Occupation

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science, biology, chemistry, math, or pharmacy. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations. These concentrations may also list courses used to meet General Education requirements.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227 or BIO 237

Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra

Mathematics (MATH) MTH 160 Basic Statistics MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations

Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III

Pre-Pharmacy (PPHA) Two Restricted Electives in Biology (see below) CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I PHY 122 General Physics II Biology Restricted Electives for Pre-Pharmacy (PPHA): BIO 111, BIO 161, BIO 162, BIO 208, BIO 237, BIO 215 or BIO 227 Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 160, MTH 192, along with other Biology restricted electives. See a program advisor to select appropriate Biology courses.

Articulation:

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of

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high school pre-calculus are recommended to prepare for this program.

Program Information Report

- The biology and chemistry concentrations require one year of high school chemistry or CEM 101 with a "C" or better to enroll in CEM 111.		
Minimum Concentration Credits Required for the Program:60Select a concentration for requirements and total credits required for program.		
Math and Scie	nce Concentrations	
Biology/Pre-M	ledicine (BMED)	(60 credits)
First Semester	·	(17 credits)
BIO 162	General Biology II Cells and Molecules	4
CEM 111	General Chemistry I	4
MIH 1/6 or	College Algebra	4
Elective	Elective(s) to reach minimum 60 credits	5
Second Semes	ter	(16 credits)
BIO 161	General Biology I Ecology and Evolution	4
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
MTH 160 or	Basic Statistics**	
MTH 192	Calculus II	4
Third Semeste	r	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
Elective	Soc. Sci. Elective(s) 1	3
Elective	Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227 or BIO 237	4
Fourth Semest	ter	(13 credits)
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3
Minimum Cred	lits Required for the Concentration or Option: 60	
Chemistry/Pre	-Medicine (CMED)	(60 credits)
First Semester	•	(16 credits)
CEM 111	General Chemistry I	4
MTH 191	Calculus I	5
PHY 111	General Physics I	4
Elective	Elective(s) to reach minimum 60 credits	3
Second Semes	iter	(16 credits)
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
MTH 192	Calculus II	4
PHY 122	General Physics II	4
Third Semeste	r .	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
MIH 19/	Linear Algebra	4
Elective	SOC. SCI. Elective(S) 1	3
Fourth Semest		(14 credits)
Elective	Elective(s) to reach minimum 60 credits	1
CEM 222	Organic Chemistry II	4
Elective	Arts/Human, Elective(s) 1	3
Elective	Arts/Human Elective(s) 2	3
		J

Minimum Credits Required for the Concentration or Option: 60

Mathematics (I	MATH)	(60 credits)
First Semester		(15 credits)
Elective	Nat. Sci. Elective(s)	3
MTH 191	Calculus I	5
Elective	Select one course from the following: CPS 120, CPS 141, CPS 161 or CPS 171	3
ENG 111	Composition I	4
Second Semest	ter	(14 credits)
Elective	Nat. Sci. Lab Elective(s)	3
MIH 160	Basic Statistics	4
MIH 192		4
Elective	Soc. Sci. Elective(s) 1	3
Third Semester	r	(17 credits)
Elective	Speech/Comp. Elective(s)	3
Elective	Elective(s) to reach minimum 60 credits	3
MTH 197	Linear Algebra	4
MTH 293	Calculus III	4
Elective	Soc. Sci. Elective(s) 2	3
Fourth Semest		(14 credits)
MIH 295	Differential Equations	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Arts/Human. Elective(s) 2	3
Elective	Elective(s) to reach a minimum of 60 credits.	4
Minimum Cred	its Required for the Concentration or Option: 60	
Pre-Actuarial S	cience (PPAS)-also available online	(60 credits)
Pre-Actuarial S First Semester	cience (PPAS)-also available online	(60 credits) (16 credits)
Pre-Actuarial S First Semester ACC 111	Principles of Accounting I	(60 credits) (16 credits) 3
Pre-Actuarial S First Semester ACC 111 CPS 161	Principles of Accounting I An Introduction to Programming with Java	(60 credits) (16 credits) 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111	Principles of Accounting I An Introduction to Programming with Java Composition I	(60 credits) (16 credits) 3 4 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5 (16 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Drinciples of Accounting II	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Electivo	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Principles of Economics I	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 3 4 3 3 3 3 3 4 4 5 (16 credits) 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 3 4 4 3 4 4 4 5 5 6 6 6 6 6 7 6 7 6 7 6 7 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semester ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 3 4 3 3 4 4 3 3 4 3 3 4 4 3 3 4 4 5 5 6 6 7 6 7 8 8 8 8 8 8 8
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 3 3 3 3 3 3 4 3 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 (13 credits) 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 3 3 4 4 5 5 (16 credits) 3 4 5 (16 credits) 3 3 4 5 (16 credits) 3 3 3 4 5 (16 credits) 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 4 3 (13 credits) 3 4 3 (15 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+ er Calculus III Arts/Human Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 4 3 (13 credits) 3 4 3 (15 credits) 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++ er Calculus III Arts/Human. Elective(s) 2++	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 (13 credits) 3 4 3 (15 credits) 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective Elective Elective Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++ er Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 4 3 (13 credits) 3 4 3 (15 credits) 4 3 3 4 4 3 3 4 4 3 3 4 4 3 3 4 4 5 5 6 6 7 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective Elective Elective Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++ Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s) Elective(s) to reach minimum 60 credits	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 4 3 (13 credits) 3 4 3 (15 credits) 4 3 5

Pre-Pharmacy (PPHA)		(60 credits)
	have a second	
FIRST Semes	ter	(16 credits)
Elective	Biology Restricted Elective	4
CEM 111	General Chemistry I	4
MTH 191	Calculus I	5
Elective	Arts/Human. Elective(s)	3

Second Sem	ester	(15 credits)
Elective	Restricted Biology Elective	4
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
Elective	Elective(s) to reach minimum 60 credits	3
Third Semes	ster	(17 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
PHY 111	General Physics I	4
Elective	Arts/Human. Elective(s) 2	3
Elective	Soc. Sci. Elective(s) 1	3
Fourth Sem	ester	(12 credits)
CEM 222	Organic Chemistry II	4
PHY 122	General Physics II	4
Elective	Elective(s) to reach minimum 60 credits	1
Elective	Soc. Sci. Elective(s) 2	3
Minimum Cr	edits Required for the Concentration or Opt	on: 60

Minimum Credits Required for the Program:

Notes:

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191. **Students transferring to EMU as a biology major may substitute MTH 160 or higher for MTH 192.

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

+See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the the EMU Diverse Word Requirements list.

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Transfer

Math and Science (ASMSAS)

Associate in Science Degree Program Effective Term: Fall 2021

High Demand Occupation High Skill Occupation High Wage Occupation

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science. biology, chemistry, math, or pharmacy. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations. These concentrations may also list courses used to meet General Education requirements.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227 or BIO 237

Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra

Mathematics (MATH) MTH 160 Basic Statistics MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations

Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III

Pre-Pharmacy (PPHA) Two Restricted Electives in Biology (see below) CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I PHY 122 General Physics II Biology Restricted Electives for Pre-Pharmacy (PPHA): BIO 111, BIO 161, BIO 162, BIO 208, BIO 237, BIO 215 or BIO 227 Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 160, MTH 192, along with other Biology restricted electives. See a program advisor to select appropriate Biology courses.

Articulation:

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of

Monday, August 30, 2021 3:5:40 p.m.

high school pre-calculus are recommended to prepare for this program.

Program Information Report

- The biology a CEM 111.	nd chemistry concentrations require one year of high school chemistry or CEM 101 with a "C" or	better to enroll in
Minimum Concentration Credits Required for the Program:60Select a concentration for requirements and total credits required for program.		
Math and Scier	nce Concentrations	
Biology/Pre-M	edicine (BMED)	(60 credits)
First Semester		(17 credits)
BIO 162	General Biology II Cells and Molecules	4
CEM 111	General Chemistry I	4
MIH 1/6 or	College Algebra	4
Elective	Elective(s) to reach minimum 60 credits	5
Second Semes	ter	(16 credits)
BIO 161	General Biology I Ecology and Evolution	4
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
MTH 160 or	Basic Statistics**	
MTH 192	Calculus II	4
Third Semeste	r	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
Elective	Soc. Sci. Elective(s) 1	3
Elective	Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227 or BIO 237	4
Fourth Semest	er	(13 credits)
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3
Minimum Cred	its Required for the Concentration or Option: 60	
Chemistry/Pre	-Medicine (CMED)	(60 credits)
First Semester		(16 credits)
CFM 111	General Chemistry I	4
MTH 191	Calculus I	5
PHY 111	General Physics I	4
Elective	Elective(s) to reach minimum 60 credits	3
Second Semes	ter	(16 credits)
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
MTH 192	Calculus II	4
PHY 122	General Physics II	4
Third Semeste	r	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
MTH 197	Linear Algebra	4
Elective	Soc. Sci. Elective(s) 1	3
Fourth Semest	er	(14 credits)
Elective	Elective(s) to reach minimum 60 credits	1
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	SUC. SCI. Elective(S) 2	3
LIECTIVE	Alts/Human. Liettive(S) 2	3

Minimum Credits Required for the Concentration or Option: 60

Mathematics (I	MATH)	(60 credits)
First Semester		(15 credits)
Elective	Nat. Sci. Elective(s)	3
MTH 191	Calculus I	5
Elective	Select one course from the following: CPS 120, CPS 141, CPS 161 or CPS 171	3
ENG 111	Composition I	4
Second Semest	ter	(14 credits)
Elective	Nat. Sci. Lab Elective(s)	3
MTH 160	Basic Statistics	4
MIH 192		4
Elective	SUC. SCI. Elective(S) 1	2
Third Semeste	r	(17 credits)
Elective	Speech/Comp. Elective(s)	3
Elective	Elective(s) to reach minimum 60 credits	3
MTH 197	Linear Algebra	4
MTH 293	Calculus III	4
Elective	Soc. Sci. Elective(s) 2	3
Foundly Compared		
	er Differential Equations	(14 creats)
Floctive		4
Elective	Arts/Human, Elective(5) 1	2
Elective	Floring(s) to reach a minimum of 60 credits	1
LIECTIVE		7
Minimum Cred	its Required for the Concentration or Option: 60	
Pre-Actuarial S	Science (PPAS)-also available online	(60 credits)
Pre-Actuarial S First Semester	Science (PPAS)-also available online	(60 credits) (16 credits)
Pre-Actuarial S First Semester ACC 111	Science (PPAS)-also available online Principles of Accounting I	(60 credits) (16 credits) 3
Pre-Actuarial S First Semester ACC 111 CPS 161	Principles of Accounting I An Introduction to Programming with Java	(60 credits) (16 credits) 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111	Principles of Accounting I An Introduction to Programming with Java Composition I	(60 credits) (16 credits) 3 4 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I	(60 credits) (16 credits) 3 4 4 5 (16 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 FCO 211	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I Principles of Accounting II Principles of Accounting II	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Election	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I Principles of Accounting II Principles of Accounting II Principles of Economics I	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Nat. Sci. Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Nat. Sci. Elective(s) Calculus II	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 3 4 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 3 4 3 (13 credits)
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 3 4 3 (13 credits) 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 3 4 3 4 3 4 3 4 3 4 3 4 3 4
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s)	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 3 4 3 (13 credits) 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 4 3 3 3 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 3 3 3 3 3 3 3 4 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 (13 credits) 3 4 3 4 3 (13 credits) 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 3 4 3 3 4 4 5 5 (16 credits) 3 3 3 4 5 (16 credits) 3 3 3 3 3 4 3 3 3 3 3 3 3 3 3 3 3 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2+	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 (13 credits) 3 4 3 4 3 3 4 3 4 3 4 3 3 4 3 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) 2+ er Calculus III	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 3 4 3 (13 credits) 3 4 3 (15 credits) 4 3
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++ Calculus III Arts/Human. Elective(s) 2++	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 (16 credits) 3 4 3 (13 credits) 3 4 3 (15 credits) 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective Elective	Science (PPAS)-also available online Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 r Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++ Speech/Comp. Elective(s) Elective(s) to reach minimum 60 credits	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 (16 credits) 3 4 3 (13 credits) 3 4 3 (15 credits) 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 3 4 5 5 6 6 7 7 7 7 7 7 7 7 7 7 7 7 7
Pre-Actuarial S First Semester ACC 111 CPS 161 ENG 111 MTH 191 Second Semest ACC 122 ECO 211 Elective MTH 192 Elective Third Semester ECO 222 MTH 197 Elective Elective Fourth Semest MTH 293 Elective Elective Elective Elective	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I ter Principles of Accounting II Principles of Economics I Nat. Sci. Elective(s) Calculus II Arts/Human. Elective(s) 1 Principles of Economics II Linear Algebra Nat. Sci. Lab Elective(s) Soc. Sci. Elective(s) 2++ Calculus III Arts/Human. Elective(s) 2++ Speech/Comp. Elective(s) Elective(s) to reach minimum 60 credits	(60 credits) (16 credits) 3 4 4 5 (16 credits) 3 3 4 3 (13 credits) 3 4 3 (13 credits) 4 3 4 3 3 (15 credits) 4 3 5

Pre-Pharmacy (PPHA)		(60 credits)
First Compate		(1C availab)
rirst Semeste		(16 creaits)
Elective	Biology Restricted Elective	4
CEM 111	General Chemistry I	4
MTH 191	Calculus I	5
Elective	Arts/Human. Elective(s)	3
Second Semest	er	(15 credits)
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Elective	Restricted Biology Elective	4
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
Elective	Elective(s) to reach minimum 60 credits	3
Third Semester		(17 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
PHY 111	General Physics I	4
Elective	Arts/Human. Elective(s) 2	3
Elective	Soc. Sci. Elective(s) 1	3
Fourth Semeste		(12 credits)
CEM 222	Organic Chemistry II	4
PHY 122	General Physics II	4
Elective	Elective(s) to reach minimum 60 credits	1
Elective	Soc. Sci. Elective(s) 2	3
Minimum Credit	ts Required for the Concentration or Option: 60	

Minimum Credits Required for the Program:

Notes:

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191.

**Students transferring to EMU as a biology major may substitute MTH 160 or higher for MTH 192.

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

+See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the the EMU Diverse Word Requirements list.

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WCC General Education Requirements Effective Fall 2018

Associate degree programs were updated to meet the revised WCC general education requirements below.

Course Distribution Requirements

Associate degree students must complete courses from each of six General Education content areas. The requirements vary, depending on which degree is being earned. The number of general education credit hours required for each degree is as follows.

	AA	AS	AAS
Writing/Composition	3-4 credits	3-4 credits	3-4 credits
2nd Writing/Composition or Communication	3-4 credits	3 credits	3 credits
Mathematics	3-4 credits	3-4 credits	3-4 credits
Natural Sciences ¹	7-8 credits	7-8 credits	3-4 credits
Social & Behavioral Science ²	6 credits	6 credits	3 credits
Arts and Humanities ³	6 credits	6 credits	3 credits
General Education Electives to reach 30 credits	0-2 credits	0-2 credits	N/A
Minimum	30 credits	30 credits	18 credits

¹ Two courses in Natural Science including one with laboratory experience (from two disciplines)

² From two disciplines

³ From two disciplines

Transfer and University Parallel Programs

If your goal is to continue your education toward a baccalaureate degree, then transfer and university parallel programs is the track for you. Complete the first two years of study in a supportive environment with small classes and personal attention.

Before beginning any transfer program, a student should consult with an academic advisor or counselor to obtain a program articulation agreement or a transfer guide. Early in the program, the student should contact an undergraduate advisor at the transfer college for specific admission and curriculum requirements and, if available, an unofficial transfer-credit evaluation.

Copies of articulation agreements and transfer guides are available in the Counseling Office on the second floor of the Student Center Building. Computers with access to the Internet Web sites of four-year colleges and universities are also available there.

Math and Science

Learn more about math or science through this associate degree program.

Math and Science (ASMSAS)

Associate in Science Degree

Program Effective Term: Fall 2018

High Demand Occupation High Skill Occupation High Wage Occupation

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science, biology, chemistry, math, or pharmacy. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations. These concentrations may also list courses used to meet General Education requirements.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227, BIO 228 or BIO 237 Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra Mathematics (MATH) MTH 160 Basic Statistics MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I

MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III

Pre-Pharmacy (PPHA) Two Restricted Electives in Biology (see below) CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I PHY 122 General Physics II

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Biology Restricted Electives for Pre-Pharmacy (PPHA): BIO 111, BIO 161, BIO 162, BIO 208, BIO 237, BIO 215, BIO 227 or BIO 228 Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 160, MTH 192, along with other Biology restricted electives. See a program advisor to select appropriate Biology courses.

Articulation:

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

This program will fulfill MACRAO requirements if, in addition to the courses completed to meet General Education requirements, students complete one additional course in Social and Behavioral Science. Students must have MACRAO posted on their transcripts by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of high school pre-calculus are recommended to prepare for this program.

- The biology and chemistry concentrations require one year of high school chemistry or CEM 101 with a "C" or better to enroll in CEM 111.

Minimum Concentration Credits Required for the Program:

Select a concentration for requirements and total credits required for program.

Math and Science Concentrations

Biology/Pre-Medicine (BMED) (60 credits) First Semester (17 credits) **BIO 162** General Biology II Cells and Molecules 4 4 CEM 111 General Chemistry I MTH 176 or College Algebra 4 MTH 191 Calculus I* Elective(s) to reach minimum 60 credits 5 Elective Second Semester (16 credits) General Biology I Ecology and Evolution BIO 161 4 **CEM 122** General Chemistry II 4 ENG 111 Composition I 4 Basic Statistics** MTH 160 or Calculus II MTH 192 4 Third Semester 14 credits) CEM 211 Organic Chemistry I 4 Elective Speech/Comp. Elective(s) 3 3 Elective Soc. Sci. Elective(s) 1 Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227, BIO 228 or BIO 237 Elective 4 (13 credits) Fourth Semester **CEM 222** Organic Chemistry II 4 Elective 3 Arts/Human. Elective(s) 1 Elective Soc. Sci. Elective(s) 2 3 Elective 3 Arts/Human, Elective(s) 2 Minimum Credits Required for the Concentration or Option: 60 Chemistry/Pre-Medicine (CMED) (60 credits) First Semester (16 credits) **CEM 111** General Chemistry I 4 MTH 191 5 Calculus I PHY 111 General Physics I 4 Elective Elective(s) to reach minimum 60 credits 3

Second SemesterCEM 122General Chemistry IIENG 111Composition IMTH 192Calculus IIPHY 122General Physics II

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(16 credits)

4

4 4

4

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Third Seme	ster	(14 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
MTH 197	Linear Algebra	4
Elective	Soc. Sci. Elective(s) 1	3
Fourth Sem	ester	(14 credits)
Elective	Elective(s) to reach minimum 60 credits	1
CEM 222	Organic Chemistry II	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Soc. Sci. Elective(s) 2	3
Elective	Arts/Human. Elective(s) 2	3

Minimum Credits Required for the Concentration or Option: 60

Mathematic	s (MATH)	(60 credits)
First Semes	ter	(15 credits)
Elective	Nat. Sci. Elective(s)	3
MTH 191	Calculus I	5
Elective	Select one course from the following: CPS 120, CPS 141, CPS 161 or CPS 171	3
ENG 111	Composition I	4
Second Sen	iester	(14 credits)
Elective	Nat. Sci. Lab Elective(s)	3
MTH 160	Basic Statistics	4
MTH 192	Calculus II	4
Elective	Soc. Sci. Elective(s) 1	3
Third Seme	ster	(17 credits)
Elective	Speech/Comp. Elective(s)	3
Elective	Elective(s) to reach minimum 60 credits	3
MTH 197	Linear Algebra	4
MTH 293	Calculus III	4
Elective	Soc. Sci. Elective(s) 2	3
Fourth Sem	ester	(14 credits)
MTH 295	Differential Equations	4
Elective	Arts/Human. Elective(s) 1	3
Elective	Arts/Human, Elective(s) 2	3
Elective	Elective(s) to reach a minimum of 60 credits.	4
Minimum Ci	edits Required for the Concentration or Option: 60	
Pre-Actuari	al Science (PPAS)	(60 credits)
First Semes	ter	(16 credits)
ACC 111	Principles of Accounting I	3
CPS 161	An Introduction to Programming with Java	4
ENG 111	Composition I	4
MTH 191	Calculus I	5
Second Sen	lester	(16 credits)
ACC 122	Principles of Accounting II	3
ECO 211	Principles of Economics I	3
Elective	Nat. Sci. Elective(s)	3
MTH 192	Calculus II	4
Elective	Arts/Human. Elective(s) 1	3
Third Seme	ster	(13 credits)
ECO 222	Principles of Economics II	3
MTH 197	Linear Algebra	4
Elective	Nat. Sci. Lab Elective(s)	3
Elective	Soc. Sci. Elective(s) 2+	3

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Fourth Sem	lester	(15 credits)
MTH 293	Calculus III	4
Elective	Arts/Human. Elective(s) 2++	3
Elective	Speech/Comp. Elective(s)	3
Elective	Elective(s) to reach minimum 60 credits	5
Minimum C	redits Required for the Concentration or Option: 60	
Pre-Pharma	acy (PPHA)	(60 credits)
First Semes	ster	(16 credits)
Elective	Biology Restricted Elective	4
CEM 111	General Chemistry I	4
MTH 191	Calculus I	5
Elective	Arts/Human. Elective(s)	3
Second Sen	nester	(15 credits)
Elective	Restricted Biology Elective	4
CEM 122	General Chemistry II	4
ENG 111	Composition I	4
Elective	Elective(s) to reach minimum 60 credits	3
Third Seme	ster	(17 credits)
CEM 211	Organic Chemistry I	4
Elective	Speech/Comp. Elective(s)	3
PHY 111	General Physics I	4
Elective	Arts/Human. Elective(s) 2	3
Elective	Soc. Sci. Elective(s) 1	3
Fourth Sem	ester	(12 credits)
CEM 222	Organic Chemistry II	4
PHY 122	General Physics II	4
Elective	Elective(s) to reach minimum 60 credits	1
Elective	Soc. Sci. Elective(s) 2	3
Minimum C	redits Required for the Concentration or Option: 60	

Minimum Credits Required for the Program:

Notes:

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191.

**Students transferring to EMU as a biology major may substitute MTH 160 or higher for MTH 192.

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

+See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the the EMU Diverse Word Requirements list.

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WASHTENAW COMMUNITY COLLEGE GENERAL EDUCATION REVISION PROGRAM CHANGE FORM FOR AA AND AS PROGRAMS 2018-2019

Program Code: ASMSAS	Program Name: Math ~ Science	
Division Code: AV5 MSE	Department:	

This form is to be used only for General Education Revision Program Changes for Associate in Arts (AA) and Associate in Science (AS) programs. Any other program changes should be submitted separately using a standard Program Change Form.

Directions:

- 1. Review each general education area under Requested Changes below and respond as needed.
- 2. Attach the semester program layout showing the current program listing from the WCC catalog.
 - a. Indicate any changes to be made on the semester layout.
 - b. Draw a line through any courses that should be removed on the semester layout.
 - c. Write in any courses that need to be added on the semester layout.
- 3. Submit this form and semester program layout to the Office of Curriculum and Assessment (SC 257).

Current General Education	Requirements	Revised General Education Requirements	2018-2019	
AA and AS		AA and AS		
Writing	6 - 7 credits	English Composition	3 - 4 credits	
Speech Mathematics	3 credits 3 - 4 credits	2 nd Course in English Composition or one course in Communication	3 - 4 credits	
Natural Sciences	3 - 4 credits	Mathematics	3 - 4 credits	
Social & Behavioral Sciences	6 credits	Natural Sciences from 2 disciplines including one lab course	7 - 9 credits	
Critical Thinking	0 credits	Social & Behavioral Sciences from 2 disciplines	6 credits	
Computer & Information		Arts & Humanities from 2 disciplines	6 credits	
Literacy	3 credits	Elective Credits to reach a minimum of 30 credit hours	0 - 3 credits	
		Total	30 credits	

Please review each General Education Area in the chart below, and record the needed changes in the chart and on the attached semester layout.

. Ventile at	REQUESTED CHANGES
Genera	al Education Area
English change Option	Composition – The requirement for one writing/English composition course remains the same. No es will be made unless specifically requested below. (Use Writing Elective or ENG 111) al Change:
2 nd Coo WCC p option 1. 2. 3.	urse in English Composition or one course in Communication reviously required both a second composition/writing course and a communication course. Your s are: Allow students to select any course that meets composition/writing or communication (recommended). Require students to take a specific composition course (identify course below and on semester layout). Require students to take a specific communication course (identify course below and on semester layout).

Done 1/29/18

NWLB

Requested Change:

Re	viewer Print Name Signature Date
	Elective Credits to reach a minimum of 30 credit hours – A course titled "General Education Credit(s) to Reach a Minimum of 30 Credit Hours" will be created and then added as needed to the program.
	 Computer and Information Literacy The requirement for computer and information literacy has been removed. Your options are: Continue to require a specific computer course. If a specific course is required in your program, we will leave it there. If you previously used "Computer and Information Literacy Course," you will need to specify either a specific course or a list of courses from which to choose. Remove the computer and information literacy course if the program will still meet the minimum of 60 credit hours. Remove the computer and information literacy course and replace the course with elective or other credits as needed to meet the minimum of 60 credit hours. Required Change:
	Arts & Humanities from 2 disciplines – The requirement for two arts and humanities courses remains the same. No changes will be made unless specifically requested below. (Note: A department can designate a COM course as a requirement here. The same course cannot be counted in two areas.) Optional Change:
	Social & Behavioral Sciences from 2 disciplines – The requirement for two social and behavioral science courses remains the same. No changes will be made unless specifically requested below. Optional Change:
	 Natural Sciences from 2 disciplines including one lab course WCC previously required one natural science course. Your options are: No change needed – a second natural science course is already included in my program. Add a second natural science course in the semester shown on the semester layout attached. Unless specific courses are required, include one course identified as a lab science course. Requested Change:
	Mathematics – The requirement for one mathematics course remains the same. However, the courses that meet the MTA requirement have changed slightly. MTH 148, 149 and 167 do not meet the general education requirement for AA or AS degrees. Please identify an alternate course or list "Math elective". Optional Change:
	 2nd Course in English Composition or one course in Communication Credit Hours Because of this change, an extra 3 – 4 credit hours may be available in the program. Please specify how you would like to use those credit hours. Your options are: Reduce the number of credit hours if the program total is over 60 (recommended). Replace the course with elective credits as needed to reach a minimum of 60 credit hours. Add a specific program-related course (please add the course in the semester it should be taken on the semester layout).

Reviewer	Print Name	Signature	Date
Initiator		0	
Department Chair	1	emails	
Division Dean/ Administrator	XIII .	All	
Vice President for Instruction			

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(ASMSAS)

Transfer and University Parallel Programs

If your goal is to continue your education toward a baccalaureate degree, then transfer and university parallel programs is the track for you. Complete the first two years of study in a supportive environment with small classes and personal attention.

Business (AABAS)

Computer Science: Programming in Java (ASCSPJ) See School of Information Technology Criminal Justice (AACJ) Education, Early Childhood (AAECE) Education, Elementary (AAELEM) Education, Secondary (AASECO) Environmental Science (ASENVS) 1. Environmental Science (ENV1) 2. Environmental Science and Society (ENV2) Exercise Science (ASESCI) General Studies in Math and Natural Sciences (ASGSMS) Honors in the Liberal Arts (AAHLA) Human Services (AAHUST) Information Systems: Programming in C++ (ASISPC) See School of Information Technology Liberal Arts Transfer (AALAT) Math and Science (ASMSAS) 1. Pre-Medicine Concentration (BMED or CMED) 2. Mathematics Concentration (MATH) 3. Physics/Pre-Engineering Concentration (PHYS) 4. Pre-Actuarial Science Concentration (PPAS) 5. Pre-Pharmacy Concentration (PPHA)

Before beginning any transfer program, a student should consult with an academic advisor or counselor to obtain a program articulation agreement, or a transfer guide. Early in the program, the student should contact an undergraduate advisor at the transfer college for specific admission and curriculum requirements and, if available, an unofficial transfer-credit evaluation.

Copies of articulation agreements and transfer guides are available in the Counseling Office on the second floor of the Student Center Building. Computers with access to the Internet Web sites of four-year colleges and universities are also available there.

Math and Science

Learn more about math or science through this associate degree program.

Math and Science (ASMSAS) Associate in Science Degree Program Effective Term: Fall 2015

High Demand Occupation High Skill Occupation High Wage Occupation

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science, biology, chemistry, math, pharmacy, or physics. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227, BIO 228 or BIO 237 Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra Mathematics (MATH) MTH 160 Basic Statistics MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations Elective: Take an additional three credits in the MTH discipline Physics/Pre-Engineering (PENG) CEM 111 General Chemistry I MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations PHY 211 Analytical Physics I PHY 222 Analytical Physics II Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III Pre-Pharmacy (PPHA) Two Restricted Electives in Biology (see below) CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I PHY 122 General Physics II Biology Restricted Electives for Pre-Pharmacy (PPHA): BIO 111, BIO 161, BIO 162, BIO 208, BIO 237, BIO 215, BIO 227 or BIO 228 Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 160, MTH 192, along with other Biology restricted electives. See a program advisor to select appropriate Biology courses. Articulation:

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

This program will fulfill MACRAO requirements if, in addition to the courses completed to meet General Education requirements,

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students complete one additional course in Social and Behavioral Science. Students must have MACRAO posted on their transcripts by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of high school pre-calculus are recommended to prepare for this program.

- The physics concentration requires one semester of high school physics or PHY 111 with a "C" or better to enroll in PHY 211. - The biology, chemistry, and physics concentrations require one year of high school chemistry or CEM 101 with a "C" or better to

enroll in CEM 111.

Minimum Concentration Credits Required for the Program:

60

(61 credits)

Math and Science Concentrations

Biology/Pre-Medicine (BMED)

Elest Samestar		CONT
BIO 162 CEM 111	General Biology II Cells and Molecules General Chemistry I	4 4
MTH 176 or MTH 191	College Algebra Calculus I*	4
Elective	Computer Lit, Elective(s)	3
BIO 161 CEM 122 ENG 111 MTH 160 or	General Biology I Ecology and Evolution General Chemistry II Composition I Basic Statistics**	4 4 4
MTH 192	Calculus II	4
Third Semester CEM 211 ENG 226 Elective Elective	Organic Chemistry I Composition II Soc. Sci. Elective(s) Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227, BIO 228 or BIO 237	credits) 4 3 3 4
Fourth Semest		credita)
COM 101	Fundamentals of Speaking	3
Elective Elective Elective	Arts/Human. Elective(s) Soc. Sci. Elective(s) Arts/Human. Elective(s)	3 3 3
Minimum Credi	its Required for the Concentration or Option: 61	
Chemistry/Pre-	-Medicine (CMED) (62	credits)
First Semester		
CEM 111 MTH 191	General Chemistry I Calculus I	4
PHY 111 Elective	General Physics I Computer Lit. Elective(s)	4

Second Second 4 CEM 122 General Chemistry II 4 Composition I ENG 111 4 MTH 192 Calculus II 4 PHY 122 General Physics II 68 9 1 1 1 1 C 1 Third Semester 4 Organic Chemistry I CEM 211 3 ENG 226 Composition II 4 Linear Algebra MTH 197 3 Elective Soc. Sci. Elective(s) ALL A Fourth Semesters COM 101 Fundamentals of Speaking 3 4 CEM 222 Organic Chemistry II

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Elective Elective Elective	Arts/Human. Elective(s) Soc. Sci. Elective(s) Arts/Human. Elective(s)	3 3 3
Minimum Cred	its Required for the Concentration or Option: 62	
Mathematics (МАТН)	(60 credits)
BIO 162 or CEM 111 or PHY 111 MTH 191 Elective ENG 111	General Biology II Cells and Molecules General Chemistry I General Physics I Calculus I Computer Lit. Elective(s) Composition I	4 5 3 4
BIO 161 or CEM 122 or PHY 122 MTH 160 MTH 192 Elective	General Biology I Ecology and Evolution General Chemistry II General Physics II Basic Statistics Calculus II Soc. Sci. Elective(s)	4 4 4 3
COM 101 ENG 226 MTH 197 MTH 293 Elective	Fundamentals of Speaking Composition II Linear Algebra Calculus III Soc. Sci. Elective(s)	3 3 4 4 3
Fourth Semeet MTH 295 Elective Elective Elective	Differential Equations Arts/Human. 2 Elective(s) Arts/Human. Elective(s) Elective(s) to reach a minimum of 60 credits.	4 3 3 2-3
Minimum Cred	its Required for the Concentration or Option: 60	(60 gradita)
CEM 111 MTH 191 PHY 111 Elective	General Chemistry I Calculus I General Physics I Computer Lit. Elective(s)	4 5 4 3
ENG 111 MTH 192 PHY 122 Elective	Composition I Calculus II General Physics II Arts/Human. Elective(s)	4 4 4 3
Third Content of the ENG 226 MTH 197 PHY 211 Elective	Composition II Linear Algebra Analytical Physics I Soc. Sci. Elective(s)	3 4 5 3
Fourth Semest COM 101 MTH 293 PHY 222 Elective	Fundamentals of Speaking Calculus III Analytical Physics II Arts/Human. Elective(s)	(1) (1) (1) 3 4 5 3

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Elfth Samesh MTH 295 Elective	Differential Equations Soc. Sci. Elective(s)	4 3		
Minimum Cre	dits Required for the Concentration or Option: 68			
Pre-Actuarial	Science (PPAS)	(60 credits)		
JPASSING TO				
ACC 111	Principles of Accounting I	3		
CPS 161	An Introduction to Programming with Java	4		
MTH 191	Calculus I	5		
Second Same	nm.			
ACC 122	Principles of Accounting II	3		
ECO 211 ENG 226	Composition II	3		
MTH 192	Calculus II	4		
Elective	Arts/Human. Elective(s)	3		
Third School				
ECO 222 MTH 197	Principles of Economics II Linear Algebra	4		
Elective	Nat. Sci. Elective(s)	4		
Elective	Soc. Sci. Elective(s)+	3		
Fourth Seme	14			
MTH 293	Calculus III Arts/Human_Elective(s)++	4		
Elective	Nat. Sci. Elective(s)+++	4		
Elective	Speech Elective(s)	3		
Minimum Cre	dits Required for the Concentration or Option: 60			
Pre-Pharmac	у (РРНА)	(62 credits)		
Entraction				
Elective	Biology Restricted Elective	4		
CEM 111	General Chemistry I	4		
Elective	Arts/Human. Elective(s)	3		
Second Seme	Ito			
Elective	Restricted Biology Elective	4		
CEM 122	General Chemistry II	4		
Elective	Speech Elective(s)	3		
CEM 211	Organic Chemistry I	4		
ENG 226 PHV 111	Composition II General Physics I	4		
Elective	Arts/Human. Elective(s)	3		
Elective	Soc. Sci. Elective(s)	3		
FourthSeme				
CEM 222 PHY 122	Organic Chemistry II General Physics II	4		
Elective	Computer Lit. Elective(s)	3		
Elective	Soc. Sci. Elective(s)	3		
Minimum Cre	dits Required for the Concentration or Option: 62			
Minimum Cre	Minimum Credits Required for the Program: 60			

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Notes:

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191.

**Students transferring to EMU as a biology major may substitute MTH 160 or higher for MTH 192.

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

+See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the the EMU Diverse Word Requirements list.

+++Students may take 3 credits of a MTA approved natural science course as the second Natural Science elective but may need an elective to bring the total number of credits back up to 60 if necessary.

Math and Science (ASMSAS) Associate in Science Degree

• <u>2015 - 2016</u>

Description

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science, biology, chemistry, math, pharmacy, or physics. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227, BIO 228, or BIO 237

Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra

Mathematics (MATH) MTH 160 Basic Statistics MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations Elective: Take an additional three credits in the MTH discipline

Physics/Pre-Engineering (PENG) CEM 111 General Chemistry I MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations PHY 211 Analytical Physics I PHY 222 Analytical Physics II

Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III

Pre-Pharmacy (PPHA) BIO 161 General Biology I Ecology and Evolution BIO 162 General Biology II Cells and Molecules 2 Restricted Electives in Biology below CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I PHY 122 General Physics II MTH 191 Calculus I Biology Restricted Electives: BIO 111, BIO 161, BIO 162, BIO 208, BIO 237, BIO 215, BIO 227 or BIO 228

Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 192 Calculus II, MTH 160 Basic Statistics along with other Biology restricted electives. See a program advisor to select appropriate Biology courses.

Articulation

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

This program will fulfill MACRAO requirements if, in addition to the courses completed to meet General Education requirements, students complete one additional course in Social and Behavioral Science. Students must have MACRAO posted on their transcripts by the WCC Student Records Office.

Admissions Requirements

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of high school pre-calculus are recommended to prepare for this program.

- The physics concentration requires one semester of high school physics or PHY 111 with a "C" or better to enroll in PHY 211.

- The biology, chemistry, and physics concentrations require one year of high school chemistry or CEM 101 with a "C" or better to enroll in CEM 111.

Contact Information

Division Math, Science & Health

Department Physical Sciences Dept Advisors Jerrell McCowin

Requirements

Select a concentration for requirements and total credits required for program.

Biology/Pre-Medicine (BMED)

First Semester

Class	Title	Credits
<u>BIO 162</u>	General Biology II Cells and Molecules	4
<u>CEM 111</u>	General Chemistry I	4
<u>MTH 176</u> o	r College Algebra	
<u>MTH 191</u>	Calculus I *	4
Elective(s)	Computer and Information Literacy	3
Total		15

Second Semester

Class	Title	Credits
<u>BIO 161</u>	General Biology I Ecology and Evolution	4
<u>CEM 122</u>	General Chemistry II	4
<u>ENG 111</u>	Composition I	4
<u>MTH 160</u> or	Basic Statistics **	
<u>MTH 192</u>	Calculus II	4
Total		16

Third Semester

Class	Title	Credits
<u>CEM 211</u>	Organic Chemistry I	4
<u>ENG 226</u>	Composition II	3
Elective(s)	Social and Behavioral Science	3
	Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227, BIO 228 or BIO 237	4
Total		14

Class	Title	Credi	ts
<u>CEM 222</u>	Organic Chemistry II	4	
<u>COM 101</u>	Fundamentals of Speaking	3	
Elective(s)	Arts and Humanities	3	
Elective(s)	Social and Behavioral Science	3	
Elective(s)	Arts and Humanities	3	
Total		16	
Total Credits Required		61	

Chemistry/Pre-Medicine (CMED)

First Semester

Class	Title	Credits
<u>CEM 111</u>	General Chemistry I	4
<u>MTH 191</u>	Calculus I	5
<u>PHY 111</u>	General Physics I	4
Elective(s)	Computer and Information Literacy	3
Total		16

Second Semester

Class	Title	Credits
<u>CEM 122</u>	General Chemistry II	4
<u>ENG 111</u>	Composition I	4
<u>MTH 192</u>	Calculus II	4
<u>PHY 122</u>	General Physics II	4
Total		16

Third Semester

Class	Title	Credits
CEM 211	Organic Chemistry I	4
<u>ENG 226</u>	Composition II	3
<u>MTH 197</u>	Linear Algebra	4
Elective(s)	Social and Behavioral Science	3
Total		14

Class	Title	Credits
<u>COM 101</u>	Fundamentals of Speaking	3

<u>CEM 222</u>	Organic Chemistry II	4
Elective(s)	Arts and Humanities	3
Elective(s)	Social and Behavioral Science	3
Elective(s)	Arts and Humanities	3
Total		16
Total Credi	ts Required	62

Mathematics (MATH)

First Semester

Class	Title	Credits
<u>BIO 162</u>	or General Biology II Cells and Molecules	
<u>CEM 111</u>	or General Chemistry I	
<u>PHY 111</u>	General Physics I	4
<u>MTH 191</u>	Calculus I	5
Elective(s)	Computer and Information Literacy	3
<u>ENG 111</u>	Composition I	4
Total		16

Second Semester

Class	Title	Credits
<u>BIO 161</u>	or General Biology I Ecology and Evolution	
<u>CEM 122</u>	or General Chemistry II	
<u>PHY 122</u>	General Physics II	4
<u>MTH 160</u>	Basic Statistics	4
<u>MTH 192</u>	Calculus II	4
Elective(s)	Social and Behavioral Science	3
Total		15

Third Semester

Class	Title	Credits
<u>COM 101</u>	Fundamentals of Speaking	3
<u>ENG 226</u>	Composition II	3
<u>MTH 197</u>	Linear Algebra	4
<u>MTH 293</u>	Calculus III	4
Elective(s)	Social and Behavioral Science	3
Total		17

Class	Title	Credits
<u>MTH 295</u>	Differential Equations	4
Elective(s)	Arts and Humanities 2	3
Elective(s)	Arts and Humanities	3
	Elective(s) to reach a minimum of 60 credits.	2 - 3
Total		12 - 13
Total Credits Required		60 - 61

Physics/Pre-Engineering (PENG)

First Semester

Class	Title	Credits
<u>CEM 111</u>	General Chemistry I	4
<u>MTH 191</u>	Calculus I	5
<u>PHY 111</u>	General Physics I	4
Elective(s)	Computer and Information Literacy	3
Total		16

Second Semester

Class	Title	Credits
<u>ENG 111</u>	Composition I	4
<u>MTH 192</u>	Calculus II	4
<u>PHY 122</u>	General Physics II	4
Elective(s)	Arts and Humanities	3
Total		15

Third Semester

Class	Title	Credits
<u>ENG 226</u>	Composition II	3
<u>MTH 197</u>	Linear Algebra	4
<u>PHY 211</u>	Analytical Physics I	5
Elective(s)	Social and Behavioral Science	3
Total		15

Class	Title	Credits
<u>COM 101</u>	Fundamentals of Speaking	3
<u>MTH 293</u>	Calculus III	4

<u>PHY 222</u>	Analytical Physics II	5
Elective(s)	Arts and Humanities	3
Total		15

Fifth Semester

Class	Title	Credits
<u>MTH 295</u>	Differential Equations	4
Elective(s)	Social and Behavioral Science	3
Total		7
Total Credi	ts Required	68

Pre-Actuarial Science (PPAS)

First Semester

Class	Title	Credits
<u>ACC 111</u>	Principles of Accounting I	3
<u>CPS 161</u>	An Introduction to Programming with Java	4
<u>ENG 111</u>	Composition I	4
<u>MTH 191</u>	Calculus I	5
Total		16

Second Semester

Class	Title	Credits
<u>ACC 122</u>	Principles of Accounting II	3
<u>ECO 211</u>	Principles of Economics I	3
<u>ENG 226</u>	Composition II	3
<u>MTH 192</u>	Calculus II	4
Elective(s)	Arts and Humanities	3
Total		16

Third Semester

Class	Title	Credits
<u>ECO 222</u>	Principles of Economics II	3
<u>MTH 197</u>	Linear Algebra	4
Elective(s)	Natural Sciences	4
Elective(s)	Social and Behavioral Science +	3
Total		14

Fourth Semester

Class	Title	Credits
<u>MTH 293</u>	Calculus III	4
Elective(s)	Arts and Humanities ++	3
Elective(s)	Natural Sciences +++	4
Elective(s)	<u>Speech</u>	3
Total		14
Total Credi	ts Required	

60

Pre-Pharmacy (PPHA)

First Semester

	Class	Title	Credits
1	^J <u>Elective</u>	Biology Restricted Elective	· ·
3/22/15.	<u>CEM 111</u>	General Chemistry I	4
per Joy	(<u>MTH 191</u>)	Calculus I	5 -
this show	Elective(s)	Arts and Humanities	3
not be included o	Total M description. Second Semester		16

Class	Title	Credits
Elective	Biology Restricted Elective	4
<u>CEM 122</u>	General Chemistry II	4
<u>ENG 111</u>	Composition I	4
Elective(s)	Speech	3
Total		15

Third Semester

Class	Title	Credits
<u>CEM 211</u>	Organic Chemistry I	4
<u>ENG 226</u>	Composition II	3
<u>PHY 111</u>	General Physics I	4
Elective(s)	Arts and Humanities	3
Elective(s)	Social and Behavioral Science	3
Total		17

Class	Title	Credits
CEM 222	Organic Chemistry II	4
<u>PHY 122</u>	General Physics II	4
Elective(s)	Computer and Information Literacy	3
Elective(s)	Social and Behavioral Science	3
Total		14
Total Credi	ts Required	62

Footnotes

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191.

**Students transferring to EMU as a biology major may substitute MTH 160 or higher for MTH 192.

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

+See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the EMU Diverse Word Requirements list.

J+++Students may take a-3 credits of a MTA approved natural science course as the second Natural Science elective but may need an elective to bring the total number of credits back up to 60 if necessary.

Transfer and University Parallel Programs

If your goal is to continue your education toward a baccalaureate degree, then transfer and university parallel programs is the track for you. Complete the first two years of study in a supportive environment with small classes and personal attention.

Business (AABAS)

Computer Science: Programming in Java (ASCSPJ) See School of Information Technology Criminal Justice (AACJ) Education, Early Childhood (AAECE) Education, Elementary (AAELEM) Education, Secondary (AASECO) Environmental Science (ASENVS) 1. Environmental Science (ENV1) 2. Environmental Science and Society (ENV2) Exercise Science (ASESCI) General Studies in Math and Natural Sciences (ASGSMS) Honors in the Liberal Arts (AAHLA) Human Services (AAHUST) Information Systems: Programming in C++ (ASISPC) See School of Information Technology Liberal Arts Transfer (AALAT) Math and Science (ASMSAS) 1. Pre-Medicine Concentration (BMED or CMED) 2. Mathematics Concentration (MATH) 3. Physics/Pre-Engineering Concentration (PHYS) 4. Pre-Actuarial Science Concentration (PPAS) 5. Pre-Pharmacy Concentration (PPHA)

Before beginning any transfer program, a student should consult with an academic advisor or counselor to obtain a program articulation agreement, or a transfer guide. Early in the program, the student should contact an undergraduate advisor at the transfer college for specific admission and curriculum requirements and, if available, an unofficial transfer-credit evaluation.

Copies of articulation agreements and transfer guides are available in the Counseling Office on the second floor of the Student Center Building. Computers with access to the Internet Web sites of four-year colleges and universities are also available there.

Math and Science

Learn more about math or science through this associate degree program.

Math and Science (ASMSAS) Associate in Science Degree Program Effective Term: Fall 2015

High Demand Occupation High Skill Occupation High Wage Occupation

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in actuarial science, biology, chemistry, math, pharmacy, or physics. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227, BIO 228, or BIO 237 Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra Mathematics (MATH) MTH 160 Basic Statistics MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations Elective: Take an additional three credits in the MTH discipline Physics/Pre-Engineering (PENG) CEM 111 General Chemistry I MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations PHY 211 Analytical Physics I PHY 222 Analytical Physics II Pre-Actuarial Science (PPAS) ECO 211 Principles of Economics I ECO 222 Principles of Economics II MTH 191 Calculus I MTH 192 Calculus II MTH 197 Linear Algebra MTH 293 Calculus III Pre-Pharmacy (PPHA) BIO 161 General Biology I Ecology and Evolution BIO 162 General Biology II Cells and Molecules CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II PHY 111 General Physics I PHY 122 General Physics II MTH 191 Calculus I Optional Transfer Courses for Pre-Pharmacy (PPHA): MTH 192 Calculus II, BIO 111 Anatomy and Physiology - Normal structure and Function, BIO 208 Genetics, BIO 237 Microbiology, BIO 215 Cell and Molecular Biology, BIO 227 Biology of Animals or BIO 228 Biology of Plants, MTH 160 Basic Statistics

Articulation:

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

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This program will fulfill MACRAO requirements if, in addition to the courses completed to meet General Education requirements,

students complete one additional course in Social and Behavioral Science. Students must have MACRAO posted on their transcripts by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of high school pre-calculus are recommended to prepare for this program.

- The physics concentration requires one semester of high school physics or PHY 111 with a "C" or better to enroll in PHY 211.

- The biology, chemistry, and physics concentrations require one year of high school chemistry or CEM 101 with a "C" or better to enroll in CEM 111.

Minimum Concentration Credits Required for the Program:

Math and Science Concentrations

Biology/Pre-Medicine (BMED)

Elective

Elective

First Semester BIO 162 CEM 111 MTH 176 or MTH 191 Elective	General Biology II Cells and Molecules General Chemistry I College Algebra Calculus I* Computer Lit. Elective(s)	1) 44 43
Second Semest BIO 161 CEM 122 ENG 111 MTH 160 or MTH 192	er General Biology I Ecology and Evolution General Chemistry II Composition I Basic Statistics** Calculus II	i) 4 4 4 4
Third Semester CEM 211 ENG 226 Elective Elective	(14 credits Organic Chemistry I Composition II Soc. Sci. Elective(s) Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227, BIO 228 or BIO 237) 4334
Fourth Semeste CEM 222 COM 101 Elective	r Organic Chemistry II Fundamentals of Speaking Arts/Human. Elective(s)) 4 3 3

Minimum Credits Required for the Concentration or Option: 61

Soc. Sci. Elective(s)

Arts/Human. Elective(s)

Chemistry/Pre-	-Medicine (CMED) (62 credits)	1
First Semester CEM 111 MTH 191 PHY 111 Elective	General Chemistry I 4 Calculus I 5 General Physics I 4 Computer Lit, Elective(s) 3	1513
Second Semest CEM 122 ENG 111 MTH 192 PHY 122	er (16 credits) General Chemistry II Composition I Calculus II General Physics II	
Third Semester CEM 211 ENG 226 MTH 197 Elective	Organic Chemistry I Composition II Linear Algebra Soc. Sci. Elective(s)	***
Fourth Semeste	er Fundamentals of Speaking	

Thursday, March 5, 2015 9:29:14 a.m.

(61 credits)

60

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3 3

Program Information Report

CEM 222 Elective Elective Elective	Organic Chemistry II4Arts/Human. Elective(s)3Soc. Sci. Elective(s)3Arts/Human. Elective(s)3
Minimum Credit	s Required for the Concentration or Option: 62
Mathematics (M	ATH) (60 credits)
First Semester BIO 162 or CEM 111 or PHY 111 MTH 191 Elective ENG 111	General Biology II Cells and Molecules General Chemistry I General Physics I Calculus I Computer Lit. Elective(s) Composition I
Second Semeste BIO 161 or CEM 122 or PHY 122 MTH 160 MTH 192 Elective	Image: Strain
Third Semester COM 101 ENG 226 MTH 197 MTH 293 Elective	Fundamentals of Speaking(17 credits)Composition II3Linear Algebra4Calculus III4Soc. Sci. Elective(s)3
Fourth Semester MTH 295 Elective Elective Elective Elective	r (12 credits) Differential Equations 4 Arts/Human. 2 Elective(s) 3 Arts/Human. Elective(s) 3 Elective(s) to reach a minimum of 60 credits. 2-3
Minimum Credits	s Required for the Concentration or Option: 60
Physics/Pre-Eng	jineering (PENG) (68 credits)
First Semester CEM 111 MTH 191 PHY 111 Elective	(16 credits)General Chemistry ICalculus IGeneral Physics IComputer Lit. Elective(s)
Second Semeste ENG 111 MTH 192 PHY 122 Elective	IT Composition I 4 Calculus II 6 General Physics II 4 Arts/Human. Elective(s) 3
Third Semester ENG 226 MTH 197 PHY 211 Elective	Composition II Linear Algebra Analytical Physics I Soc. Sci. Elective(s)

Fourth Semeste	ir (15 cred)	(5)
COM 101	Fundamentals of Speaking	3
MTH 293	Calculus III	4
PHY 222	Analytical Physics II	5
Elective	Arts/Human. Elective(s)	3

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Fifth Semester MTH 295 Elective	Differential Equations Soc. Sci. Elective(s)) 4 3
Minimum Cred	its Required for the Concentration or Option: 68	
Pre-Actuarial S	Science (PPAS) (60 credits	5)
First Semester ACC 111 CPS 161 ENG 111 MTH 191	Principles of Accounting I An Introduction to Programming with Java Composition I Calculus I	3445
Second Semes ACC 122 ECO 211 ENG 226 MTH 192 Elective	ter Principles of Accounting II Principles of Economics I Composition II Calculus II Arts/Human. Elective(s)	33343
Third Semester ECO 222 MTH 197 Elective Elective	Principles of Economics II Linear Algebra Nat. Sci. Elective(s) Soc. Sci. Elective(s)+	3443
Fourth Semest MTH 293 Elective Elective Elective	er Calculus III Arts/Human. Elective(s)++ Nat. Sci. Elective(s)++ Speech Elective(s)) 4 3 4 3
Minimum Cred	its Required for the Concentration or Option: 60	-
Pre-Pharmacy		•
First Semester BIO 162 CEM 111 MTH 191 Elective	General Biology II Cells and Molecules General Chemistry I Calculus I Arts/Human. Elective(s)	4453
Second Semes BIO 161 CEM 122 ENG 111 Elective	ter General Biology I Ecology and Evolution General Chemistry II Composition I Speech Elective(s)	94443
Third Semester CEM 211 ENG 226 PHY 111 Elective Elective	Organic Chemistry I Composition II General Physics I Arts/Human. Elective(s) Soc. Sci. Elective(s)	43433
Fourth Semest CEM 222 PHY 122 Elective Elective	er Organic Chemistry II General Physics II Computer Lit, Elective(s) Soc. Sci. Elective(s)	4433

Minimum Credits Required for the Concentration or Option: 62

Minimum Credits Required for the Program:

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60

Notes:

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191.

**Students transferring to EMU as a biology major may substitute MTH 160 or higher for MTH 192.

***Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

+See the MTA list to make course selections from any discipline except ECO.

++Transfer students should consider a course from the the EMU Diverse Word Requirements list.

+++Students may take a 3 credit natural science course as the second Natural Science elective but may need an elective to bring the total number of credits back up to 60 if necessary.

PROGRAM CHANGE OF DISCONTINUATION FORM

	I ROORAM CHANGE OR DISCONTINUATION I ORM					
Program Code: ASMSAS	Program Name: Math and Science	Effective Term: Fall 2015				
Division Code: MSN	Department: Math/Allied Health					
Directions:						
1. Attach the current prog	ram listing from the WCC catalog or W	eb site and indicate any changes to be made.				
2. Draw lines through any a separate sheet.	text that should be deleted and write in	additions. Extensive narrative changes can be included on				
3. Check the boxes below new courses as part of t should be submitted at	for each type of change being proposed he proposed program change, must be a the same time as the program change fo	l. Changes to courses, discontinuing a course, or adding approved separately using a Master Syllabus form, but rm.				
Requested Changes:						
Review Remove course(s): Add course(s): Program title (title was Description Type of award Advisors Articulation information Show all changes on the attace	Review Program admission requirements Add course(s): See concentration information attached Program title (title was) Program outcomes Description Accreditation information Type of award Discontinuation (attach program discontinuation of students and timetable for phasing out courses) Articulation information Other Add concentrations for Pre-Pharmacy and Pre-Actuarial Science - Remore Comp Science					
 Rationale for proposed changes or discontinuation: Pre-Pharmacy: The current ASMSAS at WCC has biology, chemistry and physics concentrations but none require all 3 disciplines with math. Advanced studies in pharmacy, beyond the associate level, require that a rigorous foundation be built in these disciplines. Offering a comprehensive interdisciplinary degree will benefit our students transferring into pharmacy and /or other pre-med programs. Pre-Actuarial Science: Actuarial Science is a growing field of study. The Occupational Outlook handbook predicts a 26% increase in employment in this area between 2012 and 2022. The 2012 median salary for an actuary was \$93,680 or \$45.04 per hour. This new concentration will guide students to complete the required combination of mathematics and economics needed in this field of study. 						
Financial/staffing/equipment/space implications:						
The courses used in these programs already exist and are used in other programs. The advisor for Math and Science and the advisor for Pharmacy Technology are an existing resource for these students.						

List departments that have been consulted regarding their use of this program. Pharmacy Technology, Math and Science

Signatures:

Signatures:		1	
Reviewer	Print Name	Signature	Date
Department Chair	Lisa Rombes	ana kont	2-4-15
Division Dean/Administrator	Kristin Brandemuehl	Hits Grandenuch	2.4.45
Vice President for Instruction	William Abernethy	545-4	2-9-15
President			

Do not write in shaded area. Entered in: Banner 24me C&A Database 2/11 5 We og File 215 mo Board Approval AP

Please submit completed form to the Office of Curriculum and Assessment and email an electronic copy to sjohn@wccnet.edu for posting on the website.



Math and Science (ASMSAS) Associate in Science Degree

High Demand Occupation High Skill Occupation High Wage Occupation

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in biology, chemistry, computer science, math, or physics. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations.

Biology/Pre-Medicine (BMED)

CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227, BIO 228, or BIO 237

Chemistry/Pre-Medicine (CMED)

CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra MTH 293 Calculus III

Computer Science (COMS)

CPS 171 Introduction to Programming with C++ CPS 271 Object Features of C++ CPS 272 Data Structures with C++ MTH 197 Linear Algebra MTH 293 Calculus III Elective: Take an additional six credits in the CPS discipline

Mathematics (MATH)

MTH 160 Basic Statistics MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations Elective: Take an additional three credits in the MTH discipline

Physics/Pre-Engineering (PENG)

CEM 111 General Chemistry I MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations PHY 211 Analytical Physics I PHY 222 Analytical Physics II

Articulation:

This program will fulfill the Michigan Transfer Agreement (MTA) requirements provided the student takes two science courses from two different disciplines. One course must have a lab component. Students must have MTA posted on their transcripts by the WCC Student Records Office.

This program will fulfill MACRAO requirements if, in addition to the courses completed to meet General Education requirements, students complete one additional course in Social and Behavioral Science. Students must have MACRAO posted on their transcripts by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of high school pre-calculus are recommended to prepare for this program.

- The physics concentration requires one semester of high school physics or PHY 111 with a "C" or better to enroll in PHY 211.

- The biology, chemistry, and physics concentrations require one year of high school chemistry or CEM 090 with a "C" or better to enroll in CEM 111.

MTH 197 MTH 293

MTH

ECO 211

ECO 222

MTH 191

192

Au-Pharmacy (PPHA) BIO 161 BIO 162 (EM 211 CEM 222 PHY III PHY 122 MTH 191

Pre-Actuarial Science (PAS)

Ø

Recommended Course Sequences Rue-Pharmacy (PPHA)

. .

	Semester	x Fall	Winter	Spring/Summer	Any	
	Course #	Course Title				Credit Hours
-25	MTH 191	Calculus 1				5
1	CEM 111	General Chemistry 1				4
١	BIO 162	General Biology Il Cells and Molecules o	r BIO 111, BIO 208	8, or BIO 237		4
4	Elective(s)	Arts and Humanities l				3
`	an the second second			Total Semest	er Credits	16

	Semester 2	Fall		_x_Winter	Spring/Summer	Any	
	Course #	Course Title					Credit Hours
2	CEM 122	General Chemistry II					4
١	BIO 161	General Biology 1 Ecology	and Evolution or	BIO 111, BI	O 208, or BIO 237		4
3	ENG 111	Composition 1			이 사람은 것 같은 것 같아요.		4
ú	Elective (s)	Speech					3
					Total Seme	ster Credits	. 15

	Semester 3	3 _x_Fall	Winter	Spring/Summer	Any	
	Course #	Course Title				Credit Hours
١	CEM 211	Organic Chemistry l				4
7,	PHY 111	General Physics 1 (or PHY 211)				4
r	ENG 266 221	Composition ll				3
μ	Elective(s)	Arts and Humanities 2				3
Ś	Elective(s)	Social and Behavioral Science 1	i de la construcción de la constru La construcción de la construcción d	n ar an ann an Anna an		3
			中国社会主义	Total Sem	ester Credits	17

	Semester 4	Fall	_x_Winter	Spring/Summer	Any	
	Course #	Course Title				Credit Hours
١	CEM 222	Organic Chemistry ll				4
ч.	PHY 122	General Physics ll (or PHY 222)				4
2	Elective(s)	Social and Behavioral Science 2				3
X,	Elective(s)	Computer and Information				3
ι,r				Total Se	mester Credits	14
	A MARINE STREET			Total Pr	ogram Credits	62

Optional Transfer Courses

	Course #	Course Title	Credit Hours
4	MTH 192	Calculus Z 11	4
1	BIO 111	Anatomy and Physiology – Normal Structure and Function	5
r	BIO 208	Genetics	4
3	BIO 237	Microbiology	4
		Total Semester Credits	17

Optional Transfer Courses Credit Hours Course # Course Title BIO 215 Cell and Molecular Biology 4 ł BIO 227 Zoology Binlony of Annhalt r or BIO 228 Bidação of Flants 4 Botany 4 MTH 160 3 3 Elective đ 15 **Total Semester Credits** Total Transferrable Credits 94 1. 1. 1. 1. A. A.

Biochemistry (400 level course at U of M) Physiology

Section IX. Recommended Course Sequences



First Semester

Class	Title	Credits
ACC 111	Principles of Accounting I	3
MTH 191	Calculus I	5
ENG 111	Composition I	4
t <u>CPS 161</u>	An Introduction to Programming with Java	4
Total		16

Second Semester

Class	Title	Credits
ӄ <u>Elective(s)</u>	Arts and Humanities	3
<u>Ъ ENG 226</u>	Composition II	3
۵ <u>MTH 192</u>	Calculus II	4
∲ <u>ECO 211</u>	Principles of Economics I	3
ACC 122	Principles of Accounting II	3
Total		16

Third Semester

Class	Title	Credits
• <u>ECO 222</u>	Principles of Economics II	3
v <u>MTH 197</u>	Linear Algebra	4
⁷ Elective(s)	Natural Sciences*	4
Lective(s)	Social and Behavioral Science** 1	3
Total		14

Fourth Semester

Class	Title	Credits
λ <u>Elective(s)</u>	Speech	3
<u>MTH 293</u>	Calculus III	4
3 Elective(s)	Natural Sciences**** FH	4
² Elective(s)	Arts and Humanities 2*** ++	3
Total		14
Total Credits	s Required	60

*Students transferring to a four-year institution should choose a lab-based, MTA-approved science course.

***See the EMU Diverse World Requirement list

**** Can take a 3 credit hour science course as the second Natural Science elective, but may need an elective to bring the total ++1 number of credits back up to 60 if necessary.



Transfer and University Parallel Programs

If your goal is to continue your education toward a baccalaureate degree, then transfer and university parallel programs is the track for you. Complete the first two years of study in a supportive environment with small classes and personal attention.

Business (AABAS)

Computer Science: Programming in Java (ASCSPJ) See School of Information Technology Criminal Justice (AACJ) Education, Early Childhood (AAECE) Education, Elementary (AAELEM) Education, Secondary (AASECO) Environmental Science (ASENVS) Exercise Science (ASESCI) General Studies in Math and Natural Sciences (ASGSMS) Human Services (AAHUST) Information Systems: Programming in C++ (ASISPC) See School of Information Technology Liberal Arts Transfer (AALAT) Math and Science (ASMSAS)

1. Pre-Medicine Concentration (BMED or CMED)

- 2. Computer Science Concentration (COMS)
- 3. Mathematics Concentration (MATH)
- 4. Physics/Pre-Engineering Concentration (PHYS)

Before beginning any transfer program, a student should consult with an academic advisor or counselor to obtain a program articulation agreement, or a transfer guide. Early in the program, the student should contact an undergraduate advisor at the transfer college for specific admission and curriculum requirements and, if available, an unofficial transfer-credit evaluation.

Copies of articulation agreements and transfer guides are available in the Counseling Office on the second floor of the Student Center Building. Computers with access to the Internet Web sites of four-year colleges and universities are also available there.

Computer Science and Information Systems

Interested in a bachelor's degree in computer science or (business) information systems? This area provides the foundation you need to be successful.

Math and Science (ASMSAS) Associate in Science Degree Program Effective Term: Fall 2013

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in biology, chemistry, computer science, math, or physics. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations.

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry II CEM 222 Organic Chemistry II Elective: BIO 111, BIO 208, BIO 215, BIO 227, BIO 228, or BIO 237

Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra MTH 293 Calculus III

Computer Science (COMS) CPS 171 Introduction to Programming with C++ CPS 271 Object Features of C++ CPS 272 Data Structures with C++ MTH 197 Linear Algebra MTH 293 Calculus III Elective: Take an additional six credits in the CPS discipline

Mathematics (MATH) MTH 160 Basic Statistics MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations Elective: Take an additional three credits in the MTH discipline

Physics/Pre-Engineering (PENG) CEM 111 General Chemistry I MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations PHY 211 Analytical Physics I PHY 222 Analytical Physics II

Articulation:

This program will fulfill MACRAO requirements if, in addition to the courses completed to meet General Education requirements, students complete one additional course in Social and Behavioral Science. Students must have their transcripts certified for MACRAO completion by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of high school pre-calculus are recommended to prepare for this program.

- The physics concentration requires one semester of high school physics or PHY 111 with a "C" or better to enroll in PHY 211. - The biology, chemistry, and physics concentrations require one year of high school chemistry or CEM 090 with a "C" or better to enroll in CEM 111.

Minimum Concentration Credits Required for the Program:

Math and Science Concentrations

Biology/Pre-M	edicine (BMED) [6	1 credits)
First Semester BIO 162 CEM 111 MTH 176 or MTH 191 Elective	General Biology II Cells and Molecules General Chemistry I College Algebra Calculus I* Computer Lit. Elective(s)	5 credits) 4 4 3 3
Second Semest BIO 161 CEM 122 ENG 111 MTH 160 or MTH 192	ter General Biology I Ecology and Evolution General Chemistry II Composition I Basic Statistics** Calculus II	6 credits) 4 4 4 4
Third Semester CEM 211 ENG 226 Elective Elective	Organic Chemistry I Composition II Soc. Sci. Elective(s) Select one course from the following: BIO 111, BIO 208***, BIO 215, BIO 227, BIO 228 or BIO 237	4 credits) 4 3 3 4
Fourth Semest CEM 222 COM 101 Elective Elective Elective	Organic Chemistry II Fundamentals of Speaking Arts/Human. Elective(s) Soc. Sci. Elective(s) Arts/Human. Elective(s)	Sicradits) 4 3 3 3 3 3
Minimum Credi	its Required for the Concentration or Option: 61	
Chemistry/Pre	-Medicine (CMED)	6 credits)
Chemistry/Pre First Semester CEM 111 MTH 191 PHY 111 Elective	-Medicine (CMED) (64 General Chemistry I Calculus I General Physics I Computer Lit. Elective(s)	5 credits) 5 credits) 4 5 4 3
Chemistry/Pres First Semester CEM 111 MTH 191 PHY 111 Elective Second Semest CEM 122 ENG 111 MTH 192 PHY 122	-Medicine (CMED) (60 General Chemistry I Calculus I General Physics I Computer Lit. Elective(s) ter General Chemistry II Composition I Calculus II General Physics II	5 credits) 5 credits) 4 5 4 3 5 credits) 4 4 4 4 4 4 4 4 4
Chemistry/Pres	-Medicine (CMED) (60 General Chemistry I Calculus I General Physics I Computer Lit. Elective(s) ter General Chemistry II Composition I Calculus II General Physics II Organic Chemistry I Composition II Linear Algebra Soc. Sci. Elective(s)	5 credits) 4 5 4 3 5 credits) 4 4 4 4 4 4 3 4 3 4 3 4 3 4 3 4 3 4 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4
Chemistry/Pres	-Medicine (CMED) (6 General Chemistry I Calculus I General Physics I Computer Lit. Elective(s) ter (1) General Chemistry II Composition I Calculus II General Physics II r Organic Chemistry I Composition II Linear Algebra Soc. Sci. Elective(s) er Fundamentals of Speaking Organic Chemistry II Calculus III Arts/Human. Elective(s)	5 credits) 4 5 4 5 4 3 5 credits) 4 4 4 4 4 3 5 credits) 3 4 4 3 5 credits) 4 4 3 4 4 3 4 3 4 4 3 4 4 4 4 4 4 4 4 4 4 4 4 4

Minimum Credits Required for the Concentration or Option: 66
🗱 Washtenaw Community College

Program Information Report

Computer Scier	(68 credits))
First Semester MTH 191 PHY 111 Elective	Calculus I General Physics I Computer Lit. Elective(s)	543
Second Semest CPS 171 ENG 111 MTH 192 PHY 122	er Introduction to Programming with C++ Composition I Calculus II General Physics II	11111
Third Semester CPS 271 ENG 226 MTH 197 PSY 100	Object Features of C++ Composition II Linear Algebra Introduction to Psychology	1313
Fourth Semeste CPS 272 MTH 293 Elective Elective	er Data Structures with C++ Calculus III Arts/Human. Elective(s) Take an additional three credits in the CPS discipline	1 1 3 3
Fifth Semester COM 101 PLS 112 Elective Elective	Fundamentals of Speaking Introduction to American Government Arts/Human. Elective(s) Take an additional three credits in the CPS discipline	3333
Minimum Credi	ts Required for the Concentration or Option: 68	
Mathematics (N	(61 credits)	1
First Semester BIO 162 or CEM 111 or PHY 111 MTH 191 Elective ENG 111	General Biology II Cells and Molecules General Chemistry I General Physics I Calculus I Computer Lit. Elective(s) Composition I	1531
Second Semest BIO 161 or CEM 122 or PHY 122 MTH 160 MTH 192 Elective	General Biology I Ecology and Evolution General Chemistry II General Physics II Basic Statistics Calculus II Soc. Sci. Elective(s)	¥ 1113
Third Semester COM 101 ENG 226 MTH 197 MTH 293 Elective	Fundamentals of Speaking Composition II Linear Algebra Calculus III Soc. Sci. Elective(s)	33113
Fourth Semeste MTH 295 Elective Elective Elective Elective	Differential Equations Arts/Human. Elective(s) Arts/Human. Elective(s) Take an additional three credits in the MTH discipline	1333

Minimum Credits Required for the Concentration or Option: 61

Program Information Report

Physics/Pre-E	ingineering (PENG) (68 cre	edits)
First Semester CEM 111 MTH 191 PHY 111 Elective	General Chemistry I Calculus I General Physics I Computer Lit. Elective(s)	dla) 4 5 4 3
Second Semes ENG 111 MTH 192 PHY 122 Elective	i ter Composition I Calculus II General Physics II Arts/Human, Elective(s)	dite) 4 4 4 3
Third Semester ENG 226 MTH 197 PHY 211 Elective	r Composition II Linear Algebra Analytical Physics I Soc. Sci. Elective(s)	idits) 3 4 5 3
Fourth Semest COM 101 MTH 293 PHY 222 Elective	ter Fundamentals of Speaking Calculus III Analytical Physics II Arts/Human. Elective(s)	i dits) 3 4 5 3
Fifth Semester MTH 295 Elective	r Differential Equations Soc. Sci. Elective(s)	idits) 4 3
Minimum Credi	lits Required for the Concentration or Option: 68	
Minimum Credi <i>Notes:</i>	lits Required for the Program:	61
*Chudente he	Service to FMULTE - bisless means a bettake MTU 176 as any bisbar 4 availt berry mathematics for MTU 101	

*Students transferring to EMU as a biology major may substitute MTH 176 or any higher 4-credit hour math course for MTH 191. **Students transferring to EMU as a biology major may substitute MTH 160 or higher for MTH 192

Students transferring to EMU as a biology major may substitute MTH 160 or higher for MTH 192. *Students transferring to EMU as a biology major may consider completing BIO 208 at WCC prior to transfer.

Math and Science

Learn more about math or science through this associate degree program.

PROGRAM CHANGE OR DISCONTINUATION FORM

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Program Code: AS NS AS	Program Name:	MATH and Sc	IENCE	Effective	Term:	
Division Code: M 5 N	Department: L i	fe Science	BNED	concentra	tion	
Directions: Interview Interview Interview 2. Draw lines through any text that should be deleted and write in additions. Extensive narrative changes can be included on a separate sheet. Interview Interview 3. Check the boxes below for each type of change being proposed. Changes to courses, discontinuing a course, or adding new courses as part of the proposed program change, must be approved separately using a Master Syllabus form, but should be submitted at the same time as the program change form. Requested Changes: Image: CPS 171, PSY 100, PLS Image: CPS 171, PSY 100,						
Articulation information Show all changes on the attact	n hed page from the cata	ılog.				
Rationale for proposed changes or discontinuation: Replace existing introductory Biology sequence with new majors-level courses; adjust program to reflect computer literacy requirement; create flexibility in program so it can be adapted for transfer to various 4-year institutions; create flexibility in program so it can be used by Biology majors as well as Pre-med majors.						
Financial/staffing/equipment/space implications:						
List departments that have been consulted regarding their use of this program. Biology, Chemistry						
Signatures:						
Reviewer	F	rint Name	Signat	ure	Date	
Initiator	Ani	re Heise	and the	use	2/14/13	
Department Chair	Ani	re Heise	ane	Herse	2/14/13	
Division Dean/Administrate	or $M.S.$	howalter	71 Show	6	2/14/13	

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Vice President for Instruction	Bin Abeneth		3/22/13
President	V/A		3 / / 2
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100.000 2/15/13 5/1	1	for to	
Office of Curriculum & Assess	sment	http://www.wc	cnet.edu/departments/curriculum

PROGRAM CHANGE OR DISCONTINUATION FORM

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Program Code:	Program Name: Math and Science	Effective	Term: F' 2013		
ASMSAS	MATH & SEIBNCE				
Division Code: MSH	Department: Math and Science MATH concentration	m for (MATH)			
Directions:		0			
1. Attach the current prog	ram listing from the WCC catalog or Wel	b site and indicate any changes to be ma	de.		
2. Draw lines through any a separate sheet.	text that should be deleted and write in a	dditions. Extensive narrative changes c	an be included on		
3. Check the boxes below new courses as part of t should be submitted at	for each type of change being proposed. he proposed program change, must be ap the same time as the program change for	Changes to courses, discontinuing a co proved separately using a Master Syllab m.	urse, or adding us form, but		
Requested Changes:					
Review Program admission requirements X Remove course(s): CPS 171, six additional elective credits in the MTH discipline Continuing eligibility requirements Add course(s): Program outcomes Add course(s): Accreditation information Description Discontinuation (attach program discontinuation plan that includes transition of students and timetable for phasing out courses) Advisors Other					
Rationale for proposed changes or discontinuation: This change applies to the concentration in Mathematics. After researching comparable degrees in mathematics, requiring CPS 171 is not needed. In addition, the program does not require nine additional MTH credits as originally listed. Beyond MTH 295, it is very difficult for students to find courses that would meet this requirement.					
Financial/staffing/equi	pment/space implications:				
NA					
List departments that have been consulted regarding their use of this program. Mathematics, Science					
Signatures:					
Reviewer	Print Name	Signature	Date		
Initiator	Kristin Good	Justa Mord	2/14/13		
Department Chair	Kristin Good	Marzym	2/14/13		
Division Dean/Administra	tor M. Showalter	M. Shouse	2/14/13		
Vice President for Instructi	on STUDIT BLACKLOW	File	2/26/13		
President		- man of	1		
Do not write in shaded area. Entered in: Banner C&A Database Log File Board Approval					
Please submit completed f	orm to the Office of Curriculum and Asse	ssment and email an electronic copy to s	john@wccnet.edu fo		

Please submit completed form to the Office of Curriculum and Assessment and email an electronic copy to sjohn@wccnet.edu for posting on the website.

logged 2/15/13 % Office of Curriculum & Assessment

WASHTENAW COMMUNITY COLLEGE

PROGRAM CHANGE OR	DISCONTINUATION	N FORM				
Program Code: ASMSAS	Program Name:	Math & Sc	ence	Effective	Гerm: F	2013
Division Code: MSH Department: Physical Science for PENG & CMED concentrations						
Directions:		-				
1. Attach the current prog	ram listing from the V	VCC catalog or Web	site and indicat	e any changes to be mad	de.	
2. Draw lines through any a separate sheet.	text that should be de	eleted and write in ac	lditions. Extens	ive narrative changes ca	in be included	on
3. Check the boxes below new courses as part of t should be submitted at t	for each type of chang he proposed program the same time as the p	ge being proposed. change, must be approgram change form	Changes to cour proved separate n.	rses, discontinuing a cou y using a Master Syllabu	urse, or adding 18 form, but	5
Requested Changes:	······	0	+of			
Review Program admission requirements Remove course(s): CP5 [71] Intro to Phoraa mina Program admission requirements Add course(s): Program outcomes Program outcomes Program title (title was) Accreditation information Description Discontinuation (attach program discontinuation plan that includes transition of students and timetable for phasing out courses) Advisors Other						
Show all changes on the atta	ched page from the cata	log.				
Rationale for proposed changes or discontinuation: This change applets to the Concentration for both Chemistry and Physics Pre engineering. After researching comparable degrees in pre-med W/ Chem of Physics, requiring CPS 171 is not needed. Financial/staffing/equipment/space implications:						
List departments that have been consulted regarding their use of this program.						
Reviewer	F	rint Name	/	Signature	Date	
Initiator	La:+ kle	en Butcher	Kathle	-Butcher	1/31/2	2013
Department Chair						
Division Dean/Administra	tor M. S	howalter	M So	upt	2/14/	13
Vice President for Instruct	ion Strer	Bleckhow	SB	n lil	2/26/	13

President C&A Database 3/14/13 Log File 3/14/13 Board Approval Do not write in shaded area. Entered in: Banner____

Please submit completed form to the Office of Curriculum and Assessment and email an electronic copy to siohn@wccnet.edu for posting on the website.

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http://www.wccnet.edu/departments/curriculum

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Associate in Science Degree

2010 - 2011 2011 - 2012 2012 - 2013

Description

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This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in biology, chemistry, computer science, math, or physics. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Complete the requirements for one of the following concentrations. The same source may not be used to meet both a concentration requirement and other program requirements above. Please consult an advisor to select appropriate electives (22-26 credits).-

Biology/Pre-Medicine (BMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II BIO 227 Biology of Animale

BID III or 208 or 215 or 227 or 228 or 237 Altorganic Biochemistry of BIO 208 Genetics

BIO 228 Biology of Plants U Elective: BIO 228, BIO 211, BIO 208, BIO 215, BIO 227, BIO 228, or BIO 237

Chemistry/Pre-Medicine (CMED) CEM 111 General Chemistry I CEM 122 General Chemistry II CEM 211 Organic Chemistry I CEM 222 Organic Chemistry II MTH 197 Linear Algebra MTH 293 Calculus III

Computer Science (COMS) CPS 171 Intro to Programming with C++

CPS 271 Object Features of C++ CPS 272 Data Structures with C++ MTH 197 Linear Algebra MTH 293 Calculus III Elective: Take an additional six credits in the CPS discipline

Mathematics (MATH) MTH 160 Basic Statistics MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations **3** Elective: Take an additional **1** credits in the MTH discipline

Physics/Pre-Engineering (PENG) CEM 111 General Chemistry I MTH 197 Linear Algebra MTH 293 Calculus III MTH 295 Differential Equations PHY 211 Analytical Physics I PHY 222 Analytical Physics II

Articulation

This program will fulfill MACRAO requirements if, in addition to the courses completed to meet General Education requirements, students complete one additional course in Social and Behavioral Science. Students must have their transcripts certified for MACRAO completion by the WCC Student Records Office.

Admissions Requirements

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of high school pre-calculus are recommended to prepare for this program.

- The chemistry, physics, and employer science concentrations requires one semester of high school physics (PHY 105 or PHY 111 with a "C" or better to enroll in PHY 211.

- The biology, chemistry, and physics concentrations require one year of high school chemistry or CEM 090 to enroll in CEM 111.

with a "C" or better

Biology/Pre-Medicine (BM	(ED)	
First Semester		
Class	Title	Credits
BIO 162	New Name	4
<u>CEM 111</u>	General Chemistry I	4
<u>MTH 191¹</u> 0	r Calculus I	
<u>MTH 176</u>	College Algebra	4
Elective(s)	Computer and Information Literacy	3
Total		15
Second Semester		
Class	Title	Credits
BIO 161	New Name	4
<u>CEM 122</u>	General Chemistry II	4
ENG 111	Composition I	4
<u>MTH 192</u> ² 01	r Calculus II	
<u>MTH 160</u>	Basic Statistics	4
Total		16
Third Semester		
Class	Title	Credits
<u>CEM 211</u>	Organic Chemistry I	4
ENG 226	Composition II	3
Social Science	Elective	3
Biology Elective ³	Select one course from the following: BIO 111, BIO 208, BIO 215, BIO 227, BIO 228 or BIO 237	4
Total		14
Fourth Semester		
Class	Title	Credits
<u>CEM 222</u>	Organic Chemistry II	4
<u>COM 101</u>	Fundamentals of Speaking	3
Elective(s)	Arts and Humanities	3
Social Science	Elective	3
Elective(s)	Arts and Humanities	3
Totai		10
Total Credits Required		61
	Students transferring to EMIL of a biology major way substitute MTU 176 or any biology 4 and the surmative	a course for MTH 101
	² Students transferring to EMU as a biology major may substitute MTH 170 or ally higher 4-credit hour mat	
	³ Students transferring to EMU as a biology major may consider completing BIO 208 Genetics at WCC prio	r to transfer

First Senester Class Title Credits Notes New credits CH111 General Chemistry 1 4 4 4 MTII 191 Calculus 1 5 5 PHY 111 General Physics 1 4 3 Total 16 16 Second Semester 16 16 Class Title Credits Class Title Credits Class Calculus 11 4 MTH 192 Calculus 11 4 MTH 192 Calculus 11 4 PHY 112 General Physics 11 4 Otal 16 16 Fold 16 16 Fold 1 4 PHY 102 General Physics 11 3 Class Title Credits Class Title Credits PM 1197 Linear Algebra 3 Class Title Credits Class Title Credits Class Title Credits Class	Chemistry/Pre-Mec	dicine (CMED)			
ClassTitleCreditsNotesvew credits $ETM 1111$ General Chemistry I44 $MTH 191$ Calculus I55Calculus I533FortalComputer and Information Literacy33FortalInformation Literacy33Second SenesterInformation Literacy36ClassTitleCreditsCreditsClassComposition I44EM 122General Chemistry II44EM 122General Chemistry II44PM 122Calculus II44FortalInfo1616FortalInfo1616FortalGeneral Physics II44Foural Chemistry I44Foural Chemistry I44Second Senester33ClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsStell 22Organic Chemistry II41414141415331616ClassTitleCreditsStell 23Calcu	First Semester				
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MTH 191 PHY 111 General Physics I55PHY 111 General Physics I44Elective(5) FotalComputer and Information Literacy 163Second Semester1616ClassTitleClassCeneral Chemistry II4PHY 122 Calculus II44PHY 122 Calculus II44PHY 122 Calculus II44Physics II44Physics II44Fotal1616ClassTitleClassCredits4ClassComposition I3ClassComposition II3ClassComposition II3ClassComposition II3ClassComposition II3ClassComposition II3ClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClass	<u>CEM 111</u>	General Chemistry I	4		4
PHY 111 General Physics I 4 4 Elective(s) Computer and Information Literacy 3 3 Fotal 16 16 Second Semester Ite Credits 16 Second Semester 4 4 CBM 122 General Chemistry II 4 4 VBG 111 Composition I 4 4 VPI 122 General Physics II 4 4 Otal 16 16 16 Fhird Semester 16 16 16 Class Title Credits 16 16 Class Title Credits 4 4 Second Semester 16 16 16 16 Class Title Credits 4 4 4 4 Second Semester 1 4 5 5 5 <t< td=""><td>MTH 191</td><td>Calculus I</td><td>5</td><td></td><td>5</td></t<>	MTH 191	Calculus I	5		5
Elective(s) Computer and Information Literacy 3 3 Total 16 16 Second Semester 16 16 Class Title Credits CEM 122 General Chemistry II 4 4 LNG 111 Composition 1 4 4 Class Title Credits 4 PHY 122 General Physics II 4 4 Class Title Credits 6 Fotal 16 16 16 Fortal 16 16 16 Filt Organic Chemistry 1 4 4 Class Title Credits 4 CS2 100 Introduction to Psychology 3 Change to social science elsective 3 Total 14 14 14 Fourth Semester 11 4 4 Class Title Credits 3 3 Colm 101 Fundamentals of Speaking 3 3 3 Class Title Credits 3 3 3 <	PHY 111	General Physics I	4		4
Total 16 Otal 16 Second Semester CLass Title CPM 122 General Chemistry II 4 4 MTH 192 Calculus II 4 4 QHY 122 General Physics II 4 4 QHY 122 General Physics II 4 4 Organic Chemistry I 4 4 16 Class Title Credits Credits CEM 211 Organic Chemistry I 4 4 QSY 100 Introduction to Psychology 3 Change to social science elsective 3 3 Ordal 14 14 14 Fourth Semester 3 Class Title Credits COM 101 Fundamentals of Speaking 3 14 14 Pourth 223 Calculus III 4 20M 102 Fundamentals of Speaking 3 16 14 4 20M 101 Fundamentals of Speaking 3 16 14 4 20M 122 Organic Chemistry II 4 20M 123	Elective(s)	Computer and Information Literacy	3		3
Second Semester Class Title Credits EM 122 General Chemistry II 4 4 ENG 111 Composition I 4 4 MTH 192 Calculus II 4 4 PHY 122 General Physics II 4 4 Otal 16 16 16 First Semester Class Title Credits CEM 211 Organic Chemistry I 4 4 CSQ 226 Composition II 3 3 MTH 197 Linear Algebra 4 4 CSQ 100 Introduction to Psychology 3 Change to social science elsective 3 Fotal 14 14 14 Fifte Credits COM 101 Fundamentals of Speaking 3 3 Cotal 14 4 4 Sective(s) Arts and Humanities 3 3 Total 14 14 14 Sective(s) Arts and Humanities 3 3 Total 14 <td>Total</td> <td></td> <td>16</td> <td></td> <td>16</td>	Total		16		16
ClassTitleCreditsEM 122General Chemistry II44EM 111Composition I444111Composition I4420111General Physics II44Fotal1616ClassTitleCreditsClassTitleCreditsClassComposition II32026Composition II32037Linear Algebra4444ENG 226Composition II325Y 100Introduction to Psychology3 Change to social science elsective31414Fourth SemesterClassTitleClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitle14442101141414141414ClassTitleCredits211Introduction to Programming with Ctil4 remove215111414216106217Introduction to American Government3 Change to social science elsective218106Chal Credits Required7066	Second Semester				
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ENG 111 MTH 192Composition 144MTH 192Calculus II44OralI44TotalI6I6Fhird SemesterClassTitleCreditsClassTitleCreditsCEM 211Organic Chemistry I44ENG 226Composition II33MTH 197Linear Algebra4425Y 100Introduction to Psychology3 Change to social science elsective3Total141414Fourth SemesterClassTitleCredits CreditsC0M 101Fundamentals of Speaking33C2M 222Organic Chemistry II44MTH 1923Calculus III44Elective(s)Arts and Humanities33Total141414Fifth SemesterClassTitleCreditsClassTitleCredits3ClassArts and Humanities33Total141414Fifth Semester333ClassArts and Humanities33Total1066	<u>CEM 122</u>	General Chemistry II	4		4
MTH 192 PTY 122 TotalCalculus II44PtY 122 FotalGeneral Physics II44Fotal1616Fird SemesterClass CM 226 Composition IITitle Credits Composition IICredits 3MTH 197 PSY 100 TotalLinear Algebra44PSY 100 TotalIntroduction to Psychology3 Change to social science elsective 33Class Class Title Comto Chemistry II44Fourth Semester141414Fourth SemesterClass Title Com 101 Teundamentals of Speaking Calculus III33Sett 222 TotalOrganic Chemistry II44Atts and Humanities Potal333Fifth Semester141414Fifth SemesterClass Class Title Programming with $C^{\pm \pm}$ Total414Fifth Semester333Title Credits Credits Class53Fifth Semester333Class Class ClassTitle Credits Tradection to Programming with $C^{\pm\pm}$ Total43Class ClassTitle Credits Total33Fifth Semester333Class ClassTitle Credits Total106	<u>ENG 111</u>	Composition I	4		4
PHY 122 FotalGeneral Physics II44Fotal1616Inite CreditsClassTitleCreditsCent 211Organic Chemistry I44Cent 211Organic Chemistry I44A composition II33Organic Chemistry II4ClassTitleCreditsCound colspan="2">CreditsCound colspan="2">CreditsClassTitleCreditsCalculus II44Arts and Humanities33TitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsOrgan=Chemistry II4Arts and Humanities333ClassTitleCredits <td><u>MTH 192</u></td> <td>Calculus II</td> <td>4</td> <td></td> <td>4</td>	<u>MTH 192</u>	Calculus II	4		4
Total1616Fhird SemesterClassTitleCreditsCEM 211Organic Chemistry I44ENG 226Composition II33MTH 197Linear Algebra4428Y 100Introduction to Psychology3 Change to social science elsective3Foatl1414Fourth SemesterClassTitleCreditsClassFundamentals of Speaking33CEM 222Organic Chemistry II44Elective(s)Arts and Humanities33Total141414Fifth SemesterClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitleCreditsState of the programming with $C^{\pm 1}$ 44Fifth SemesterClassTitleCreditsClassTitleCreditsClassTitleCreditsOrganic Introduction to American Government3 Change to social science elsective33ClassTitleCreditsClass <td>PHY 122</td> <td>General Physics II</td> <td>4</td> <td></td> <td>4</td>	PHY 122	General Physics II	4		4
Fhird SemesterClassTitleCreditsCEM 211Organic Chemistry I44ENG 226Composition II33MTH 197Linear Algebra4428Y 100Introduction to Psychology3 Change to social science elsective3Total141414Fourth SemesterClassTitleCreditsCOM 101Fundamentals of Speaking33CEM 222Organic Chemistry II44Elective(s)Arts and Humanities33Total141414Fifth SemesterClassTitleCreditsClassTitleCredits3Fortal141414Fifth Semester1414ClassTitleCreditsClassTitleCredits3ClassTitleCredits3ClassTitleCredits3ClassTitle106Chal Credits Required7066	Total	•	16		16
ClassTitleCreditsCEM 211Organic Chemistry I44ENG 226Composition II33MTH 197Linear Algebra44PSY 100Introduction to Psychology3 Change to social science elsective3Total141414Fourth SemesterClassTitleCreditsCOM 101Fundamentals of Speaking33CEM 222Organic Chemistry II442054 122Organic Chemistry II44216ctive(s)Arts and Humanities33Fotal141414Fifth SemesterClassTitleCreditsClassTitleCredits3Fotal141414Fifth Semester33ClassTitleCreditsClassTitleCreditsClassTitleCreditsClassTitle3Class1414Fifth Semester3ClassArts and Humanities3Change to social science elsective3Class106Credits Required7066	Third Semester				
CEM 211 ENG 226 COmposition IIOrganic Chemistry I44ENG 226 Composition II33MTH 197 ESY 100Lincar Algebra44PSY 100 FotalIntroduction to Psychology3 Change to social science elsective3Fotal141414Fourth SemesterClassTitleCreditsCOM 101 EEM 222 FotalFundamentals of Speaking33CEM 222 Elective(s)Organic Chemistry II44Elective(s) Fifth SemesterArts and Humanities33Fifth SemesterIntroduction to Programming with $C\pm 1$ 4 removePLS 112 Elective(s)Introduction to American Government3 Change to social science elsective3Fotal106Fotal106	Class	Title	Credits		
ENG 226 Composition II 3 3 MTH 197 Linear Algebra 4 4 2SY 100 Introduction to Psychology 3 Change to social science elsective 3 Total 14 14 14 Fourth Semester Class Title Credits COM 101 Fundamentals of Speaking 3 3 CEM 222 Organic Chemistry II 4 4 ATTH 1933 Calculus III 4 4 Elective(s) Arts and Humanities 3 3 Fotal 14 14 14 Fifth Semester Class Title Credits SPE-171 Introduction to Programming with $C^{\pm 1}$ 4 remove PLS_112 Introduction to American Government 3 Change to social science elsective 3 Total 10 6 Fotal 10 6	<u>CEM 211</u>	Organic Chemistry I	4		4
MTH 197 2SY 100Linear Algebra44PSY 100 FotalIntroduction to Psychology3 Change to social science elsective3Fourth Semester1414ClassTitleCreditsCOM 101 CEM 222Fundamentals of Speaking33CEM 222 Deganic Chemistry II44MTH 293 Calculus III44Elective(s) Arts and Humanities33Fotal1414Fifth SemesterClassTitle TitleCredits CreditsClassTitle CreditsClassTitle Arts and Humanities3Fotal1414Fotal Change to social science elsectiveArts and Humanities33ClassTitle Arts and Humanities3ClassTitle Arts and Humanities3Gotal106	<u>ENG 226</u>	Composition II	3		3
PSY 100 TotalIntroduction to Psychology3 Change to social science elsective3Fourth Semester1414ClassTitleCreditsCOM 101 CEM 222Fundamentals of Speaking33CEM 222 Organic Chemistry II44MTH 293 Calculus III44Elective(s) Arts and Humanities33Total1414Fifth SemesterClassTitle Credits TotalCredits TremoveSPS 171 ClassIntroduction to Programming with C±+ 144Fifth Semester333Sps 171 ClassIntroduction to American Government 103 Change to social science elsective3Gotal106Fotal106	MTH 197	Linear Algebra	4		4
Total1414Fourth SemesterClassTitleCredits $COM 101$ Fundamentals of Speaking33 $CEM 222$ Organic Chemistry II44 $MTH 293$ Calculus III44Elective(s)Arts and Humanities33Fotal141414Fifth SemesterClassTitleCredits $Class$ TitleCredits $Class$ TitleGredits $Class$ TitleOvernment $Class$ $Credits$ 3 $Class$ C	PSY 100	Introduction to Psychology	3 C	hange to social science elsective	3
Class Title Credits COM 101 Fundamentals of Speaking 3 3 CEM 222 Organic Chemistry II 4 4 MTH 293 Calculus III 4 4 Elective(s) Arts and Humanities 3 3 Fotal 14 14 14 Fifth Semester Class Title Credits CPS 151 Introduction to Programming with C++ 4 remove PLS 112 Introduction to American Government 3 Change to social science elsective 3 Fotal 10 6 Fotal 70 66	Total		14	C	14
ClassTitleCreditsCOM 101Fundamentals of Speaking33CEM 222Organic Chemistry II44MTH 293Calculus III44Elective(s)Arts and Humanities33Fotal1414Fifth SemesterClassTitleCreditsClassTitleCreditsClassTitleCreditsClassArts and Humanities3Class1414Fifth Semester3Class1066	Fourth Semester				
COM 101Fundamentals of Speaking33CEM 222Organic Chemistry II44MTH 293Calculus III44Elective(s)Arts and Humanities33Fotal1414Fifth SemesterClassTitleCreditsOrganic Chemistry II44Fifth SemesterClassTitleCreditsDistribution to Programming with C+14 removePLS 112Introduction to American Government3 Change to social science elsective3Fotal1066	Class	Title	Credits		
CEM 222 Organic Chemistry II 4 4 MTH 293 Calculus III 4 4 Elective(s) Arts and Humanities 3 3 Total 14 14 Fifth Semester Class Title Credits CPS 171 Introduction to Programming with C+1 4 remove PLS 112 Introduction to American Government 3 Change to social science elsective 3 Fotal 10 6	<u>COM 101</u>	Fundamentals of Speaking	3		3
MTH 293 Calculus III 4 4 Elective(s) Arts and Humanities 3 3 Fotal 14 14 Fifth Semester Class Title Credits <u>CPS +71</u> Introduction to Programming with C++ 4 remove PLS 112 Introduction to American Government 3 Change to social science elsective 3 Elective(s) Arts and Humanities 3 10 6	CEM 222	Organic Chemistry II	4		4
Elective(s) Arts and Humanities 3 3 Fotal 14 14 14 Fifth Semester Introduction to Programming with C++ 4 remove PLS 112 Introduction to American Government 3 Change to social science elsective 3 Elective(s) Arts and Humanities 3 10 66	<u>MTH 293</u>	Calculus III	4		4
Total 14 14 Fifth Semester Class Title Credits Class Title Credits <u>CPS +71</u> Introduction to Programming with C±+ 4 remove PLS 112 Introduction to American Government 3 Change to social science elsective 3 Elective(s) Arts and Humanities 3 10 66 Total 70 66	Elective(s)	Arts and Humanities	3		3
Fifth Semester Class Title Credits <u>CPS +71</u> Introduction to Programming with C++ 4 remove PLS 112 Introduction to American Government 3 Change to social science elsective 3 <u>Elective(s)</u> Arts and Humanities 3 10 6 Fotal 10 66	Total		14		14
ClassTitleCredits <u>CPS 171</u> Introduction to Programming with C++4 remove <u>PLS 112</u> Introduction to American Government3 Change to social science elsective3 <u>Elective(s)</u> Arts and Humanities33Total106	Fifth Semester				
Streaming with C+1 4 remove PLS 112 Introduction to American Government 3 Change to social science elsective 3 Elective(s) Arts and Humanities 3 10 6 Fotal 70 66	Class	Title	Credits		
Listic Arts and Humanities 3 3 Fotal 10 6	DIS 112	Introduction to American Government	4 10	hange to social science elsective	3
ControlControlControlControlControlFotal106Fotal Credits Required7066	$\frac{110112}{\text{Flootive}(n)}$	Arts and Humanities		hange to sooial selence elsective	2
Total Credits Required 70 66	Total	Ans and numanities	3 10		6
	Total Credits Require	ed	70		66

Mathematics (MATH)					
First Semester					
Class		Title	Credits	Notes	New Credits
BIO LOT 162	or	Concepts of Biology I Cells and A	olecules		
<u>CEM 111</u>	or	General Chemistry 1 General Physics I	4 kee	h	4
MTH 191		Calculus I	5 keer	5	5
Elective(s)		Computer and Information Literacy	3 keep	5	3
		Take an additional three credits in the	3		
		MTH discipline	rem t keep	ove	1 moved from semester 2
ENG 111 Total		Composition I	4 keep	þ	4 moved from semester 2
Total			17		
Second Semester					
Class ,		Title	Credits		
BIO 103-16	or	General Biology I Ecology and	Evolutio	17	
<u>CEM 122</u>	or	General Chemistry II	4 1	_	4
<u>PHY 122</u>		General Physics II	4 keep	p ove	4
MTH 192		Calculus II	4 kee	p	4
		Later desting to American Concernment	, Cha	inge to social	
PLS 112		Introduction to American Government	³ scie	nce elsective	3 moved from semester 5
MTH 160 Total		Basic Statistics	4 keej	р	4 moved from semester 3
Third Semester					
Class		Title	Cradits		
ENG 226		Composition II	3 keep	D	3
<u>MTH 197</u>		Linear Algebra	4 kee	p	4
PSY 100		Introduction to Psychology	3 Cha	inge to social	3
COM 101		Fundamentals of Speaking	3 kee	n	3 moved from semester 4
MTH 293		Calculus III	4 kee	þ	4 moved from semester 4
Total			17		17
Fourth					
Semester					
			<i>a u</i>		
Class		Title	Credits	n	3
Elective(s)		Arts and Humanities Take an additional three credits in the	J Kee	þ	5
		MTH discipline	³ rem	love	
MTH 295		Differential Equations	4 kee	р	4 moved from semester 5
Elective(s)		Arts and Humanities	3 kee	р	3 moved from semester 5
		Take an additional three credits in the	3 100	n	3 moved from semester 5
Total			16	٢	13
Fifth Semester -	no lo	nger needed			
Total Credits					
Required			71		61

Physics/Pre-Engi	ineering (PENG)			
First				
Semester				
	714		New	
Class	Title	Credits Notes	Credits	
<u>CEM 111</u>	General Chemistry I	4 keep	4	
<u>MTH 191</u>	Calculus I	5 keep	5	
<u>PHY 111</u>	General Physics I	4 кеер	4	
Elective(s)	Literacy	³ keen	3	
	Elicitacy		U	
Total		16	16	
Second				
Semester				
Class	Title	Cradita		
Class	-Introduction to	Creatis		
<u>CPS 171</u>	Programming with C++	⁴ remove		
<u>ENG 111</u>	Composition I	4 keep	4	
<u>MTH 192</u>	Calculus II	4 keep	4	
<u>PHY 122</u>	General Physics II	4 keep	4	
Elective(s)	Arts and Humanities	3 keep	3 Note:	: Moved from semester 5
Total		19	15	
Third				
Semester				
Class	Title	Credits	-	
ENG 226	Composition II	3 keep	3	
MIH 197	Linear Algebra	4 keep	4	
<u>FFIT 21P</u>	Analytical Flipsics I	Change to social	5	
<u>PSY 100</u>	Introduction to Psychology	3 science elsective	3	
Total	,	15	15	
Fourth				
Semester				
Class	Title	Credits		
COM 101	Fundamentals of Speaking	3 keep	3	
MTH 293	Calculus III	4 keep	4	
PHY 222	Analytical Physics II	5 keep	5	
Elective(s)	Arts and Humanities	3 keep	3	
Total		15	15	
Fifth				
Semester				
Semester				
Class	Title	Credits		
<u>MTH 295</u>	Differential Equations	4 keep	4	
PLS 112	Introduction to American	$\frac{1}{3}$ Change to social	2	
	Government	science eisective	5	
Total		7	7	
Total Credits				
Required		72	68	

PROGRAM CHANGE OR DISCONTINUATION FORM

Program Code: ASMSAS	Program Name: Associates of Science Math and Science	Effective Term: W' 12
Division Code: MらH	Department: Math + Science	

Directions:

- 1. Attach the current program listing from the WCC catalog or Web site and indicate any changes to be made.
- 2. Draw lines through any text that should be deleted and write in additions. Extensive narrative changes can be included on a separate sheet.
- 3. Check the boxes below for each type of change being proposed. Changes to courses, discontinuing a course, or adding new courses as part of the proposed program change, must be approved separately using a Master Syllabus form, but should be submitted at the same time as the program change form.

Review Remove course(s): X Add course(s): CEM 111 and CEM 122 to the possible general education and core course options for the ASMAS degree. Program title (title was) Description Type of award Advisors Articulation information	 Program admission requirements Continuing eligibility requirements Program outcomes Accreditation information Discontinuation (attach program discontinuation plan that includes transition of students and timetable for phasing out courses) Other
Show all changes on the <u>attached page from the catalog</u> .	
Rationale for proposed changes or discontinuation:	

Students should have the option to use the Chemistry courses as possible general education and core course options for the ASMSAS degree in addition to the choices of Biology and Physics.

Financial/staffing/equipment/space implications:

List departments that have been consulted regarding their use of this program. Mathematics and Natural Science

Signatures:

Reviewer	Print Name	Signature	Date
Initiator	Kristin Chatas/Kathy	Red Shul	11.4.11
	Butcher	Happle Butch	11-7-11
Department Chair	Kristin Chatas	Unist Stud Hall On	11.4.11 11-7-1
Division Dean/Administrator	Martha Showalter	m Shoren But	te 11/10/11
Vice President for Instruction	Stuart Blacklaw	- Coult -	12-6-11
President	N/A		
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fn 12/19/11

Office of Curriculum & Assessment

MATH AND SCIENCE

Students utilize this program in preparation for a degree in engineering or physics.

mathematics

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71

Math and Science (ASMSAS)

General Educat	ion Requirements	(34 credits)
ENG 111	Composition I	4
ENG 226	Composition II	3
COM 101	Fundamentals of Speaking	3
<u>MTH 191</u>	Calculus I	5
BIO 101 or	Concepts of Biology	
PHY 111	General Physics 1 OR CEM 111	4
PSY 100	Introduction to Psychology	3
PLS 112	Introduction to American Government	3
Arts/Human.	Elective(s)	6
Computer Lit.	Elective(s)	3
Core Courses		(12 credits)

Core Courses

CPS 171	Introduction to Programming with C++
MTH 192	Calculus II
BIO 103 or	General Biology II
PHY 122	General Physics II Or CEM 122

Complete the requirements for the following concentration.

Math Concentration

Mathematics (MATH)

(25 credits)

MTH 160	Basic Statistics
MTH 197	Linear Algebra
MTH 293	Calculus III
MTH 295	Differential Equations
Elective	Take an additional nine credits

Minimum Credits Required for the Program:

Associate in Science Deg

Math a	nd Science (ASN	ISAS)
This pr a four-; bachelo science, student Studen and tra which t	ogram prepares s 'ear college or un r's degree in biolog math, or physics. s a solid foundatio ts should obtain p nsfer equivalenci ney are transferrin	tudents to transf iversity to compl gy, chemistry, com The program will n in math and sc program requiren es from the colle ng.
Articul require pleted t student and Bel transcri the WC	ation: This progra ments if, in addition o meet General Ec- s complete one add avioral Science, St pts certified for M C Student Records	m will fulfill MAC on to the courses ducation requiren litional course in s udents must have ACRAO completi Office.
Progra	m Admission Re	quirements:
 Stude of 7 t high s pre-cs this p 	nts must have an begin the math a chool algebra and ilculus are recommo rogram.	Academic Math sequence. Two ye one year of high mended to prepa

Program Information Report

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Math and Science (ASMSAS) Associate in Science Degree

Program Effective Term: Fall 2012

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in biology, chemistry, computer science, math, or physics. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Articulation:

This program will fulfill MACRAO requirements if, in addition to the courses completed to meet General Education requirements, students complete one additional course in Social and Behavioral Science. Students must have their transcripts certified for MACRAO completion by the WCC Student Records Office.

Program Admission Requirements:

- Students must have an Academic Math Level of 7 to begin the math sequence. Two years of high school algebra and one year of high school pre-calculus are recommended to prepare for this program.

- The chemistry, physics, and computer science concentrations require one semester of high school physics or PHY 105 or PHY 111 with a "C" or better to enroll in PHY 211.

- The biology, chemistry, and physics concentrations require one year of high school chemistry or CEM 090 to enroll in CEM 111.

S		
ENG 111	Composition I	4
ENG 226	Composition II	3
COM 101	Fundamentals of Speaking	3
MTH 191	Calculus I	5
BIO 101 or	Concepts of Biology*	
CEM 111 or	General Chemistry I	
PHY 111	General Physics I	4
PSY 100	Introduction to Psychology	3
PLS 112	Introduction to American Government	3
Arts/Human.	Elective(s)	6
Computer Lit.	Elective(s)	3
CPS 171	Introduction to Programming with C++	4
MTH 192	Calculus II	4
BIO 103 or	General Biology II*	

CEM 122 or General Chemistry II PHY 122 General Physics II

Minimum Concentration Credits Required for the Program:

Complete the requirements for one of the following concentrations. The same course may not be used to meet both a concentration requirement and other program requirements above. Please consult an advisor to select appropriate electives.

Math and Science Concentrations

Biology/Pre-M	edicine (BMED)	(24 credits)
CEM 111	General Chemistry I	4
CEM 122	General Chemistry II	4
CEM 211	Organic Chemistry I	4
CEM 222	Organic Chemistry II	4
BIO 227 or	Biology of Animals	
BIO 228	Biology of Plants	4
Elective	BIO 102 BIO 111 BIO 208 BIO 215 BIO 227 BIO 228 or BIO 237	4-5
LIECTIVE	Dio 102, Dio 111, Dio 200, Dio 215, Dio 227, Dio 220, 0, Dio 257	
Chemistry/Pre	-Medicine (CMED)	(24 credits)
CEM 111	General Chemistry I	4
CEM 122	General Chemistry II	4
CEM 211	Organic Chemistry I	4
CEM 222	Organic Chemistry II	4
MTH 197	Linear Algebra	4
MTH 293		4
1111 255		
Computer Scier	nce (COMS)	(22 credits)
CPS 271	Object Features of C++	4
CPS 272	Data Structures with C++	4
Monday, December	r 19, 2011 - 3:53:7 p.m.	Page 2 of 9

Program Information Report

MTH 197 MTH 293 Elective	Linear Algebra Calculus III Take an additional six credits			4 4 6
Mathematic	s (MATH)		 (25 credit	ts)
MTH 160	Basic Statistics	,		4
MTH 197	Linear Algebra			4
MTH 293	Calculus III			4
MTH 295	Differential Equations			4
Elective	Take an additional nine credits			9
Physics/Pro	e-Engineering (PENG)		(26 credi	ts)
CEM 111	General Chemistry I			4
MTH 197	Linear Algebra			4
MTH 293	Calculus III			4
MTH 295	Differential Equations			4
PHY 211	Analytical Physics I			5
PHY 222	Analytical Physics II			5
Minimum C	redits Required for the Program:			68
Notes:				

*The BMED concentration requires BIO 101 & BIO 103. The CMED, COMS, and PENG concentrations require PHY 111 & PHY 122. The MATH concentration may choose the BIO, CEM or PHY sequence.

Math and Science

Learn more about math or science through this associate degree program.

Monday, December 19, 2011 3:53:7 p.m.

Program Code: ASMSAS	Program Nar	ne: Math and Science A	5 program	Effective Term: f07
Division Code: MNB	Department:	Math & Natural Sciences		
Directions:				
1. Attach the current pro	ogram listing from	the WCC catalog or Web	site and indicate any o	changes to be made.
2. Draw lines through an a separate sheet.	ny text that should	l be deleted and write in ac	ditions. Extensive na	rrative changes can be included on
3. Check the boxes belo new courses as part o should be submitted a	ow for each type of f the proposed pro at the same time as	f change being proposed. ogram change, must be app s the program change form	Changes to courses, d proved separately usin 	iscontinuing a course, or adding g a Master Syllabus form, but
Requested Changes:				
Review Remove course(s): Add course(s): Program title (title w Description Type of award Advisors Articulation informa Show all changes on the a	as tion <u>ttached page from t</u>) he catalog.	 Program admissio Continuing eligibil Program outcome Accreditation info Discontinuation (a plan that includes for phasing out co 226 	n requirements lity requirements es ormation attach program discontinuation transition of students and timetabl purses) bice of ENG 107 restrict to ENG
Rationale for propose Transfer implications &	d changes or dis & MACRAO guid	continuation: elines		
Financial/staffing/eq	luipment/space	implications:		
1		ulted regarding their use	of this program.	
List departments that	t have been const	uncu regularing their acc		
List departments that Signatures:	t have been const	uncu regurung men uce		

Kevlewer	Fillt Ivalue	orginature	
Initiator	L. Nelson		
Department Chair	R. Hagood	-lot Jose	3/24/07
Division Dean/Administrator	M. Showalter	Mr. Journ 1	3/29/07
Vice President for Instruction		Roger M. Nolses.	4/5/07
President			
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Please submit completed form to the Office of Curriculum and Assessment and email an electronic copy to <u>sjohn@wccnet.edu</u> for posting on the website.

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University Transfer Programs

Math and Science (ASMSAS)

Associate in Science Degree

Program Effective Term: Fall 2007

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in biology, chemistry, computer science, math, or physics. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Articulation:

This program will fulfill MACRAO requirements if, in addition to the courses completed to meet General Education requirements, students complete one additional course in Social and Behavioral Science. To use MACRAO, students must have their transcripts certified for MACRAO completion by the WCC Student Records Office.

Program Admission Requirements:

- Students must have a minimum COMPASS Trigonometry score of 46 or complete (MTH 176 and MTH 178) or MTH 180 with a grade of "C" or better to begin the math sequence. Two years of high school algebra and one year of high school pre-calculus are recommended to prepare for this program.

- The chemistry, physics, and computer science concentrations require one semester of high school physics or PHY 105 or PHY 111 with a "C" or better to enroll in PHY 211.

- A high school computer course or CIS 100 is required to enroll in CIS 110.

- The biology, chemistry, and physics concentrations require one year of high school chemistry or CEM 090 to enroll in CEM 111.

Continuing Eligibility Requirements:

Students must demonstrate basic computer literacy skills by successfully passing the Computer and Information Literacy Test. The test may be taken at any point during the program, but must be completed before graduating.

General Educat	ion Requirements (31 credits)
ENG 111	Composition I 4
ENG 226	Composition II 3
COM 101	Fundamentals of Speaking 3
MTH 191	Calculus I 5
BIO 101 or	Concepts Of Biology*
PHY 111	General Physics I 4
PSY 100	Introductory Psychology 3
PLS 112	Introduction to American Government 3
Arts/Human.	Elective(s) 6
*The BMED conce	entration requires BIO 101 & BIO 103. The CMED, COMS, and PENG concentrations require PHY 111 & PHY 122. The

MATH concentration may choose either the BIO or PHY sequence.

Core Courses

CPS 171
Introduction to Programming with C++
4
MTH 192
Calculus II
4

BIO 103 or General Biology II PHY 122 General Physics II

Minimum Concentration Credits Required for the Program:

Complete the requirements for one of the following concentrations. The same course may not be used to meet both a concentration requirement and other program requirements above. Please consult an advisor to select appropriate electives.

Math and Science Concentrations

	(2233333)
CEM 111	General Chemistry I
CEM 122	General Chemistry II
CEM 211	Organic Chemistry I
CEM 222	Organic Chemistry II
BIO 227 or	Biology of Animals
BIO 228	Biology of Plants
Elective	BIO 102, BIO 111, BIO 208, BIO 215, BIO 227, BIO 228, or BIO 237

CEM 111	General Chemistry I
CFM 122	General Chemistry II
CEM 211	Organic Chemistry I

Thursday , April 05, 2007 01:04:58 p.m.

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Program Information Report

CEM 222	Organic Chemistry II
MTH 197 MTH 293	Calculus III 4
	(AZ credit)
CPS 271	Object Features of C++
CPS 272	Data Structures with C++
MTH 202	Calevia III 4
Elective	Take an additional six credits 6
	(MATH)
MTH 160	Basic Statistics 4
MTH 197	Linear Algebra 4
MTH 293	Calculus III
MTH 295	Differential Equations
Elective	Take an additional nine credits
2021220222	Engineering (PENG)
CEM 111	General Chemistry I
MTH 197	Linear Algebra
MTH 293	Calculus III
MTH 295	Differential Equations
PHY 211	Analytical Physics 1
201 222	
Minimum Cre	dits Required for the Program: 65

WASHTENAW COMMUNITY COLLEGE

PROGRAM CHANGE FORM

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Program Code: Program	Name: d Science Associate in Science	Effect	ive Term:		
ASMISAS Main an	d Science Associate in Science	<u>105</u>			
Directions:					
1. Attach the current program listing	from the WCC catalog and indicate a	ny changes to be made.			
2. Draw lines through any text that sh a separate sheet.	ould be deleted and write in addition	s. Extensive narrative changes can	be included on		
3. Check the boxes below for each ty new courses as part of the propose should be submitted at the same tir	pe of change being proposed. Chang d program change, must be approved ne as the program change form.	es to courses, discontinuing a cour l separately using a Master Syllabus	se, or adding form, but		
Requested Changes:					
Remove course(s) Advisors Add course(s) After changes Total program credits: Current credits After changes Articulation information Program Title (title was) Continuing eligibility requirements Description Program outcomes Type of award Other readability/format Show all changes on the attached page from the catalog.					
Rationale for proposed changes: standardize to present calalog format					
Financial/staffing/equipment/sp	ace implications:				
List departments that have been consulted regarding their use of this program.					
Signatures:					
Reviewer	Print Name	Signature	Date		

Keviewci	1 thit i vanic				
Program Change Initiator					
Department Chair		A			
Division Dean/Administrator	M. Showalter	m Shawat	4/14/05		
Vice President of Instruction	¥5	Roger M. Palacy	1/25/05		
Please submit completed form to the Office of Curriculum and Assessment.					

Please submit completed form to the Office of Curriculum and ssment.

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Math and Science (ASMSAS)

Associate in Science Degree

Program Effective Term: Fall 2005

This program prepares students to transfer to a four-year college or university to complete a bachelor's degree in biology, chemistry, computer science, math, or physics. The program will give students a solid foundation in math and science. Students should obtain program requirements and transfer equivalencies from the college to which they are transferring.

Articulation:

This program will fulfill MACRAO requirements if, in addition to the courses completed to meet General Education requirements, students complete one additional course in Social and Behavioral Science. To use MACRAO, students must have their transcripts certified for MACRAO completion by the WCC Student Records Office.

Program Admission Requirements:

- Students must have a minimum COMPASS Trigonometry score of 46 or complete (MTH 176 and MTH 178) or MTH 180 with a grade of "C" or better to begin the math sequence. Two years of high school algebra and one year of high school pre-calculus are recommended to prepare for this program.

- The chemistry, physics, and computer science concentrations require one semester of high school physics or PHY 105 or PHY 111 with a "C" or better to enroll in PHY 211.

- A high school computer course or CIS 100 is required to enroll in CIS 110.

- The biology, chemistry, and physics concentrations require one year of high school chemistry or CEM 057 to enroll in CEM 111.

Continuing Eligibility Requirements:

Students must demonstrate basic computer literacy skills by successfully passing the Computer and Information Literacy Test. The test may be taken at any point during the program, but must be completed before graduating.

(12 credits)

General E	ducation Requirements (31 credit	s)	
ENG 111	Composition I	4	
ENG 107* or	Technical Writing		
ENG 226	Composition II	3	
COM 101	Fundamentals of Speaking	3	
MTH 191	Calculus I	5	
BIO 101** or	Concepts Of Biology		
PHY 111	General Physics I	4	
PSY 100	Introductory Psychology	3	
PLS 112	Introduction to American Government	3	
Arts/Human.	Elective(s)	6	
*The Chemistry/Dre Medicine and Physics concentrations require FNG 107: all			

'The Chemistry/Pre-Medicine and Physics concentrations require ENG 107; al other concentrations require ENG 226.

**The Biology/Pre-Medicine concentration requires BIO 101 & 103; the Mathematics concentration can use either the BIO or PHY sequence; all other 9/15/05 make convection on Web fr concentrations require PHY 241 & 222:

111+122

Core Courses

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CPS 171	Introduction to Programming with C++	4
MTH 192	Calculus II	4
BIO 103 or	General Biology II	
PHY 122	General Physics II	4

Minimum Concentration/Option Credits Required for the Program:

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Complete the requirements for one of the following concentrations. The same course may not be used to meet both a concentration requirement and other program requirements above. Please consult an advisor to select appropriate electives.

Minimum	Credits	Required	for the	Program
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Math and Science Concentrations

Biology/Pro	e-Medicine (BMED) (24 Credits)
Life Sciences	s Department
Advisor:	
CEM 111	General Chemistry I
CEM 122	General Chemistry II
CEM 211	Organic Chemistry I
CEM 222	Organic Chemistry II
Choose:	BIO 227 Biology of Animals or
	BIO 228 Biology of Plants
Elective	BIO 102, BIO 111, BIO 208, BIO 215, BIO 216, BIO 227, BIO 228, BIO 237
Chemistry/	Pre-Medicine (CMED) (24 Credits)
Physical Sci Advisor:	ences Department
CEM 111	General Chemistry I
CEM 122	General Chemistry II
CEM 211	Organic Chemistry I
CEM 222	Organic Chemistry II
MTH 197	Linear Algebra
MTH 293	Calculus III
Computer	Science (COMS) (25 Credits)
Computer In Advisor:	struction Department
CIS 238	PC Assembly Language
CPS 271	Object Features of C++
CPS 272	Data Structures with C++
MTH 197	Linear Algebra
MTH 293	Calculus III
Elective	take an additional six credits
Mathemati	cs (MATH) (25 Credits)
Mathematics Advisor:	Department
MTH 160	Basic Statistics
MTH 197	Linear Algebra
MTH 293	Calculus III
MTH 295	Differential Equations
Elective	take an additional nine credits

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Physics/Pre-Engineering (PENG) (26 Credits) Department Advisor:

CEM 111	General Chemistry I	4
MTH 197	Linear Algebra	4
MTH 293	Calculus III	4
MTH 295	Differential Equations	4
PHY 211	Analytical Physics I	5
PHY 222	Analytical Physics II	5

Program Approval Document

Associate In Science In

MATH AND SCIENCE

Prepared by

Kathy Butcher, James Egan and David Shier Math and Natural Sciences Division Washtenaw Community College

April 21, 1999

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WASHTENAW COMMUNITY COLLEGE PROGRAM AUTHORIZATION FORM

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1.	Program Title: Sciel	nce And Math Ass	sociate In Sci	ence Degree		Program Code: M 5A 5
2.	Division: MNS	3. Der	partment:			CIF Code:
4.	Type of Program:	A.A .	🔀 A.S.	🗌 A.A.S.	🗌 A.T.	.S.
	Advanced Certific	ate 🗌 Master	y Certificate	Achievement (Certificate	Certificate of Completion
5.	Will this program be	Perkins funded?	🗌 yes	🗌 no	6. Effec	tive Year: Fall 1999
7.	7. Program Description (for Catalog, brochures, etc.: This program prepares to transfer to a four-year college or university to complete a bachelor of science (BS) degree program in the sciences. Four-year liberal arts graduates prepare for a wide variety of jobs and professions. Their studies emphasize communication, analytical, computational, scientific, and critical thinking skills. Science graduates become teachers, scientists, chemists, biologists, doctors, laboratory					

researchers, nurses, pharmacists, among other possible professions.

8. Advisors: Kathy Butcher, James Egan, Judith Fish, David Shier

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9 Admissions Criteria:	10. Criteria for Continuing Program Eligibility:
The following high school courses or WCC equivalents must be completed with a grade of "C" or	
better: -Two years of high school algebra and one year of high school analysis and trigonometry or MTH 178	
and 179. -One year of high school chemistry Descing scores on the College's entering student	
placement tests in reading, writing, and math.	

11. Attach a Program Approval Document [PAD], which includes the following:

A. Program Description B. Program Goals C. Needs Assessment	D. Enrollmer E. Program (F. Course D	nt Projections Cost Analysis escriptions	G. Anarysis of H. Articulations I. Licensure/A	
Approval Recommended:	Print Name	Signature		Dete
Program Initiator: K. Butcher, J.	Egan, D. Snier	- Came CE		5/11/55
Dept. Chair/Dir.: <u>same as above</u> Interim L	lean, r	- C. F		5/1/59
Dean/Admin.:	oc-James Egan		The	5/6/99
VP, Instr/Stud Ser: <u>Guy Altieri</u>		- Alley Cla	E. MA	10/3/04
President: Larry Whitwo	th	(- Aller M	<u>mere</u>	
Date of Board Approval: <u>IT IUU</u> &	15,1444	\geq		

Crist, Deen, Admissions, California Desard

COURSE REQUIREMENTS FOR PROGRAM

Course	Title	Credit	Pre-requisites/Co-requisites
BIO 101	Concepts of Biology	4	BIO 101L (co-req)
	Eundamentals of Speaking	3	None
			MTH 169 or two years HS algebra: CIS
CPS 171			100 or CIS 110 or HS computer class
ENG 111	Composition I	4	ENG 000
ENG 122	Composition II	3	ENG 111
MTH 191	Calculus I	5	MTH 178 and MTH 179
MTH 192	Calculus II	4	MTH 191
PLS 112	Introduction to American Government	3	None
PSY 100	Introductory Psychology	3	None
(optional)			
Select courses			
based on major:			
Biology &			
General Science:			
BIO 103	General Biology II	4	BIO 101; CEM 111; or Consent
BIO 215	Introduction to Cell Physiology	3	CEM 111; BIO 101; or Consent
BIO 216	Cell Physiology Lab	1	BIO 215 (co-req)
BIO 227	Zoology	4	BIO 101 or Consent
BIO 228	Botany	4	BIO 101 or Consent
CEM 111	General Chemistry I	1	CEM 057, or HS chemistry; HS algebra
CEM 122	General Chemistry II	4	CEM 111; MTH 169
CEM 211	Organic Chemistry I	4	CEM 111
CEM 222	Organic Chemistry II	4	CEM 122; CEM 211
Chemistry & Pre-Medicine			
CEM 111	see above		

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MIN 295		60	
MIN 233	Differential Fountions	4	MTH 197; MTH 293
MTH 202	see above		
MIH 160	Dasic Statistics		
	Pagic Statistics	4	MTH 097
Math:			·
PHY 222	see above		
PHY 211	see above		
MTH 293	Calculus III	4	MTH 192; MTH 197 (co-req)
MTH 197	Linear Algebra	4	MTH 191
CIS 238	PC Assembly Language	3	1 semester computer program language
CPS 272	Data Structures with C++	4	CPS 171, or CPS 290, or consent
CPS 271	Object Features of C++	4	CPS 171 or consent
CPS 171	Introduction to Programming with C++	4	MTH 169 or two years HS algebra; CIS 100 or CIS 110 or HS computer class
Computer Science			
CEM 222	see above		
CEM 211	see above		
CEM 122	see above		
CEM 111	see above		
Physics:			
PHY 222	Analytical Physics II	5	PHY 211; PHY 222L (co-req)
PHY 211	Analytical Physics I	5	MTH 191; PHY 105 or PHY 111 or HS Physics
CEM 222	see above		
CEM 211	see above		
CEM 122	see above		

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A. PROGRAM DESCRIPTION

This program prepares to transfer to a four-year college or university to complete a bachelor of science (BS) degree program in the sciences. Four-year liberal arts graduates prepare for a wide variety of jobs and professions. Their studies emphasize communication, analytical, computational, scientific, and critical thinking skills. Science graduates become teachers, scientists, chemists, biologists, doctors, laboratory researchers, nurses, pharmacists, among other possible professions.

B. PROGRAM GOALS

To prepare students for a successful transfer to a four-year institution in a science or math field

C. NEEDS ASSESSMENT

Employment Outlook

Information about employment trends indicate that the professions of biological, medical and physical scientists and chemists will grow faster than average from 1998-2006. Nationally, from 1998 through 2006, there will be a 20% increase in the openings for chemists and a 25% increase for scientists.

In the Ann Arbor area, it is expected that there will be 28% increase in openings for medicine and health science managers and a 35% increase in math and natural science managers.

Expected Earnings/Wages

Nationally, average salaries for biologists with bachelor's degrees were approximately \$25,868 and for chemists, the average salary was \$49,400. In Michigan, the annual salary range for biologists was between \$27,800-\$58,400 and for chemists \$29,114-\$50,998. (Michigan Occupational Information System, 1998).

D. ENROLLMENT PROJECTIONS

Estimated Number of Students per Year

We expect to enroll between 40-50 students the first semester and expect increased enrollments once this program becomes established.

Longevity of Program

E. PROGRAM COST ANALYSIS

Start-up Costs

There are no additional costs for this program.

F. COURSE DESCRIPTIONS

1. BIO 101: Concepts of Biology

Basic principles and concepts of biology are surveyed in lecture and laboratory with emphasis on biological processes as well as practical applications. if followed by BIO 103, this course provides a comprehensive year sequence for biology majors. Taken alone, it serves as a good introduction to biology for non-science students.

2. BIO 103: General Biology II

The emphasis in this course is on analyzing the processes and mechanisms involved in biological systems including the cell, genetics, organisms and ecology/evolution. Topics are covered from an experimental point of view. This course, with BIO 101, provides a

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comprehensive survey of biological concepts and shows the interrelationship of topics covered from the molecular to the population level. This course is required for the Biology/Pre-medicine Program.

3. BIO 215: Introduction to Cell Physiology

Introduction to the chemistry and physiology of living cells, including cell metabolism, membrane permeability and excitability, movement and contractile elements, gene expression and protein synthesis. Properties common to all living things will be emphasized, as well as the importance of those properties in the human organism.

4. BIO 216: Cell Physiology Lab

This is a lab course designed to be taken concurrently with BIO 215, Introduction to Cell Physiology.

5. BIO 227: Zoology

Lecture, field, and laboratory investigation provide an intensive study of the classification, evolutionary relationship, structure, and function of the major animal groups. Included are the sponges, jellyfish, worms, mollusks, insects, arthropods, starfish and other echinoderms, fish, amphibians, reptiles, birds and mammals.

6. BIO 228: Botany

In this class, field and laboratory investigations provide detailed study of plant structure and function. It is for students with a general interest in plants or to provide a basis for further work in botany or other programs.

7. CEM 111: General Chemistry I

This course covers the major topics in chemistry. Laws of chemical combination, states of matter, atomic and molecular structure, bonding, and other basic principles are covered. It is for students in a professional or preprofessional curriculum.

8. CEM 122: General Chemistry II

This course covers four major topics in chemistry: kinetics, chemical thermodynamics, chemical equilibria, and electrochemistry. Laboratory work includes qualitative and quantitative analysis.

9. CEM 211: Organic Chemistry I

This course provides students with the background in nomenclature of organic chemistry, stereochemistry, the preparation and reactions of aliphatic and aromatic compounds. Students also practice the preparation and handling of organic compounds in the laboratory. This is the first course in a two-semester sequence.

10. CEM 222: Organic Chemistry II

This course provides a continued exploration of nomenclature, stereochemistry, preparations and reactions of organic compounds including spectroscopic analysis in the laboratory. Students apply the techniques used in CEM 211 to the synthesis and analysis of complex organic compounds. Laboratory work includes hands-on spectroscopic analysis (IR, GC, and NMR) of products and unknowns. This is the second course in a two semester sequence of organic chemistry.

11. CIS 238: PC Assembly Language

This is a first course in the PC assembly language. The organization of the 80x86 microprocessor is examined to aid in the study of the instruction set. Topics include various character/numeric conversions, twos and tens complement arithmetic. string and bit manipulation, the calling of assembly language routines from other assembly programs as well as from high level language programs, and the use and modification of DOS and BIOS interrupt routines.

12. COM 101: Fundamentals of Speaking

Instruction is provided in essential speaking and listening skills. Through the use of practical experience, students receive help in organization and delivery. The course attempts to relieve the stress the average person encounters when speaking in public. Students gain a heightened awareness of the relationship between speaker and audience.

13. CPS 171: Introduction to Programming with C++

This course is an introduction to programming with C++ language. Students should have basic experience using a computer but no prior programming is required. (Experienced programmers should consider CPS 290). Students learn about problem solving strategies, top-down program development and programming style. Topics include sequential, decision and iterative control structures, functions, basic data structures, and an introduction to classes. Students write and execute approximately eight C++ programs.

14. CPS 271: Object Features of C++

This course continues the study of C++ begun in CPS 171. (Experienced programmers should consider CPS 290.) Students learn the object-oriented features of the language. Topics include classes, constructors and destructors, operator overloading, pointers, dynamic allocation of memory, inheritance, polymorphism, file manipulation, templates, and exceptions.

15. CPS 272: Data Structures with C++

This is the third of a sequence of C++ courses, following CPS 171 and CPS 271. The course covers more advanced computer science features as implemented in C++. Topics include testing, verification and complexity of algorithms, recursion, advanced data structures, class libraries, and techniques for team design of large programs.

16. ENG 111: Composition I

This course focuses on developing skills in critical reading, logical thinking, and written composition (from paragraphs to expository essays and documented papers). Reading materials serve as a basis for papers and classroom discussions. Students write both in-class and outside themes frequently. Methods of organization and development are emphasized.

17. ENG 122: Composition II

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This course is a continuation of ENG 111 and further develops critical reading and logical thinking skills. Students will write argumentative essays using a variety of formats. The research paper is emphasized.

18. MTH 160: Basic Statistics

This course provides students with a general understanding of statistical concepts dealing with the processing and interpretation of numerical information. Topics covered include describing a numerical data set, central tendency, variability, probability distributions, inference, and hypothesis testing. This course transfers to many four-year institutions. A graphing calculator is required for this course. Consult the time schedule for current brand and model.

19. MTH 191: Calculus I

This is first-semester college calculus of one variable. Topics include limits, continuity, derivatives, applications of derivatives, elementary integration, and applications of integration. This course transfers to four-year institutions. A graphing calculator is required for this course. Consult the time schedule for current brand and model.

20. MTH 192: Calculus II

This is second-semester college calculus of one variable. Topics include the calculus of transcendental functions, techniques of integration, indeterminate forms and improper integrals, sequences and series, parametric equations and polar coordinates. This course transfers to four-year institutions. A graphing calculator is required for this course.

21. MTH 197: Linear Algebra

This is an introductory college course in linear algebra. Topics include linear systems of equations, properties of vectors and matrices, determinants, vector spaces, linear transformations, eigenvalues, and applications. This course transfers to four-year institutions. A graphing calculator is required for this course. Consult the time schedule for current brand and model.

22. MTH 293: Calculus III

This is the third-semester college calculus of more than one variable. Topics include geometry in the plane and in space, vector-valued functions, partial derivatives, multiple integrals, and an introduction to vector calculus. This course transfers to four-year institutions.

23. MTH 295: Differential Equations

This is a first college course in elementary differential equations. Topics include techniques for solving ordinary differential equations of order one, techniques for solving linear equations, applications, the Laplace transform, and solving linear systems of equations using eigenvalues. This course transfers to four-year institutions. A graphing calculator is required for this course. Consult the time schedule for current brand and model.

24. PHY 211: Analytical Physics I

The first of a two-course sequence in calculus-based physics for students intending to major in science or engineering, PHY 211 develops the concepts of mechanics, heat, and wave motion. Laboratory exercises are included to assist students' understanding of these topics.

25. PHY 222: Analytical Physics II

This second part of a two-course sequence in calculus-based physics covers the concepts of electromagnetism, light, and modern physics extending the student's knowledge of physics learned in PHY 211.

27. PLS 112: Introduction to American Government

This class studies the forms and functions of American government with emphasis on national government. The decision-making process in Congress, the Presidency and the federal court system are studied. The course also examines the relationship of political parties and public opinion to the electoral process. This course is also taught as a television course.

G. ANALYSIS OF AFFECTED INSTRUCTIONAL UNITS AND CORE CURRICULUM

All of the affected instructional units are in support of this program.

H. ARTICULATIONS

This program is considered a university parallel program and all the courses transfer to the four-year institutions. Students still need to consult with a transfer counselor or academic advisor to select elective courses for their program that are equivalent to the courses required by the college and major to which they will transfer. Transfer guides with specific course requirements and WCC equivalencies are available for most Michigan colleges and universities in the Transfer and Placement Center.

I. LICENSURE/ACCREDITATION (IF APPLICABLE)

ASSOCIATE IN SCIENCE DEGREE: Science and Math

General Requirement	ts (33-34 credits)* ENG 111&122 Composition I&II	7
Computers	CPS 171 Introduction to Programming with C++	4
Humanities ^{UM1}	Select one courses in arts and humanities (choose from the list on p. 60 in the WCC Catalog)	3
Mathematics	MTH 191 Calculus I MTH 192 Calculus II	5 4
Behavioral/ Social/Science	PLS 112 Introduction to American Government PSY 100 Introductory Psychology	3 3
Science	Choose either: BIO 101 Concepts of Biology or Physics 211 Analytical Physics I (Consider future course implications and prerequisites when making this selection.)	4- 5
Concentrali	The sequirements (29-33 Credits)	

Select a concentration in Biology and General Science Physics, Computer Science or Math. Please consult with an advisor prior to beginning these concentrations.

Biology &	The following courses are required: BIO 103,
Pre-Medicine:	215, 216, 227, and 228; CEM 111, 122, 211 and 222 / 20 00 25 (CEM 111, 122, 211
	and 222
Chemistry &	The following courses are required. CEM 111,
Pre-Medicine:	122, 211 and 222; MTH 197 and 295, and
	PHY 222. Students must select additional 4
	hours in chemistry
Dhualaat	The following courses are required: CEM 111,
Physics:	122 211 and 222 MTH 197, 293 and 295; and
	DLV 222 (29 (regets)
	PH1 222.
O	The following courses are required: CPS 271,
Computer Science.	272: CIS 238: MTH 197, 293; and PHY 222.
	Select an additional 6-8 credit hours in the
	humanities, social, and/or behavioral sciences(30-32)
	The following courses are required: MTH 160,
Math:	107 203 and 295 Choose either BIO 103 or
	nuy 222 Select an additional 12 credit hours in
	the humanities social and/or behavioral
• •	sciences
	.60
Minimum Credits	Required:

SCIENCE and MATH

to transfer to a This of 1 or university to 晋 eductor of science (BS) in the sciences. Foura graduates prepare for ny of jobs and ir studies emphasize mitytical, fic and critical nee graduates mists, chemists, laboratory ICIALS. inne

*If students are transferring to EMU or other Michigan universities, one option is to follow the MACRAO agreement. This agreement outlines a series of liberal arts courses that meet the general education requirements at various fouryear institutions. See p. 230 in the WCC Catalog and a counselor for additional information.

Except for the BGS degree, UM requires a minimum of 16 credit hours of one foreign language or fourth semester proficiency. Foreign language courses usually transfer in full year sequences only.