

# **Curriculum Articulation between the Engineering Science Program at Mercer County Community College and the School of Engineering Programs (Frist- & Second-Year) at Rutgers, The State University of New Jersey**

This curriculum articulation between Mercer County Community College (MCCC) and Rutgers, The State University of New Jersey connects students in MCCC's Associate Degree Program in Engineering Science to various undergraduate programs in the School of Engineering at Rutgers.

The successful implementation of the articulation depends upon communication of its contents to all involved participants, and assumptions of responsibility by both institutions for such communication. Periodic reviews and updates are essential.

MCCC's A.S. degree program in Engineering Science prepares students to transfer to a baccalaureate degree in Engineering. Students develop a strong foundation in mathematics, physics, and chemistry, with emphasis on engineering applications and use of the computer as a problem-solving tool. A strong general education curriculum helps students develop communication and analytical skills.

The B.Sc. degrees in Engineering at Rutgers prepare graduates to enter the modern day engineering profession. Students are trained to apply a broad knowledge of mathematics, science, analysis, and design to solving engineering problems. They are provided with opportunities to experience real-world engineering design and research challenges. The students are prepared for both post-graduate studies and careers in the industrial, government, or academia settings.

The attached guidelines provide course equivalencies for the following degree programs.

1. Applied Sciences in Engineering
2. Bioenvironmental Engineering
3. Biomedical Engineering
4. Chemical Engineering
5. Civil Engineering
6. Electrical and Computer Engineering
7. Industrial Engineering
8. Materials Science and Engineering
9. Mechanical Engineering

**Table A.1: Course Equivalency for Applied Sciences in Engineering**

Mercer County Community College			Rutgers University		
Course #	Title	C.H.	Course #	Title	C.H.
CHE 101	General Chemistry I	4	160:159 160:171	General Chemistry for Engineers Intro to Experimentation	4
CMN 112	Public Speaking	3	-	-	-
ENG 101	English Composition I	3	355:100	Basic Composition (General Elective)	3
MAT 151	Calculus I	4	640:151	Calculus I	4
PHY 115	University Physics I	4	750:123 750:124	Analytical Physics IA Analytical Physics IB	4
CHE 102	General Chemistry II	4	160:160	General Chemistry for Engineers	3
CIV 103	Statics	3	440:221	Engineering Mechanics: Statics	3
ENG 102	English Composition II	3	355:101	Expository Writing	3
MAT 152	Calculus II	4	640:152	Calculus II	4
PHY 215	University Physics II	4	750:227 750:229	Analytical Physics IIA Analytical Physics IIA Lab	4
ECO 112	Microeconomics	3	220:102	Microeconomics	3
MAT 251	Calculus III	4	640:251	Multivariable Calculus	4
PHY 225	University Physics III	4	750:228 750:230	Analytical Physics IIB Analytical Physics IIB Lab	4
MAT 252	Differential Equations	4	640:244	Differential Equations	4
COS 101	Introduction to Computer Science	4	-	-	-
-	-	-	440:127	Introduction to Computers for Engineers	3
-	2 Lower Level Humanity/Social Science Electives	6	-	2 Lower Level Humanity/Social Science Electives	6

**Table A.2: Course Equivalency for Bioenvironmental Engineering**

Mercer County Community College			Rutgers University		
Course #	Title	C.H.	Course #	Title	C.H.
CHE 101	General Chemistry I	4	160:159 160:171	General Chemistry for Engineers Intro to Experimentation	4
CMN 112	Public Speaking	3	-	-	-
ENG 101	English Composition I	3	355:100	Basic Composition (General Elective)	3
MAT 151	Calculus I	4	640:151	Calculus I	4
PHY 115	University Physics I	4	750:123 750:124	Analytical Physics IA Analytical Physics IB	4
CHE 102	General Chemistry II	4	160:160	General Chemistry for Engineers	3
CIV 103	Statics	3	440:221	Engineering Mechanics: Statics	3
ENG 102	English Composition II	3	355:101	Expository Writing	3
MAT 152	Calculus II	4	640:152	Calculus II	4
PHY 215	University Physics II	4	750:227 750:229	Analytical Physics IIA Analytical Physics IIA Lab	4
CIV 230	Mechanics of Solids	4	180:243	Mechanics of Solids	3
ECO 112	Microeconomics	3	220:102	Microeconomics	3
ENT 116	Engineering Graphics	2	180:215	Engineering Graphics	1
MAT 251	Calculus III	4	640:251	Multivariable Calculus	4
PHY 225	University Physics III	4	T14:Tec	Technical Elective	3
MAT 252	Differential Equations	4	640:244	Differential Equations	4
COS 101	Introduction to Computer Science	4	-	-	-
-	-	-	440:127	Introduction to Computers for Engineers	3
BIO 101	General Biology I	4	119:101	General Biology	4
-	-	-	440:222	Engineering Mechanics: Dynamics	3
-	-	-	375:203	Physics Prin. Envir. Sci.	3
-	-	-	332:373	Elem of Elec Engineering	3
-	2 Lower Level Humanity/Social Science Electives	6	-	2 Lower Level Humanity/Social Science Electives	6

**Table A.3: Course Equivalency for Biomedical Engineering**

Mercer County Community College			Rutgers University		
Course #	Title	C.H.	Course #	Title	C.H.
CHE 101	General Chemistry I	4	160:159 160:171	General Chemistry for Engineers Intro to Experimentation	4
CMN 112	Public Speaking	3	-	-	-
ENG 101	English Composition I	3	355:100	Basic Composition (General Elective)	3
MAT 151	Calculus I	4	640:151	Calculus I	4
PHY 115	University Physics I	4	750:123 750:124	Analytical Physics IA Analytical Physics IB	4
CHE 102	General Chemistry II	4	160:160	General Chemistry for Engineers	3
CIV 103	Statics	3	440:221	Engineering Mechanics: Statics	3
ENG 102	English Composition II	3	355:101	Expository Writing	3
MAT 152	Calculus II	4	640:152	Calculus II	4
PHY 215	University Physics II	4	750:227 750:229	Analytical Physics IIA Analytical Physics IIA Lab	4
ECO 112	Microeconomics	3	220:102	Microeconomics	3
MAT 251	Calculus III	4	640:251	Multivariable Calculus	4
PHY 225	University Physics III	4	750:228 750:230	Analytical Physics IIB Analytical Physics IIB Lab	4
MAT 252	Differential Equations	4	640:244	Differential Equations	4
COS 101	Introduction to Computer Science	4	-	-	-
-	-	-	440:127	Introduction to Computers for Engineers	3
BIO 101 BIO 102	General Biology I General Biology II (To obtain transfer credits, both Bio I & II have to be completed at MCCC)	4 4	119:101 119:102	General Biology I General Biology II (To obtain transfer credits, both Bio I & II have to be completed at MCCC)	4 4
-	-	-	125:201	Intro to Biomedical Engineering	3
-	-	-	125:208	Intro to Biomechanics	3
-	2 Lower Level Humanity/Social Science Electives	6	-	2 Lower Level Humanity/Social Science Electives	6

**Table A.4: Course Equivalency for Chemical Engineering**

Mercer County Community College			Rutgers University		
Course #	Title	C.H.	Course #	Title	C.H.
CHE 101	General Chemistry I	4	160:159 160:171	General Chemistry for Engineers Intro to Experimentation	4
CMN 112	Public Speaking	3	-	-	-
ENG 101	English Composition I	3	355:100	Basic Composition (General Elective)	3
MAT 151	Calculus I	4	640:151	Calculus I	4
PHY 115	University Physics I	4	750:123 750:124	Analytical Physics IA Analytical Physics IB	4
CHE 102	General Chemistry II	4	160:160	General Chemistry for Engineers	3
CIV 103	Statics	3	440:221	Engineering Mechanics: Statics	3
ENG 102	English Composition II	3	355:101	Expository Writing	3
MAT 152	Calculus II	4	640:152	Calculus II	4
PHY 215	University Physics II	4	750:227 750:229	Analytical Physics IIA Analytical Physics IIA Lab	4
ECO 112	Microeconomics	3	220:102	Microeconomics	3
MAT 251	Calculus III	4	640:251	Multivariable Calculus	4
PHY 225	University Physics III	4	T14:TEC	Technical Elective	3
MAT 252	Differential Equations	4	640:244	Differential Equations	4
COS 101	Introduction to Computer Science	4	-	-	-
CHE 201 CHE 202	Organic Chemistry I Organic Chemistry II (To obtain transfer credits, both Org. Chem. I & II have to be completed at MCCC)	5 5	160:307 160:308	Organic Chemistry I Organic Chemistry II (To obtain transfer credits, both Org. Chem. I & II have to be completed at MCCC)	4 4
-	-	-	440:127	Introduction to Computers for Engineers	3
-	-	-	155:201	Analysis I	3
-	-	-	155:208	Thermodynamics I	3
-	2 Lower Level Humanity/Social Science Electives	6	-	2 Lower Level Humanity/Social Science Electives	6

**Table A.5: Course Equivalency for Civil and Environmental Engineering**

Mercer County Community College			Rutgers University		
Course #	Title	C.H.	Course #	Title	C.H.
CHE 101	General Chemistry I	4	160:159 160:171	General Chemistry for Engineers Intro to Experimentation	4
CMN 112	Public Speaking	3	-	-	-
ENG 101	English Composition I	3	355:100	Basic Composition (General Elective)	3
MAT 151	Calculus I	4	640:151	Calculus I	4
PHY 115	University Physics I	4	750:123 750:124	Analytical Physics IA Analytical Physics IB	4
CHE 101	General Chemistry I	4	160:159 160:171	General Chemistry for Engineers Intro to Experimentation	4
CIV 103	Statics	3	440:221	Engineering Mechanics: Statics	3
ENG 102	English Composition II	3	355:101	Expository Writing	3
MAT 152	Calculus II	4	640:152	Calculus II	4
PHY 215	University Physics II	4	750:227 750:229	Analytical Physics IIA Analytical Physics IIA Lab	4
CIV 230	Mechanics of Solids	4	180:243	Mechanics of Solids	3
ECO 112	Microeconomics	3	220:102	Microeconomics	3
MAT 251	Calculus III	4	640:251	Multivariable Calculus	4
PHY 225	University Physics III	4	T14:TEC	Technical Elective	3
MAT 252	Differential Equations	4	640:244	Differential Equations	4
DRA 190	Introduction to C.A.D	2	-	-	-
COS 101	Introduction to Computer Sciences	4	-	-	-
-	-	-	440:222	Engineering Mechanics: Dynamics	3
-	-	-	440:127	Introduction to Computers for Engineers	3
-	-	-	180:216	Intro to CADD	3
-	2 Lower Level Humanity/Social Science Electives	6	-	2 Lower Level Humanity/Social Science Electives	6

**Table A.6: Course Equivalency for Electrical and Computer Engineering**

Mercer County Community College			Rutgers University		
Course #	Title	C.H.	Course #	Title	C.H.
CHE 101	General Chemistry I	4	160:159 160:171	General Chemistry for Engineers Intro to Experimentation	4
CMN 112	Public Speaking	3	-	-	-
ENG 101	English Composition I	3	355:100	Basic Composition (General Elective)	3
MAT 151	Calculus I	4	640:151	Calculus I	4
PHY 115	University Physics I	4	750:123 750:124	Analytical Physics IA Analytical Physics IB	4
CHE 102	General Chemistry II	4	160:160	Science, Math, Engineering Elective	3
CIV 103	Statics	3	440:221	Engineering Mechanics: Statics	3
ENG 102	English Composition II	3	355:101	Expository Writing	3
MAT 152	Calculus II	4	640:152	Calculus II	4
PHY 215	University Physics II	4	750:227 750:229	Analytical Physics IIA Analytical Physics IIA Lab	4
ECO 112	Microeconomics	3	220:102	Microeconomics	3
MAT 251	Calculus III	4	640:251	Multivariable Calculus	4
PHY 225	University Physics III	4	T14:TEC	Technical Elective	3
COS 101	Introduction to Computer Science	4	-	-	-
-	-	-	440:127	Introduction to Computers for Engineers	3
-	-	-	332:221 332:223	Principles of E.E. I Principles of E.E. II Lab	4
-	-	-	332:231 332:233	Digital Logic Design Digital Logic Design Lab	4
-	-	-	332:222 332:224	Principles of E.E. II Principles of E.E. II Lab	4
-	-	-	332:226	Probability & Random Processing	3
-	-	-	332:252 332:254	Programming Methodology Program. Method I Lab	4
MAT 252	Differential Equations	4	640:244	Differential Equations	4
-	2 Lower Level Humanity/Social Science Electives	6	-	2 Lower Level Humanity/Social Science Electives	6

**Table A.7: Course Equivalency for Industrial Engineering**

Mercer County Community College			Rutgers University		
Course #	Title	C.H.	Course #	Title	C.H.
CHE 101	General Chemistry I	4	160:159 160:171	General Chemistry for Engineers Intro to Experimentation	4
CMN 112	Public Speaking	3	-	-	-
ENG 101	English Composition I	3	355:100	Basic Composition (General Elective)	3
MAT 151	Calculus I	4	640:151	Calculus I	4
PHY 115	University Physics I	4	750:123 750:124	Analytical Physics IA Analytical Physics IB	4
CHE 102	General Chemistry II	4	160:160	General Chemistry for Engineers	3
CIV 103	Statics	3	440:221	Engineering Mechanics: Statics	3
ENG 102	English Composition II	3	355:101	Expository Writing	3
MAT 152	Calculus II	4	640:152	Calculus II	4
PHY 215	University Physics II	4	750:227 750:229	Analytical Physics IIA Analytical Physics IIA Lab	4
ENT 116	Engineering Graphics	2	-	-	-
ECO 112	Microeconomics	3	220:102	Microeconomics	3
MAT 251	Calculus III	4	640:251	Multivariable Calculus	4
PHY 225	University Physics III	4	750:228 750:230	Analytic Physics IIB Analytic Physics IIB Lab	4
COS 101	Introduction to Computer Science	4	-	-	-
MAT 252	Differential Equations	4	640:244	Differential Equations	4
-	-	-	440:127	Introduction to Computers for Engineers	3
CIV 230	Mechanics of Solids	4	180:243	Mechanics of Solids	3
-	-	-	540:201	Work Des and Ergo	3
-	-	-	540:202	Work Des Lab	1
-	-	-	540:213	IE Lab	1
-	-	-	440:222	Engineering Mechanic Dynamics	3
-	-	-	540:210	Engineering Probability	3
-	2 Lower Level Humanity/Social Science Electives	6	-	2 Lower Level Humanity/Social Science Electives	6



**Table A.8: Course Equivalency for Materials Science and Engineering**

Mercer County Community College			Rutgers University		
Course #	Title	C.H.	Course #	Title	C.H.
CHE 101	General Chemistry I	4	160:159 160:171	General Chemistry for Engineers Intro to Experimentation	4
CMN 112	Public Speaking	3	-	-	-
ENG 101	English Composition I	3	355:100	Basic Composition (General Elective)	3
MAT 151	Calculus I	4	640:151	Calculus I	4
PHY 115	University Physics I	4	750:123 750:124	Analytical Physics IA Analytical Physics IB	4
CHE 102	General Chemistry II	4	160:160	General Chemistry for Engineers	3
CIV 103	Statics	3	440:221	Engineering Mechanics: Statics	3
ENG 102	English Composition II	3	355:101	Expository Writing	3
MAT 152	Calculus II	4	640:152	Calculus II	4
PHY 215	University Physics II	4	750:227 750:229	Analytical Physics IIA Analytical Physics IIA Lab	4
CIV 230	Mechanics of Solids	4	635:314	Strength of Materials	3
ECO 112	Microeconomics	3	220:102	Microeconomics	3
MAT 251	Calculus III	4	640:251	Multivariable Calculus	4
PHY 225	University Physics III	4	T14:TEC	Technical Elective	3
MAT 252	Differential Equations	4	640:244	Differential Equations	4
COS 101	Introduction to Computer Science	4	-	-	-
-	-	-	440:127	Introduction to Computers for Engineers	3
-	-	-	960:211	Statistics	3
-	-	-	635:203	Intro to MSE	3
-	-	-	635:205	Crystal Chem and Structure	3
-	-	-	635:204	Materials Processing	3
-	-	-	635:206	Mat. Thermodynamics	4
-	-	-	635:212	Physics of Materials	3
-	-	-	635:252	Laboratory I	2
-	2 Lower Level Humanity/Social Science Electives	6	-	2 Lower Level Humanity/Social Science Electives	6

**Table A.9: Course Equivalency for Mechanical Engineering**

Mercer County Community College			Rutgers University		
Course #	Title	C.H.	Course #	Title	C.H.
CHE 101	General Chemistry I	4	160:159 160:171	General Chemistry for Engineers Intro to Experimentation	4
CMN 112	Public Speaking	3	-	-	-
ENG 101	English Composition I	3	355:100	Basic Composition (General Elective)	3
MAT 151	Calculus I	4	640:151	Calculus I	4
PHY 115	University Physics I	4	750:123 750:124	Analytical Physics IA Analytical Physics IB	4
CHE 102	General Chemistry II	4	160:160	General Chemistry for Engineers	3
CIV 103	Statics	3	440:221	Engineering Mechanics: Statics	3
ENG 102	English Composition II	3	355:101	Expository Writing	3
MAT 152	Calculus II	4	640:152	Calculus II	4
PHY 215	University Physics II	4	750:227 750:229	Analytical Physics IIA Analytical Physics IIA Lab	4
CIV 230	Mechanics of Solids	4	650:291	Intro. to Mechanics of Materials	3
ECO 112	Microeconomics	3	220:102	Microeconomics	3
DRA 190	Introduction to C.A.D	2	650:215	Computer Aided Drafting	1
MAT 251	Calculus III	4	640:251	Multivariable Calculus	4
PHY 225	University Physics III	4	750:228 750:230	Analytical Physics IIB Analytical Physics IIB Lab	4
MAT 252	Differential Equations	4	640:244	Differential Equations	4
COS 101	Introduction to Computer Science	4	-	-	-
-	-	-	440:127	Introduction to Computers for Engineers	3
-	-	-	440:222	Engineering Mechanics (Dynamics)	3
-	-	-	650:231	Computational Analysis & Design	3
-	-	-	332:373	Elem. of Electrical Engineering	3
-	-	-	332:375	Elem. Electrical Engineering Lab	1
-	2 Lower Level Humanity/Social Science Electives	6	-	2 Lower Level Humanity/Social Science Electives	6