

Cecil College Academic Program Review

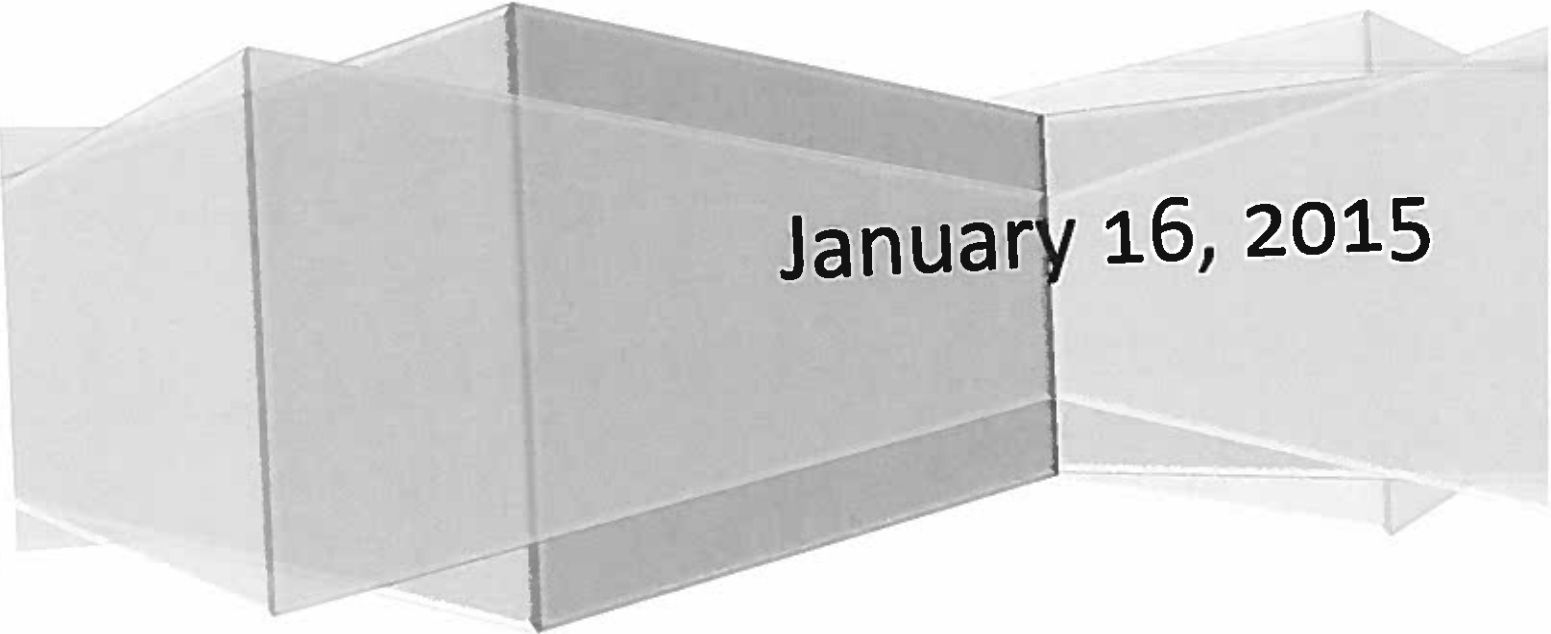


Engineering
Program
January 2015



Engineering Degree Program Review

- Aerospace Engineering
- Chemical Engineering
- Civil Engineering
- Computer Engineering
- Electrical Engineering
- Mechanical Engineering

An abstract graphic composed of several overlapping, semi-transparent 3D rectangular blocks. These blocks are arranged in a way that creates a sense of depth and perspective, with some blocks appearing to be in front of others. The blocks are light gray with darker gray outlines, and they are positioned in the lower half of the page, behind the date text.

January 16, 2015

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Executive Summary

During Spring 2006, the Department of Engineering and Physics, in conjunction with the faculty from other disciplines, developed the mission and the curriculum for Associate of Art and Science Transfer – Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, and Mechanical Engineering. This included the General Education Requirements, the Program Requirements and the Program Electives. The courses and the degree programs were approved by the Academic Affairs Committee and the Academic Senate in June 2006. In Fall 2014, the curricula for the engineering degree programs was revised to comply with Maryland Higher Education Commission (MHEC) regulations and Senate Bill SB740. All engineering degree programs at Cecil College were revised to Associate of Science degree. The engineering degree programs were reduced to 63-65 credit range based on the 60-credit exception rule granted to the engineering programs by MHEC. The college has an Articulation Agreement with the University of Delaware for the Civil Engineering option. The required courses listed in the curriculum are transferrable to all two year and four year institutions in Maryland and many other institutions across the US as full credit courses.

Student enrollment for the Associate of Science in Aerospace Engineering has been steady since 2009/10. 12 students were enrolled as Aerospace Engineering majors in FY 2013/14 compared to 10 students in FY 2009/10. Student enrollment for Associate of Science in Chemical Engineering has increased slightly compared to FY 2009/10. 9 students were enrolled as Chemical Engineering majors in FY 2013/14 compared to 6 students in FY 2009/10. Student enrollment for Associate of Science in Civil Engineering has almost doubled compared to 2009/10. 16 students were enrolled as Civil Engineering majors in FY 2009/10 whereas 31 students were enrolled in FY 2013/14. Student enrollment for Associate of Science in Computer Engineering has increased significantly compared to 2009/10. There were no students enrolled as Computer Engineering majors in FY 2009/10 and FY 2010/11 whereas FY 2013/14 had 13 students enrolled. Enrollment for Associate of Science in Electrical Engineering has increased steadily from 17 students in FY 2009/10 to 22 students in FY 2013/14. Enrollment for Associate of Science in Mechanical Engineering has also increased considerably from 25 students in FY 2009/10 to 39 students in FY 2013/14. Low enrollment of students in some courses though is a threat that the engineering programs could probably face. The department and the college need to promote the programs to attract more students and generate student interest in engineering.

The engineering department formed its first Engineering Advisory Board in Fall 2014. The Advisory Board had their first meeting on November 7, 2014. The Engineering Advisory Board includes members from academia as well as from the local industries.

The engineering department needs to work with the industries in the neighborhood by fostering its relations with these companies and integrating work experience into the curriculum. The curriculum for engineering students needs to be reviewed to incorporate internships. The

department also needs to hire more qualified adjuncts to teach engineering courses as this will reduce the workload of the full-time faculty and will also allow the full-time faculty to spend more time on professional development and stay up to date with recent developments in the field of engineering. This will offer students a diversified perspective on different engineering disciplines and allow them to make contacts with different personnel from academia and industry. The department also needs to hire qualified personnel for the machine shop in the new Engineering and Math building. The machine shop houses machines that would be dangerous for students to work with, if no guided supervision.

1.0 Program Description

Aerospace Engineering

The Associate of Science in Aerospace Engineering prepares students to transfer to a four-year institution for continued study in aerospace engineering. Aerospace engineers design, develop, and test aircraft, spacecraft, and missiles and supervise the manufacture of these products. They are concerned with the thermal, mechanical and propulsion requirements of high-speed vehicles and projectiles. Students with a bachelor's degree in aerospace engineering may continue their education in graduate school, while others may enter industry. The Associate of Science in Aerospace Engineering requires completion of 65 credits.

Chemical Engineering

The Associate of Science in Chemical Engineering program prepares students to transfer to a four-year institution for continued study in chemical engineering. Chemical engineers apply the principles of chemistry to solve problems involving the production or use of chemicals and biochemicals. They design equipment and processes for large-scale chemical manufacturing, plan and test methods of manufacturing products and treating byproducts, and supervise production. Students with a bachelor's degree in chemical engineering may continue their education in graduate school or may enter industry. The Associate of Science in Chemical Engineering requires completion of 64 credits.

Civil Engineering

The Associate of Science in Civil Engineering program prepares students to transfer to a four-year institution for civil engineering. Civil engineers design and supervise the construction of roads, buildings, airports, tunnels, dams, bridges, and water supply and sewage systems. They must consider many factors in the design process, from the construction costs and expected lifetime of a project to government regulations and potential environmental hazards such as earthquakes. Students with a bachelor's degree in civil engineering may continue their education in graduate school, while others may enter industry. The Associate of Science in Civil Engineering requires completion of 65 credits.

Computer Engineering

The Associate of Science in Computer Engineering program prepares students to transfer to a four-year institution for continued study in computer engineering. Computer Engineering is the field of study that combines computer science and electrical engineering. Computer engineers work in information technology and software development and function on multidisciplinary teams. Students with bachelor's degrees in computer engineering continue their education in graduate school or enter into the work force. The Associate of Science in Computer Engineering requires completion of 63 credits.

Electrical Engineering

The Associate of Science in Electrical Engineering program prepares students to transfer to a four-year institution for continued study in electrical engineering. Electrical Engineering is the branch of engineering that focuses on designing and analyzing components and systems that utilize electrons and photons. Electrical engineers also work in information technology and software development and function on multidisciplinary teams. Students with a bachelor's degree in electrical engineering continue their education in graduate school or enter industry. The Associate of Science in Electrical Engineering requires completion of 64 credits.

Mechanical Engineering

The Associate of Science in Mechanical Engineering program prepares students to transfer to a four-year institution for continued study in mechanical engineering. Mechanical engineering is one of the core engineering disciplines offering students a wide range of career choices in engineering practice and scientific research as well as non-engineering fields such as business, law or medicine. Students with a bachelor's degree in mechanical engineering may continue their education in graduate school or may enter industry. The Associate of Science in Mechanical Engineering requires completion of 65 credits.

1.1 Program History

During Spring 2006, the Department of Engineering and Physics, in conjunction with the faculty from other disciplines, developed the mission and the curriculum for Associate of Art and Science Transfer – Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering, and Mechanical Engineering. This included the General Education Requirements, the Program Requirements and the Program Electives. The faculty also developed the following courses for these degree programs:

- PHE 211 – Statics
- PHE 212 – Dynamics
- PHE 213 – Mechanics of Materials
- PHE 221 – Thermodynamics
- PHE 225 – Digital Electronics and Instrumentation with Lab
- PHE 285 – Principles of Electric Circuits with Lab

The courses and the degree programs were approved by the Academic Affairs Committee and the Academic Senate in June 2006.

In Fall 2014, the curricula for the engineering degree programs was revised to comply with Maryland Higher Education Commission (MHEC) regulations and Senate Bill SB740. All engineering degree programs at Cecil College were revised to Associate of Science degree. The engineering degree programs were reduced to 63-65 credit range based on the 60-credit

exception rule granted to the engineering programs by MHEC. The faculty also developed the following course for these degree programs:

PHE 101 – Introduction to Engineering Design

1.2 Faculty Profile

Faculty members teaching the mandatory courses required for each discipline:

Aerospace Engineering

Faculty Name	Credentials	Courses Taught
Anand Patel	M.S. B.S.	PHE 101, 211, 212, 213 and 221
Gail Wyant	M.S. B.S.	PHY 217 and 218
Veronica Dougherty	PhD M.S. B.S.	CHM 103, 104, 113 and 114
Kim Sheppard	M.S. B.S.	MAT 121, 201, 202, 203 and 246
Susan Bernadzikowski	M.A. B.A.	EGL 101 and 102

Chemical Engineering

Faculty Name	Credentials	Courses Taught
Anand Patel	M.S. B.S.	PHE 101 and 211
Gail Wyant	M.S. B.S.	PHY 217 and 218
Veronica Dougherty	PhD M.S. B.S.	CHM 103, 104, 113, 114, 203 and 204
Kim Sheppard	M.S. B.S.	MAT 121, 201, 202, 203 and 246
Susan Bernadzikowski	M.A. B.A.	EGL 101 and 102

Civil Engineering

Faculty Name	Credentials	Courses Taught
Anand Patel	M.S. B.S.	PHE 101, 211, 212, 213 and 221
Gail Wyant	M.S.	PHY 217 and 218

Veronica Dougherty	B.S. PhD M.S. B.S.	CHM 103, 104, 113 and 114
Kim Sheppard	M.S. B.S.	MAT 121, 201, 202, 203 and 246
Susan Bernadzikowski	M.A. B.A.	EGL 101 and 102

Computer Engineering

Faculty Name	Credentials	Courses Taught
Anand Patel	M.S. B.S.	PHE 101
Gail Wyant	M.S. B.S.	PHY 217 and 218
Patrick Wyant	PhD M.S. B.S.	PHE 225 and 285
Ahmed Tarek	PhD M.Engg. B.S.	CSC 205
Edward Boas Jr.	Ed.D C.A.G.S. M.Ed. B.S.	CSC 205
Kim Sheppard	M.S. B.S.	MAT 121, 201, 202, 203, 236, 240 and 246
Susan Bernadzikowski	M.A. B.A.	EGL 101 and 102

Electrical Engineering

Faculty Name	Credentials	Courses Taught
Anand Patel	M.S. B.S.	PHE 101
Gail Wyant	M.S. B.S.	PHY 217, 218 and 219
Patrick Wyant	PhD M.S. B.S.	PHE 225 and 285
Ahmed Tarek	PhD M.Engg. B.S.	CSC 205
Edward Boas Jr.	Ed.D	CSC 205

	C.A.G.S. M.Ed. B.S.	
Kim Sheppard	M.S. B.S.	MAT 121, 201, 202, 203, 240 and 246
Susan Bernadzikowski	M.A. B.A.	EGL 101 and 102

Mechanical Engineering

Faculty Name	Credentials	Courses Taught
Anand Patel	M.S. B.S.	PHE 101, 211, 212, 213 and 221
Gail Wyant	M.S. B.S.	PHY 217 and 218
Veronica Dougherty	PhD M.S. B.S.	CHM 103, 104, 113 and 114
Kim Sheppard	M.S. B.S.	MAT 121, 201, 202, 203 and 246
Susan Bernadzikowski	M.A. B.A.	EGL 101 and 102

1.3 Program Curriculum

In Fall 2014, the curricula for the engineering degree programs was revised to comply with Maryland Higher Education Commission (MHEC) regulations and Senate Bill SB740. All engineering degree programs at Cecil College were revised to Associate of Science degree. The engineering degree programs were reduced to 63-65 credit range based on the 60-credit exception rule granted to the engineering programs by MHEC.

The following are the courses associated with each discipline:

Aerospace Engineering

	General Education Requirements	General Education Code	Credits
ARTS/HUM	Arts and Humanities Elective ¹	H	3
EGL 101	Freshman Composition	E	3
EGL 102	Composition and Literature	H	3
MAT 121	Precalculus ²	M	4
MAT 201	Calculus I with Analytic Geometry	M	4

PHY 217	General Physics I with Lab	SL	4
PHY 218	General Physics II with Lab	SL	4
SOC SCI	Social Science Electives ³	SS	6
Program Requirements			
PHE 101	Introduction to Engineering Design		3
PHE 211	Statics		3
PHE 212	Dynamics		3
PHE 213	Mechanics of Materials		3
PHE 221	Thermodynamics		3
MAT 202	Calculus II with Analytic Geometry	M	4
MAT 203	Multivariable Calculus	M	4
MAT 246	Introduction to Differential Equations	M	3
CHM 103	General Chemistry I	S	3
CHM 113	General Chemistry I Lab		1
CHM 104	General Chemistry II	S	3
CHM 114	General Chemistry II Lab		1
Total Credits Required in Program:			65

¹Selection may not include EGL designation

²Students placed in MAT 201 or higher Math may replace MAT 121 with MAT, PHY, PHE, CSC or CHM elective(s) – **students must satisfy the four credit requirement**

³Courses must be from two different disciplines

Chemical Engineering

	General Education Requirements	General Education Code	Credits
ARTS/HUM	Arts and Humanities Elective ¹	H	3
EGL 101	Freshman Composition	E	3
EGL 102	Composition and Literature	H	3
MAT 121	Precalculus ²	M	4
MAT 201	Calculus I with Analytic Geometry	M	4
PHY 217	General Physics I with Lab	SL	4
PHY 218	General Physics II with Lab	SL	4
SOC SCI	Social Science Electives ³	SS	6
Program Requirements			
PHE 101	Introduction to Engineering Design		3
PHE 211	Statics		3
CHM 103	General Chemistry I	S	3
CHM 113	General Chemistry I Lab		1
CHM 104	General Chemistry II	S	3
CHM 114	General Chemistry II Lab		1
CHM 203	Organic Chemistry I with Lab		4
CHM 204	Organic Chemistry II with Lab		4
MAT 202	Calculus II with Analytic Geometry	M	4
MAT 203	Multivariable Calculus	M	4
MAT 246	Introduction to Differential Equations	M	3

Total Credits Required in Program:¹Selection may not include EGL designation²Students placed in MAT 201 or higher Math may replace MAT 121 with MAT, PHY, PHE, CSC or CHM elective(s) **students must satisfy the four credit requirement**³Courses must be from two different disciplines**Civil Engineering**

	<i>General Education Requirements</i>	<i>General Education Code</i>	<i>Credits</i>
ARTS/HUM	Arts and Humanities Elective ¹	H	3
EGL 101	Freshman Composition	E	3
EGL 102	Composition and Literature	H	3
MAT 121	Precalculus ²	M	4
MAT 201	Calculus I with Analytic Geometry	M	4
PHY 217	General Physics I with Lab	SL	4
PHY 218	General Physics II with Lab	SL	4
SOC SCI	Social Science Electives ³	SS	6
<i>Program Requirements</i>			
PHE 101	Introduction to Engineering Design		3
PHE 211	Statics		3
PHE 212	Dynamics		3
PHE 213	Mechanics of Materials		3
PHE 221	Thermodynamics		3
MAT 202	Calculus II with Analytic Geometry	M	4
MAT 203	Multivariable Calculus	M	4
MAT 246	Introduction to Differential Equations	M	3
CHM 103	General Chemistry I	S	3
CHM 113	General Chemistry I Lab		1
CHM 104	General Chemistry II	S	3
CHM 114	General Chemistry II Lab		1
			65

Total Credits Required in Program:¹Selection may not include EGL designation²Students placed in MAT 201 or higher Math may replace MAT 121 with MAT, PHY, PHE, CSC or CHM elective(s) **students must satisfy the four credit requirement**³Courses must be from two different disciplines**Computer Engineering**

	<i>General Education Requirements</i>	<i>General Education Code</i>	<i>Credits</i>
ARTS/HUM	Arts and Humanities Elective ¹	H	3
EGL 101	Freshman Composition	E	3
EGL 102	Composition and Literature	H	3
MAT 121	Precalculus ²	M	4
MAT 201	Calculus I with Analytic Geometry	M	4
PHY 217	General Physics I with Lab	SL	4

PHY 218	General Physics II with Lab	SL	4
SOC SCI	Social Science Electives ³	SS	6
Program Requirements			
PHE 101	Introduction to Engineering Design		3
PHE 225	Electronics and Instrumentation		4
PHE 285	Principles of Electric Circuits		4
CSC 205	Computer Science I		3
MAT 202	Calculus II with Analytic Geometry	M	4
MAT 203	Multivariable Calculus	M	4
MAT 236	Discrete Structures	M	3
MAT 240	Introduction to Linear Algebra	M	4
MAT 246	Introduction to Differential Equations	M	3
Total Credits Required in Program:			63

¹Selection may not include EGL designation

²Students placed in MAT 201 or higher Math may replace MAT 121 with MAT, PHY, PHE, CSC or CHM elective(s) **students must satisfy the four credit requirement**

³Courses must be from two different disciplines

Electrical Engineering

	General Education Requirements	General Education Code	Credits
ARTS/HUM	Arts and Humanities Elective ¹	H	3
EGL 101	Freshman Composition	E	3
EGL 102	Composition and Literature	H	3
MAT 121	Precalculus ²	M	4
MAT 201	Calculus I with Analytic Geometry	M	4
PHY 217	General Physics I with Lab	SL	4
PHY 218	General Physics II with Lab	SL	4
SOC SCI	Social Science Electives ³	SS	6
Program Requirements			
PHE 101	Introduction to Engineering Design		3
PHE 225	Electronics and Instrumentation		4
PHE 285	Principles of Electric Circuits		4
PHY 219	General Physics III with Lab	SL	4
CSC 205	Computer Science I		3
MAT 202	Calculus II with Analytic Geometry	M	4
MAT 203	Multivariable Calculus	M	4
MAT 240	Introduction to Linear Algebra	M	4
MAT 246	Introduction to Differential Equations	M	3
Total Credits Required in Program:			64

¹Selection may not include EGL designation

²Students placed in MAT 201 or higher Math may replace MAT 121 with MAT, PHY, PHE, CSC or CHM elective(s) **students must satisfy the four credit requirement**

³Courses must be from two different disciplines

Mechanical Engineering

	<i>General Education Requirements</i>	<i>General Education Code</i>	<i>Credits</i>
ARTS/HUM	Arts and Humanities Elective ¹	H	3
EGL 101	Freshman Composition	E	3
EGL 102	Composition and Literature	H	3
MAT 121	Precalculus ²	M	4
MAT 201	Calculus I with Analytic Geometry	M	4
PHY 217	General Physics I with Lab	SL	4
PHY 218	General Physics II with Lab	SL	4
SOC SCI	Social Science Electives ³	SS	6
<i>Program Requirements</i>			
PHE 101	Introduction to Engineering Design		3
PHE 211	Statics		3
PHE 212	Dynamics		3
PHE 213	Mechanics of Materials		3
PHE 221	Thermodynamics		3
MAT 202	Calculus II with Analytic Geometry	M	4
MAT 203	Multivariable Calculus	M	4
MAT 246	Introduction to Differential Equations	M	3
CHM 103	General Chemistry I	S	3
CHM 113	General Chemistry I Lab		1
CHM 104	General Chemistry II	S	3
CHM 114	General Chemistry II Lab		1
			65

Total Credits Required in Program:

¹Selection may not include EGL designation

²Students placed in MAT 201 or higher Math may replace MAT 121 with MAT, PHY, PHE, CSC or CHM elective(s) **students must satisfy the four credit requirement**

³Courses must be from two different disciplines

2.0 Statistical Data

2.1 Completion Rates (Course Level)

The completion rates for the required courses are provided below. Completion for courses mentioned below is defined as a grade of D or better in the course.

PHE 200	Passed	Total	Completion Rate
FY 2009-2010	20	32	63%
FY 2010-2011	14	24	58%
FY 2011-2012	15	21	71%
FY 2012-2013	17	28	61%
FY 2013-	17	32	53%

PHE 213	Passed	Total	Completion Rate
FY 2009-2010	0	0	0%
FY 2010-2011	6	7	86%
FY 2011-2012	4	4	100%
FY 2012-2013	5	6	83%
FY 2013-	6	8	75%

2014			
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PHE 201	Passed	Total	Completion Rate
FY 2009-2010	8	10	80%
FY 2010-2011	5	13	38%
FY 2011-2012	12	14	86%
FY 2012-2013	15	25	60%
FY 2013-2014	14	20	70%

PHE 211	Passed	Total	Completion Rate
FY 2009-2010	13	14	93%
FY 2010-2011	4	8	50%
FY 2011-2012	9	9	100%
FY 2012-2013	9	14	64%
FY 2013-2014	11	11	100%

PHE 212	Passed	Total	Completion Rate
FY 2009-2010	0	0	0%
FY 2010-2011	5	7	71%
FY 2011-2012	5	5	100%
FY 2012-2013	5	7	71%
FY 2013-2014	2	3	67%

2014			
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PHE 221	Passed	Total	Completion Rate
FY 2009-2010	0	0	0%
FY 2010-2011	7	9	78%
FY 2011-2012	5	8	63%
FY 2012-2013	6	6	100%
FY 2013-2014	9	11	82%

PHE 225	Passed	Total	Completion Rate
FY 2009-2010	2	2	100%
FY 2010-2011	3	5	60%
FY 2011-2012	3	3	100%
FY 2012-2013	3	3	100%
FY 2013-2014	0	3	0%

PHE 285	Passed	Total	Completion Rate
FY 2009-2010	0	0	0%
FY 2010-2011	0	0	0%
FY 2011-2012	1	2	50%
FY 2012-2013	0	1	0%
FY 2013-2014	4	7	57%

2.2 Statistical Data (Program Level)

Aerospace Engineering

Student enrollment for the Associate of Science in Aerospace Engineering has been steady since 2009/10. 12 students were enrolled as Aerospace Engineering majors in FY 2013/14 compared to 10 students in FY 2009/10.

		Total Enrollment	Full-Time	% of Total	Part-Time	% of Total
<u>FY 2009/2010</u>	Summer 2009	5	0	0%	5	100%
	Fall 2009	7	6	86%	1	14%
	Spring 2010	10	8	80%	2	20%
<u>FY 2010/2011</u>	Summer 2010	4	1	25%	3	75%
	Fall 2010	11	7	64%	4	36%
	Spring 2011	7	3	43%	4	57%
<u>FY 2011/2012</u>	Summer 2011	3	0	0%	3	100%
	Fall 2011	12	7	58%	5	42%
	Spring 2012	13	7	54%	6	46%
<u>FY 2012/2013</u>	Summer 2012	1	0	0%	1	100%
	Fall 2012	11	9	82%	2	18%
	Spring 2013	9	7	78%	2	22%
<u>FY 2013/2014</u>	Summer 2013	4	0	0%	4	100%
	Fall 2013	10	3	30%	7	70%
	Spring 2014	9	2	22%	7	78%

Students by Gender

The data indicates that the majority (more than 88%) of Aerospace Engineering majors are male students. The department needs to promote female students in engineering and also needs to conduct recruiting events to get female students interested in the field of engineering.

	Total Enrollment	Female Student	% of Total	Male Students	% of Total
FY 2009/2010	10	0	0%	10	100%
FY 2010/2011	13	1	8%	12	92%
FY 2011/2012	17	2	12%	15	88%
FY 2012/2013	12	0	0%	12	100%

FY2013/2014	12	1	8%	11	92%
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Students by Ethnicity

The data indicates that the majority (more than 50%) of Aerospace Engineering majors are white students. The department needs to promote minority in engineering.

	Total Enrollment	African-American	American Indian	Asian	Hispanic	White	Unknown
FY 2009/2010	10	2	0	1	0	5	2
FY 2010/2011	13	2	0	1	1	8	1
FY 2011/2012	17	2	0	1	0	13	1
FY2012/2013	12	3	0	1	0	8	0
FY2013/2014	12	1	1	0	0	10	0

Students by Age

The data indicates that majority (more than 90%) of the Aerospace Engineering majors are high school graduates (under 25 years old).

	Total Enrollment	Less Than 25	26-30	31-40	41-50	51 and over
FY 2009/2010	10	9	0	0	1	0
FY 2010/2011	13	12	0	0	1	0
FY 2011/2012	17	16	0	0	0	1
FY2012/2013	12	12	0	0	0	0
FY2013/2014	12	11	0	1	0	0

Number of Degrees Awarded (including Pell Recipients)

The data indicates that less than 50% of the full-time enrolled students are graduating with a degree in Aerospace Engineering. The department needs to come up with a plan that focuses on completion and encourages students to graduate with an Associate of Science degree from Cecil College before transferring to a 4-year school or entering the workforce.

Total	Pell
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	Degrees	Recipients
FY 2009/2010	0	0
FY 2010/2011	0	0
FY 2011/2012	2	1
FY2012/2013	0	0
FY2013/2014	3	0
Total	5	1

Chemical Engineering

Student enrollment for Associate of Science in Chemical Engineering has increased slightly compared to FY 2009/10. 9 students were enrolled as Chemical Engineering majors in FY 2013/14 compared to 6 students in FY 2009/10.

Enrollment History

		Total Enrollment	Full-Time	% of Total	Part-Time	% of Total
<u>FY 2009/2010</u>	Summer 2009	0	0	0%	0	0%
	Fall 2009	6	1	17%	5	83%
	Spring 2010	4	0	0%	4	100%
<u>FY 2010/2011</u>	Summer 2010	1	1	100%	0	0%
	Fall 2010	6	1	17%	5	83%
	Spring 2011	5	2	40%	3	60%
<u>FY 2011/2012</u>	Summer 2011	2	2	100%	0	0%
	Fall 2011	5	4	80%	1	20%
	Spring 2012	6	4	67%	2	33%
<u>FY 2012/2013</u>	Summer 2012	2	2	100%	0	0%
	Fall 2012	8	6	75%	2	25%
	Spring 2013	7	6	86%	1	14%
<u>FY 2013/2014</u>	Summer 2013	2	2	100%	0	0%
	Fall 2013	4	2	50%	2	50%
	Spring 2014	7	5	71%	2	29%

Students by Gender

The data indicates that the majority (more than 50%) of Chemical Engineering majors are male students. The department needs to promote female students in engineering and also

needs to conduct recruiting events to get female students interested in the field of engineering.

	Total Enrollment	Female Student	Male Students
FY 2009/2010	6	1	5
FY 2010/2011	6	3	3
FY 2011/2012	7	3	4
FY2012/2013	10	4	6
FY2013/2014	9	1	8

Students by Ethnicity

The data indicates that the majority (more than 71%) of Chemical Engineering majors are white students. The department needs to promote minority in engineering.

	Total Enrollment	African-American	American Indian	Asian	Hispanic	White	Unknown
FY 2009/2010	6	1	0	0	0	4	1
FY 2010/2011	6	0	0	0	0	5	1
FY 2011/2012	7	1	0	0	0	5	1
FY2012/2013	10	2	0	0	0	8	0
FY2013/2014	9	0	0	0	1	7	1

Students by Age

The data indicates that majority (more than 57%) of the Chemical Engineering majors are high school graduates (under 25 years old).

	Total Enrollment	Less Than 25	26-30	31-40	41-50	51 and over
FY 2009/2010	6	6	0	0	0	0
FY 2010/2011	6	5	1	0	0	0
FY	7	4	1	1	1	0

2011/2012						
FY2012/2013	10	8	1	0	1	0
FY2013/2014	9	6	1	1	1	0

Number of Degrees Awarded (including Pell Recipients)

The data indicates that less than 25% of the full-time enrolled students are graduating with a degree in Chemical Engineering. The department needs to come up with a plan that focuses on completion and encourages students to graduate with an Associate of Science degree from Cecil College before transferring to a 4-year school or entering the workforce.

	Total Degrees	Pell Recipients
FY 2009/2010	0	0
FY 2010/2011	0	0
FY 2011/2012	0	0
FY2012/2013	2	0
FY2013/2014	0	0
Total	2	0

Civil Engineering

Student enrollment for Associate of Science in Civil Engineering has almost doubled compared to 2009/10. 16 students were enrolled as Civil Engineering majors in FY 2009/10 whereas 31 students were enrolled in FY 2013/14.

Enrollment History

		Total Enrollment	Full-Time	% of Total	Part-Time	% of Total
<u>FY 2009/2010</u>	Summer 2009	4	0	0%	4	100%
	Fall 2009	13	6	46%	7	54%
	Spring 2010	12	7	58%	5	42%
<u>FY 2010/2011</u>	Summer 2010	3	0	0%	3	100%
	Fall 2010	14	8	57%	6	43%
	Spring 2011	6	3	50%	3	50%
<u>FY 2011/2012</u>	Summer 2011	4	1	25%	3	75%
	Fall 2011	13	10	77%	3	23%
	Spring 2012	13	9	69%	4	31%

<u>FY 2012/2013</u>	Summer 2012	6	0	0%	6	100%
	Fall 2012	17	14	82%	3	18%
	Spring 2013	17	10	59%	7	41%
<u>FY 2013/2014</u>	Summer 2013	8	0	0%	8	100%
	Fall 2013	27	19	70%	8	30%
	Spring 2014	21	14	67%	7	33%

Students by Gender

The data indicates that the majority (more than 91%) of Civil Engineering majors are male students. The department needs to promote female students in engineering and also needs to conduct recruiting events to get female students interested in the field of engineering

	Total Enrollment	Female Student	Male Students
FY 2009/2010	16	1	15
FY 2010/2011	15	0	15
FY 2011/2012	18	0	18
FY2012/2013	23	2	21
FY2013/2014	31	2	29

Students by Ethnicity

The data indicates that the majority (more than 73%) of Civil Engineering majors are white students. The department needs to promote minority in engineering.

	Total Enrollment	African-American	American Indian	Asian	Hispanic	White	Two or more races	Unknown
FY 2009/2010	16	1	0	0	0	14	0	1
FY 2010/2011	15	3	0	0	0	11	0	1
FY 2011/2012	18	2	0	1	0	14	0	1
FY2012/2013	23	1	0	0	1	19	2	0

FY2013/2014	31	2	0	1	1	25	2	0
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Students by Age

The data indicates that majority (more than 80%) of the Chemical Engineering majors are high school graduates (under 25 years old).

	Total Enrollment	Less Than 25	26-30	31-40	41-50	51 and over
FY 2009/2010	16	13	1	2	0	0
FY 2010/2011	15	12	0	1	1	1
FY 2011/2012	18	16	1	0	1	0
FY2012/2013	23	22	0	0	0	1
FY2013/2014	31	30	0	0	0	1

Number of Degrees Awarded (including Pell Recipients)

The data indicates that less than 30% of the full-time enrolled students are graduating with a degree in Civil Engineering. The department needs to come up with a plan that focuses on completion and encourages students to graduate with an Associate of Science degree from Cecil College before transferring to a 4-year school or entering the workforce.

	Total Degrees	Pell Recipients
FY 2009/2010	0	0
FY 2010/2011	0	0
FY 2011/2012	3	1
FY2012/2013	0	0
FY2013/2014	3	0
Total	6	1

Computer Engineering

Student enrollment for Associate of Science in Computer Engineering has increased significantly compared to 2009/10. There were no students enrolled as Computer Engineering majors in FY 2009/10 and FY 2010/11 whereas FY 2013/14 had 13 students enrolled.

Enrollment History

		Total Enrollment	Full-Time	% of Total	Part-Time	% of Total
<u>FY 2009/2010</u>	Summer 2009	0	0	0%	0	0%
	Fall 2009	0	0	0%	0	0%
	Spring 2010	0	0	0%	0	0%
<u>FY 2010/2011</u>	Summer 2010	0	0	0%	0	0%
	Fall 2010	0	0	0%	0	0%
	Spring 2011	0	0	0%	0	0%
<u>FY 2011/2012</u>	Summer 2011	1	0	0%	1	100%
	Fall 2011	1	1	100%	0	0%
	Spring 2012	1	1	100%	0	0%
<u>FY 2012/2013</u>	Summer 2012	1	1	100%	0	0%
	Fall 2012	7	4	57%	3	43%
	Spring 2013	9	5	56%	4	44%
<u>FY 2013/2014</u>	Summer 2013	1	0	0%	1	100%
	Fall 2013	10	8	80%	2	20%
	Spring 2014	11	5	45%	6	55%

Students by Gender

The data indicates that the majority (more than 92%) of Computer Engineering majors are male students. The department needs to promote female students in engineering and also needs to conduct recruiting events to get female students interested in the field of engineering.

	Total Enrollment	Female Student	Male Students
FY 2009/2010	0	0	0
FY 2010/2011	0	0	0
FY 2011/2012	1	0	1
FY 2012/2013	10	0	10
FY 2013/2014	13	1	12

Students by Ethnicity

The data indicates that the majority (more than 90%) of Computer Engineering majors are white students. The department needs to promote minority in engineering.

	Total Enrollment	African-American	American Indian	Asian	Hispanic	Pacific Islander	White	Two or more races	Unknown
FY 2009/2010	0	0	0	0	0	0	0	0	0
FY 2010/2011	0	0	0	0	0	0	0	0	0
FY 2011/2012	1	0	0	0	0	0	1	0	0
FY2012/2013	10	0	0	1	0	0	9	0	0
FY2013/2014	13	0	0	0	1	0	12	0	0

Students by Age

The data indicates that majority (more than 90%) of the Computer Engineering majors are high school graduates (under 25 years old).

	Total Enrollment	Less Than 25	26-30	31-40	41-50	51 and over
FY 2009/2010	0	0	0	0	0	0
FY 2010/2011	0	0	0	0	0	0
FY 2011/2012	1	1	0	0	0	0
FY2012/2013	10	9	0	1	0	0
FY2013/2014	13	13	0	0	0	0

Number of Degrees Awarded (including Pell Recipients)

The data indicates that none of the full-time enrolled students are graduating with a degree in Computer Engineering. The department needs to come up with a plan that focuses on completion and encourages students to graduate with an Associate of Science degree from Cecil College before transferring to a 4-year school or entering the workforce.

Total	Pell
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	Degrees	Recipients
FY 2009/2010	0	0
FY 2010/2011	0	0
FY 2011/2012	0	0
FY2012/2013	0	0
FY2013/2014	0	0
Total	0	0

Electrical Engineering

Enrollment for Associate of Science in Electrical Engineering has increased steadily from 17 students in FY 2009/10 to 22 students in FY 2013/14.

Enrollment History

		Total Enrollment	Full-Time	% of Total	Part-Time	% of Total
<u>FY 2009/2010</u>	Summer 2009	5	0	0%	5	100%
	Fall 2009	13	8	62%	5	38%
	Spring 2010	11	7	64%	4	36%
<u>FY 2010/2011</u>	Summer 2010	2	1	50%	1	50%
	Fall 2010	15	8	53%	7	47%
	Spring 2011	13	3	23%	10	77%
<u>FY 2011/2012</u>	Summer 2011	4	0	0%	4	100%
	Fall 2011	20	7	35%	13	65%
	Spring 2012	20	8	40%	12	60%
<u>FY 2012/2013</u>	Summer 2012	12	1	8%	11	92%
	Fall 2012	22	11	50%	11	50%
	Spring 2013	19	9	47%	10	53%
<u>FY 2013/2014</u>	Summer 2013	8	1	13%	7	88%
	Fall 2013	18	12	67%	6	33%
	Spring 2014	15	9	60%	6	40%

Students by Gender

The data indicates that the majority (more than 87%) of Electrical Engineering majors are male students. The department needs to promote female students in engineering and also

needs to conduct recruiting events to get female students interested in the field of engineering.

	Total Enrollment	Female Student	Male Students
FY 2009/2010	17	2	15
FY 2010/2011	15	2	13
FY 2011/2012	24	3	21
FY2012/2013	28	2	26
FY2013/2014	22	1	21

Students by Ethnicity

The data indicates that the majority (more than 75%) of Electrical Engineering majors are white students. The department needs to promote minority in engineering.

	Total Enrollment	African-American	American Indian	Asian	Hispanic	Pacific Islander	White	Two or more races	Unknown
FY 2009/2010	17	0	0	0	1	0	15	0	1
FY 2010/2011	15	0	0	0	0	0	14	0	1
FY 2011/2012	24	1	0	0	0	0	21	1	1
FY2012/2013	28	3	0	1	1	0	21	1	1
FY2013/2014	22	1	0	1	1	0	17	1	1

Students by Age

The data indicates that majority (more than 53%) of the Electrical Engineering majors are high school graduates (under 25 years old).

	Total Enrollment	Less Than 25	26-30	31-40	41-50	51 and over
FY 2009/2010	17	11	2	3	1	0
FY 2010/2011	15	8	5	2	0	0

FY 2011/2012	24	14	6	4	0	0
FY2012/2013	28	19	5	3	0	1
FY2013/2014	22	16	2	2	2	0

Number of Degrees Awarded (including Pell Recipients)

The data indicates that less than 17% of the full-time enrolled students are graduating with a degree in Electrical Engineering. The department needs to come up with a plan that focuses on completion and encourages students to graduate with an Associate of Science degree from Cecil College before transferring to a 4-year school or entering the workforce.

	Total Degrees	Pell Recipients
FY 2009/2010	2	1
FY 2010/2011	0	0
FY 2011/2012	1	0
FY2012/2013	2	0
FY2013/2014	0	0
Total	5	1

Mechanical Engineering

Enrollment for Associate of Science in Mechanical Engineering has also increased considerably from 25 students in FY 2009/10 to 39 students in FY 2013/14.

Enrollment History

		Total Enrollment	Full-Time	% of Total	Part-Time	% of Total
<u>FY 2009/2010</u>	Summer 2009	7	0	0%	7	100%
	Fall 2009	23	15	65%	8	35%
	Spring 2010	16	10	63%	6	38%
<u>FY 2010/2011</u>	Summer 2010	12	0	0%	12	100%
	Fall 2010	22	11	50%	11	50%
	Spring 2011	14	4	29%	10	71%
<u>FY 2011/2012</u>	Summer 2011	15	0	0%	15	100%
	Fall 2011	24	13	54%	11	46%
	Spring 2012	22	11	50%	11	50%
<u>FY 2012/2013</u>	Summer	14	1	7%	13	93%

	2012					
	Fall 2012	27	11	41%	16	59%
	Spring 2013	22	10	45%	12	55%
FY 2013/2014	Summer 2013	12	0	0%	12	100%
	Fall 2013	25	13	52%	12	48%
	Spring 2014	28	8	29%	20	71%

Students by Gender

The data indicates that the majority (more than 87%) of Mechanical Engineering majors are male students. The department needs to promote female students in engineering and also needs to conduct recruiting events to get female students interested in the field of engineering.

	Total Enrollment	Female Student	Male Students
FY 2009/2010	25	3	22
FY 2010/2011	31	3	28
FY 2011/2012	37	3	34
FY2012/2013	34	4	30
FY2013/2014	39	5	34

Students by Ethnicity

The data indicates that the majority (more than 76%) of Mechanical Engineering majors are white students. The department needs to promote minority in engineering.

	Total Enrollment	African-American	American Indian	Asian	Hispanic	White	Two or more races	Unknown
FY 2009/2010	25	0	0	0	0	23	0	2
FY 2010/2011	31	0	0	1	0	28	0	2
FY 2011/2012	37	1	1	1	0	32	0	2
FY2012/2013	34	1	1	0	0	31	0	1

FY2013/2014	39	3	2	0	0	30	1	3
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Students by Age

The data indicates that majority (more than 75%) of the Mechanical Engineering majors are high school graduates (under 25 years old).

	Total Enrollment	Less Than 25	26-30	31-40	41-50	51 and over
FY 2009/2010	25	23	1	1	0	0
FY 2010/2011	31	24	4	2	1	0
FY 2011/2012	37	28	4	3	2	0
FY2012/2013	34	27	4	2	1	0
FY2013/2014	39	32	3	2	2	0

Number of Degrees Awarded (including Pell Recipients)

The data indicates that less than 15% of the full-time enrolled students are graduating with a degree in Mechanical Engineering. The department needs to come up with a plan that focuses on completion and encourages students to graduate with an Associate of Science degree from Cecil College before transferring to a 4-year school or entering the workforce.

	Total Degrees	Pell Recipients
FY 2009/2010	0	0
FY 2010/2011	0	0
FY 2011/2012	3	1
FY2012/2013	2	0
FY2013/2014	3	1
Total	8	2

3.0 General Education Objectives

A chart reflecting the assessment of the General Education requirements related to Associate of Science in Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering and Mechanical Engineering is provided at Appendix A.

This chart indicates how the degree programs address the following General Education Objectives:

- A. Critical and creative thinking skills and problem-solving strategies
- B. Writing
- C. Oral Communications
- D. Quantitative Analysis
- E. Computer literacy and the ability to work productively with information technology
- F. An enhanced awareness of ethics, cultural diversity, artistic expression, health and wellness issues, and the physical and social environment
- G. Information Literacy

3.1 Program Strengths

The Associate of Science degree programs in Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering and Mechanical Engineering have a strong curriculum which is regularly updated by the faculty in the department. The college has an Articulation Agreement with the University of Delaware for the Civil Engineering option. The required courses listed in the curriculum are transferrable to all two year and four year institutions in Maryland and many other institutions across the US as full credit courses.

Construction of the new Engineering and Math building has helped make the programs stronger as students in the engineering programs now have access to a machine shop on campus. The machine shop houses various engineering tools and machines like the CNC milling machine, lathe, 3D printer, etc.

Another strength for the engineering programs is the support that the department receives from the college administration and staff. The college provides good support for laboratory infrastructure and promotes use of technology. The IT department also backs the strong curriculum by providing support whenever needed.

The college being located in the tri-state area of Delaware, Pennsylvania and Maryland, helps the program as it attracts a diverse population of students.

3.2 Program Weaknesses

The department currently has only one full-time engineering faculty and needs more qualified adjuncts to cover some of the courses. This would allow the full-time faculty to explore other areas that could make the programs even stronger. Having more qualified adjuncts to teach engineering courses will reduce the workload of the full-time faculty and will also allow them to spend more time on professional development. The programs also need more publicity which could help overcome the problem of low enrollment that some courses experience.

The curriculum for engineering students needs to be reviewed to incorporate internships. This will allow students to gain valuable work-experience and apply the knowledge gained in classroom. This was also brought up at the Cecil College Engineering Advisory Board meeting in November 2014. The curriculum currently does not have any room for internships or co-ops.

3.3 Program Opportunities

The college is conveniently located near the Aberdeen Proving Ground (APG) and other major industries like DuPont and W. L. Gore & Associates. The department needs to foster its relations with these industrial giants and integrate internships into the curriculum to provide students with opportunities to apply the knowledge acquired through education and also gain valuable work experience.

Beginning Fall 2015, Frostburg University will be offering Materials Engineering courses on Cecil College's North East campus. This will allow Cecil College students to graduate with a Bachelors of Science in Materials Engineering degree program on Cecil College premises. This partnership with Frostburg University is expected to increase the enrollment in engineering courses.

3.4 Program Threats

Low enrollment of students in some courses is a threat that the engineering programs could probably face. The department and the college need to promote the programs to attract more students and generate student interest in engineering. The department needs to promote women and minority in engineering. The department needs to come up with a Summer Enrichment Program to generate student interest in Engineering. Also, local engineers in the community should be invited to campus to share their thoughts on an engineer's work life with the students.

Currently the machine shop lacks a machinist. Not having qualified personnel for the machine shop in the new Engineering and Math building is a threat for the program. The machine shop house machines that would be dangerous for students to work with, if no guided supervision.

4.0 Other Program Information

4.1 Advisory Council/Board

Cecil College formed its first Engineering Advisory Board in Fall 2014. The Advisory Board had their first meeting on November 7, 2014. The Engineering Advisory Board includes members from academia as well as from the local industries.

The following members serve on the Engineering Advisory Board at Cecil College:

Veronica Dougherty	Science and Engineering Department Chair, Professor, Cecil College
Isabel Lloyd	Undergraduate Program Director, Associate Professor, University of Maryland College Park

Jamie Gurganus	Associate Director of Engineering Education Initiatives, University of Maryland Baltimore County
Mark Butkiewicz	SURVICE Engineering, Applied Technology Operation
Mark Schlein	Edgewood Chemical Biological Center Aberdeen Proving Ground
Robert Daidone	Vice President and Site Manager, ATK Missile Defense and Controls
George Fisher	General Manager, Eastern Medical Gas Services
Patrick McKenna	Design and Automation Engineer, W.L.Gore & Associates
Anand Patel	Director of Engineering and Computer Sciences, Assistant Professor, Cecil College

The following topics were discussed in the Advisory Board meeting on November 7, 2014

Topic	Discussion	Action Taken
AS Degree Curriculum <ul style="list-style-type: none"> • Mechanical • Civil • Aerospace • Chemical • Electrical • Computer 	<ul style="list-style-type: none"> • Relevance of courses in the curriculum was discussed • No changes required in the curricula • Courses mentioned are the common/general courses required in the first two years of an engineering degree • Curricula should be circulated to local engineering firms to help them understand engineering at Cecil College 	Anand Patel will coordinate with the marketing and PR team at Cecil College to circulate the engineering curriculum to the local industries

Topic	Discussion	Action Taken
AS Degree with Concentration Model	<ul style="list-style-type: none"> • An alternate approach to the current six engineering degree programs at Cecil College • Concentration approach would not affect transferring of courses to 4-year schools • Can be a concern for marketing as students take pride in declaring what type of engineering discipline they are interested in 	Waiting for guidelines from Maryland Higher Education Commission (MHEC) regarding the concentration model before deciding on future action
Incorporating Work Experience	<ul style="list-style-type: none"> • Currently internships/co-ops are not a part of the engineering curriculum • Need to consider work-study options like the Shriver Center at UMBC • Need to collect data from current engineering students at Cecil College on where they are coming from, why they chose Cecil, their academic interests, where are they currently working, reason for working, etc. • Many industries hire high school students for summer internships/co-ops 	<p>Anand Patel will work with the faculty in the Science and Engineering department at Cecil College and coordinate with the local industries to initiate a work-study like program for current engineering students at Cecil College.</p> <p>Anand Patel will create a survey addressing the questions mentioned during discussion. The survey will be conducted beginning Spring 2015.</p>

Topic	Discussion	Action Taken
Other Feedback and Recommendations	<ul style="list-style-type: none"> • Women and minority in engineering should be promoted in marketing • Communication skills of college students in general is an industry concern. This should be incorporated in the current course work. • Should host a face-to-face job fair rather than a virtual job fair • Students should be encouraged to get certified in AutoCAD, SolidWorks, MATLAB, and other CAD/engineering software 	<p>Anand Patel will work with the marketing team at Cecil College to promote women and minority in engineering</p> <p>All engineering courses at Cecil College have projects as a part of the course work. This allows students to learn how to work in teams and communicate effectively</p> <p>Anand Patel will discuss the possibility of hosting a face-to-face job fair with the college administration</p> <p>Current engineering coursework introduces students to CAD/engineering software like AutoCAD, SolidWorks, MATLAB. Certifications are not required as a part of the curriculum due to the restriction in maximum number of credits allowed for a degree program</p>

4.2 Adequacy of Available Technology

Students enrolled in the Associated of Science in Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering and Mechanical Engineering programs are introduced to engineering software via lectures and labs that enhance their understanding about the subject. Students can access the software either on-campus, in the classrooms or in the computer lab, or off-campus by using the Cecil College's Virtual

Applications Server (Citrix) on their home computer. The table below lists the software available for student use. Students enrolled in the engineering programs have adequate technology available for their use. The technology is regularly updated by the department to give students access to the latest version of the software.

Name	Version
Microsoft Office (Word, Excel, PowerPoint)	2010
SolidWorks	2015
Creo	2.0
MATLAB	R2014a
Multisim	12.0
National Instruments LabVIEW	2012
AutoCAD	2015
Autodesk Revit	2015
NXT Programming	2.1
ROBOTC for Mindstorms	1.40
Logger Pro	3.8.5.1
Data Studio	1.9.8r10

4.3 Adequacy of Facilities

Students enrolled in the Associated of Science in Aerospace Engineering, Chemical Engineering, Civil Engineering, Computer Engineering, Electrical Engineering and Mechanical Engineering programs have access to computers in the classrooms. Students also have access to the Computer Lab located on the 3rd floor of the Technology Center building. Students can also use the Math Lab or the Writing Center on campus if they need help with their Math or English classes.

The new Engineering and Math building allows students to access the machine shop which houses engineering tools and machines. The classrooms are also equipped with lab apparatus, available for student use, which allows students to apply the knowledge gained via lectures. The apparatus allows them to work on lab activities related to the lecture content and thereby improve their understanding of the subject.

4.4 Articulation Agreements

Cecil College Degree	Partner College/University	Effective date of the Articulation Agreement	Current status of the Articulation Agreement
Associate of Art and Science Transfer – Civil Engineering	University of Delaware	Fall 2011 to Spring 2014	Renewal in progress

5.0 Program Goals and Objectives

The department conducted a 4-week STEM Enrichment Program for high school students of Cecil County during Summer 2012. There was no enrollment fee for the program. This was done to create awareness about the engineering disciplines and the engineering options available at Cecil College. The program did not attract many students and had only six participants. The department intends to conduct the program again every summer beginning 2015 with a better marketing approach in order to attract more students.

The engineering department also intends to work with the industries in the neighborhood by fostering its relations with these companies and integrating work experience into the curriculum. This would provide students with opportunities to apply the knowledge acquired through education and also gain valuable work experience.

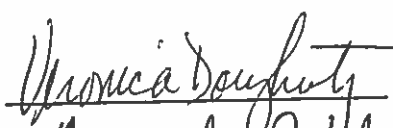
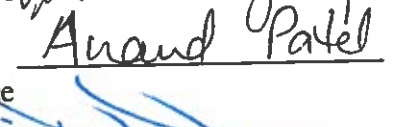


6.0 Recommendations

Even though student enrollment for all six engineering disciplines has been either steady or increasing, the department and the college still need to promote the programs to attract more students and generate student interest in engineering. Women and minority also need to be attracted to the field of engineering.

The engineering department needs to work with the industries in the neighborhood by fostering its relations with these companies and integrating work experience into the curriculum. This would provide students with opportunities to apply the knowledge acquired through education and also gain valuable work experience. The curriculum for engineering students also needs to be reviewed to incorporate internships. This will allow students to gain valuable work-experience and apply the knowledge gained in classroom.

The department needs to hire more qualified adjuncts to teach engineering courses as this will reduce the workload of the full-time faculty and will also allow the full-time faculty to spend more time on professional development and stay up to date with recent developments in the field of engineering. It also needs to hire qualified personnel for the machine shop in the new Engineering and Math building.

Approvals

Signature of Division Chair		Date	<u>2/10/15</u>
Signature of the Chair of the Academic Affairs Committee		Date	<u>2/16/15</u>
Signature of the Dean of Academic Programs		Date	<u>2-20-15</u>
Signature of the Chief Academic Officer		Date	<u>2-20-15</u>

Appendix A – Program Assessment of General Education Requirements

Program Outcomes	Student Learning Outcomes	Direct/Indirect Assessment Measure	Reporting/Use
A. Students who complete the College's General Education Core Requirements will demonstrate college-level competency in critical and creative thinking skills and problem-solving strategies.	<ol style="list-style-type: none"> Students will demonstrate an ability to use the product development process. Students will demonstrate an ability to successfully manage an engineering design project. 	<p>Discussions</p> <p>Essays</p> <p>Project presentation</p> <p>Peer evaluation</p>	<p>2011 – CCLA results</p> <p>2012 CCSSE results</p> <p>2013 – CCLA results</p> <p>2014 CCSSE results</p>
B. Students who complete the College's General Education Core Requirements will demonstrate college-level competency in writing.	<ol style="list-style-type: none"> Students will demonstrate the ability to communicate effectively in presentations and in writing. 	<p>Discussions</p> <p>Presentations</p> <p>Correspondence</p> <p>Written reports</p> <p>Laboratory assignments</p>	<p>2011 – CCLA results</p> <p>2012 CCSSE results</p> <p>2013 – CCLA results</p> <p>2014 CCSSE results</p>
C. Students who complete the College's General Education Core Requirements will demonstrate college-level competency in oral communications.	<ol style="list-style-type: none"> Students will demonstrate the ability to communicate effectively in presentations and in writing. 	<p>Discussions</p> <p>Presentations</p> <p>Correspondence</p> <p>Written reports</p> <p>Laboratory assignments</p>	<p>2011 – CCLA results</p> <p>2012 CCSSE results</p> <p>2013 – CCLA results</p> <p>2014 CCSSE results</p>
D. Students who complete the College's General Education Core Requirements will demonstrate college-level	<ol style="list-style-type: none"> Students will demonstrate an ability to use mathematics, science, and engineering principles, as well 	<p>Discussions</p> <p>Essays</p> <p>Written formulation, strategies, and computations for</p>	<p>2011 – CCLA results</p> <p>2012 CCSSE results</p> <p>2013 – CCLA results</p> <p>2014 CCSSE</p>

competency in quantitative analysis.	<p>as experimentation, for design analysis.</p> <p>2. Students will demonstrate applications of vector analysis.</p>	<p>engineering problems</p> <p>Exams</p> <p>Lab reports</p>	<p>results</p>
E. Students who complete the College's General Education Core Requirements will demonstrate college-level competency in computer literacy and in the ability to work productively with information technology.	<p>1. Students will demonstrate an ability to use computer software and instrumentation as tools to solve engineering problems.</p> <p>2. Students will demonstrate an ability to design a computer control system.</p>	<p>Discussions</p> <p>Essays</p> <p>Written formulation, strategies, and computations for engineering problems</p> <p>Exams</p> <p>Lab reports</p>	<p>2011 – CCLA results</p> <p>2012 CCSSE results</p> <p>2013 – CCLA results</p> <p>2014 CCSSE results</p>
F. Students who complete the College's General Education Core Requirements will demonstrate college-level competency in awareness of ethics, cultural diversity, artistic expression, health-and-wellness issues, and the physical and social environment.	<p>1. Students will demonstrate an understanding of the role of ethics in the engineering profession.</p> <p>2. Students will demonstrate understanding of and appreciation for artistic expression.</p> <p>3. Students will demonstrate understanding of and appreciation for health-and-wellness issues.</p> <p>4. Students will</p>	<p>Discussions</p> <p>Essays</p> <p>Exams</p> <p>Project presentations</p>	<p>2011 – CCLA results</p> <p>2012 CCSSE results</p> <p>2013 – CCLA results</p> <p>2014 CCSSE results</p>

	demonstrate understanding of and appreciation for the physical and social environment.		
<i>G. Students who complete the College's General Education Core Requirements will demonstrate college-level competency in information literacy including finding, evaluating, and using information effectively.</i>	<ol style="list-style-type: none"> 1. Students will identify, categorize, and evaluate multiple information resources. 2. Students will cite multiple information resources in various course assignments. 	Discussions Essays Exams Lab reports Project reports	2011 – CCLA results 2012 CCSSE results 2013 – CCLA results 2014 CCSSE results