CECIL COLLEGE

May 27, 2021

Dr. James D. Fielder
Secretary of Higher Education
Maryland Higher Education Commission
6 N. Liberty Street
Baltimore, MD 21201

Dear Dr. Fielder:

Enclosed for the Commission's review is a proposal for a new stand-alone lower division certificate offered by Cecil College:

LDC Pre-Engineering
HEGIS Code 0901.01; CIP Code 14.0102

We have enclosed a check for $850 to cover the Commission's fee for this review.

Should you have any questions or require additional information, please contact Dr. Colleen Flewelling, Associate Dean for Academic Assessment and Development, at 443-674-1948 or cflewelling@cecil.edu.

Sincerely,

Christy Dryer, DNP
Vice President of Academic Programs

Office Use Only: PP#

MHEC
Creating a state of achievement

Cover Sheet for In-State Institutions
New Program or Substantial Modification to Existing Program

Institution Submitting Proposal	Cecil College

Each action below requires a separate proposal and cover sheet.

- ○ New Academic Program
- ○ New Area of Concentration
- ○ New Degree Level Approval
- ◉ New Stand-Alone Certificate
- ○ Off Campus Program
- ○ Substantial Change to a Degree Program
- ○ Substantial Change to an Area of Concentration
- ○ Substantial Change to a Certificate Program
- ○ Cooperative Degree Program
- ○ Offer Program at Regional Higher Education Center

Payment Submitted: ◉ Yes ○ No | Payment Type: ○ R*STARS ◉ Check | Payment Amount: $850 | Date Submitted:

Department Proposing Program	Mathematics and Engineeering	
Degree Level and Degree Type	LDC	
Title of Proposed Program	Pre-Engineering	
Total Number of Credits	32	
Suggested Codes	HEGIS: 901.01	CIP: 14.0102
Program Modality	◉ On-campus ○ Distance Education (*fully online*)	
Program Resources	◉ Using Existing Resources ○ Requiring New Resources	
Projected Implementation Date	◉ Fall ○ Spring ○ Summer	Year: 2021
Provide Link to Most Recent Academic Catalog	URL: https://catalog.cecil.edu/	
Preferred Contact for this Proposal	Name: Colleen Flewelling	
	Title: Associate Dean of Academic Assessment and Development	
	Phone: (443) 674-1948	
	Email: cflewelling@cecil.edu	
President/Chief Executive	Type Name: Mary W. Bolt	
	Signature: Mary Way Bolt	Date: 05/27/2021
	Date of Approval/Endorsement by Governing Board:	04/29/2021

Revised 3/2019

MHEC Checks

Tracey Kempsell <TKempsell@cecil.edu>

Wed 5/26/2021 3:28 PM

To: Colleen Flewelling <cflewelling@cecil.edu>

Below is the check information you requested.

Check # 188546 – New program proposal fee pre vet tech

Check # 188547 – New program proposal fee pre engineering

Check # 188548 – New program proposal fee sports mngmnt

Tracey Kempsell
Accounts Payable
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CECIL COLLEGE
NEW PROGRAM PROPOSAL
LOWER DIVISION CERTIFICATE PRE-ENGINEERING
HEGIS 0901.01 CIP 14.0102

A. Centrality to institutional mission statement and planning priorities:

This certificate provides a basis for further study various engineering fields. The Pre-Engineering Certificate provides a course of study designed to meet the needs of students who plan to study and transfer to a college or a university that grants Associate or Baccalaureate Degrees in a variety of engineering programs.

By introducing students to this new field, this program directly supports Cecil College's mission to provide a supportive learning environment to students as they build the skills and knowledge to achieve academic success, prepare to transfer, and enter the workforce.

B. Critical and compelling regional or Statewide need as identified in the State Plan:

The lower division certificate in Pre-Engineering prepares students for further study in an Engineering program at a two- or four-year institution. Students' expenses for their degree are greatly reduced when they complete 32 credits of their degree at Cecil College. The chart below compares tuition at 4-year state institutions which have Engineering programs with the cost of attending Cecil College. Decreased expenses allow many students to complete a degree they would otherwise be unable to complete, supporting goal 2 (Success) of the Maryland State Plan for Education.

Institution	Rate	Cost per credit 2020-21	Cost for 32 credits	Savings over 32 credits
Cecil College	In-county	$125	$4,000	-
Morgan State University	In-state	$250	$8,000	$4,000
Frostburg State University	In-state	$276	$8,832	$4,832
University of Maryland College Park	In-state	$367	$11,744	$7,744

C. Quantifiable & reliable evidence and documentation of market supply & demand in the region and State:

A Pre-Engineering certificate prepares students for an engineering or engineering technician position. Maryland's Department of Labor, Licensing and Regulation projects a significant increase from 2018-2028 in the number of openings for these types of positions.[1]

Field	2018-2028 Percent Change in openings in Maryland
Aerospace Engineering and Operations Technicians	+8.7%

Field	2018-2028 Percent Change in openings in Maryland
Civil Engineering Technicians	+7.9%
Environmental Engineering Technicians	+10.6%
Electrical and Electronics Engineering Technicians	+5.6%
Mechanical Engineering Technicians	+4.7%
Aerospace Engineers	+6.2%
Civil Engineers	+7.0%
Computer Hardware Engineers	+10.9%
Electrical Engineers	+10.0%
Engineers	+7.6%
Environmental Engineers	+7.5%
Industrial Engineers	+12.3%
Mechanical Engineers	+6.4%

D. Reasonableness of program duplication:

A search of the Maryland Higher Education Commission's Academic Program Inventory database reveals one similar certificate programs in Maryland.

Institution	Program Name	Degree Offered
Community College of Baltimore County	Engineering Transfer	Certificate

Because this program is located more than 50 miles from Cecil College's campus, offering this program at Cecil College will allow students in Cecil County a more accessible and affordable option to study nearby their residence.

E. Relevance to high-demand programs at Historically Black Institutions (HBIs)

We anticipate there will be no impact on the implementation or maintenance of high-demand programs at HBI's.

F. Relevance to the identity of Historically Black Institutions (HBIs)

Bachelor's degree programs in Engineering are offered at University of Maryland Eastern Shore and Morgan State University. Because Cecil's certificate program in Engineering may lead to transfer to a bachelor's degree program, graduates could choose to attend any of these institutions.

G. Adequacy of curriculum design and delivery to related learning outcomes consistent with Regulation .10 of this chapter:

The following information on degree requirements, learning outcomes, and course descriptions will be made available to students in the college catalog, which is available on the Cecil College website. Students may also consult with advisors and faculty members to learn about these programs.

Information about new programs is clearly and accurately represented in advertising, recruiting, and admissions materials. The College's Academic Programs unit widely shares information about the requirements for new or changed degrees in MHEC-approved programs. The Admissions and Marketing departments use this information to update application and inquiry forms, internal recruitment products, and other marketing materials.

Faculty at Cecil College design all courses and programs, which are then presented to the Academic Affairs Committee, a committee comprised primarily of faculty, for approval.

The proposed lower division certificate program in Pre-Engineering requires the following courses:

Course Code	Courses (32 Credits)	Credits
ARTS/HUM	Arts/Humanities Elective	3
CHM 103	General Chemistry I	3
CHM 113	General Chemistry I Lab	1
EGL 101	College Composition	3
Select 2: MAT 121 MAT 201 MAT 202	 Precalculus OR Calculus I with Analytic Geometry OR Calculus II with Analytic Geometry	8
PHY 217	General Calculus Physics I with Lab	4
PHY 218	General Calculus Physics II with Lab	4
SOC SCI	Behavioral and Social Science Electives	6

Total Credits: 32

COURSE DESCRIPTIONS

CHM 103 General Chemistry I studies the fundamental principles of chemistry including measurement, atomic structure, stoichiometry, energy relationships, chemical bonding, molecular structure, and gases. Credits: 3 Corequisite(s): CHM 113, EGL 101, MAT 121 or MAT 127

CHM 113 General Chemistry I Lab will expose students to basic chemistry laboratory techniques and procedures such as sample preparation, data collection, gravimetric analysis and titration. Because this course is designed to complement the General Chemistry I lecture course, conceptual topics include physical properties, determination of molecular weights, stoichiometry, energy, and gas laws. Credits: 1 Corequisite(s): CHM 103

EGL 101 College Composition (E) teaches students the skills necessary to read college-level texts critically and to write effective, persuasive, thesis-driven essays for various audiences. The majority of writing assignments require students to respond to and synthesize texts (written and visual) through analysis and/or evaluation. Students also learn how to conduct academic research, navigate the library's resources, and cite sources properly. The course emphasizes the revision process by integrating self-

evaluation, peer response, small-group collaboration, and individual conferences. Additionally, students are offered guided practice in appropriate style, diction, grammar, and mechanics. Beyond completing multiple readings, students produce a minimum of 7,500 words, approximately 5,000 words of which are finished formal writing in four-five assignments, including a 2,000-word persuasive research essay. 3 credits. Pre-requisites: C or better in COL 081 and EGL 093 or equivalent skills assessment.

MAT 121 Precalculus (M) Precalculus prepares the student for the study of calculus, discrete mathematics, and other mathematics intensive disciplines through the study of algebraic, exponential, logarithmic, and trigonometric functions. Topics include functions, laws of logarithms, trigonometric and inverse trigonometric functions, trigonometric identities, solutions of trigonometric equations, the Laws of Sines and Cosines, and vectors. A problem-solving approach utilizes applications and a graphing calculator throughout the course. Credits: 4 Prerequisite(s): EGL 093, grade of C or better in MAT 093 or MAT 098

MAT 201 Calculus I with Analytic Geometry (M) Calculus I with Analytic Geometry introduces students to the mathematical techniques for limits (including L'Hospital's Rule), differentiation, and integration of algebraic, trigonometric, inverse trigonometric, logarithmic, exponential, hyperbolic, and inverse hyperbolic functions. Applications of differentiation and integration are studied. Credits: 4 Prerequisite(s): EGL 093 and grade of C or better in MAT 121

MAT 202 Calculus II with Analytic Geometry (M) Calculus II with Analytic Geometry introduces integration techniques, improper integrals, sequences, infinite series, conic sections and polar coordinates. Students will solve applied problems related to limits, differentiation, integration, and infinite series. A computer algebra system, such as Maple, is introduced and used. Credits: 4 Prerequisite(s): Grade of C or better in MAT 201

PHY 217 General Calculus Physics I with Lab (SL) General Calculus Physics I with Lab is the first course of a three-semester calculus-based general physics course sequence. This course provides a comprehensive introduction for students interested in physics and engineering. Topics related to mechanics include linear and rotational kinematics and dynamics, energy and momentum conservation, collisions, equilibrium of rigid bodies, and oscillations. Problem-solving and laboratory skills will be emphasized in this course. Previous exposure to physics principles and strong mathematics skills are highly recommended. Credits: 4 Prerequisite(s): MAT 121 Corequisite(s): MAT 201

PHY 218 General Calculus Physics II with Lab (SL) General Calculus Physics II with Lab is the second course of a three-semester calculus-based general physics course sequence. This course provides a comprehensive introduction to students interested in physics and engineering. Topics include: thermodynamics, electricity, magnetism, and radioactivity. Problem-solving and laboratory skills will be emphasized in this course. Credits: 4 Prerequisite(s): PHY 217 with a grade of C or better Corequisite(s): MAT 202

Upon successful completion of this program, students will be able to:

- Demonstrate the entry level knowledge of math, physics, chemistry, and communication skills and abilities associated with many disciplines within the field of engineering. See specific courses as listed above for Student Learning Outcomes.

Cecil College does not contract with another institution or non-collegiate organization in providing this program.

H. Adequacy of articulation

Cecil College is currently pursuing articulation agreements for this program.

I. Adequacy of faculty resources (as outlined in COMAR 13B.02.03.11).

Faculty Member	Credentials	Status	Courses Taught
Brandie Biddy, Assistant Professor of Mathematics	M.S. Johns Hopkins University (Applied and Computational Mathematics)	Full-time	MAT 202 Calculus II with Analytic Geometry
Anne Edlin, Professor of Mathematics	Ph.D. Temple University (Mathematics)	Full-time	MAT 121 Precalculus MAT 201 Calculus I with Analytic Geometry
Christopher Gaspare, Assistant Professor of English	M.A. Washington College (English)	Full-time	EGL 101 College Composition
Ebony Roper, Associate Professor of Chemistry	Ph.D. Howard University (Chemistry)	Full-time	CHM 103 General Chemistry I CHM 113 General Chemistry I Lab
Gail Wyant, Professor of Physics, Engineering, and Geosciences	M.S. SUNY Stony Brook (Mechanical Engineering)	Full-time	PHY 217 General Calculus Physics I with Lab PHY 218 General Calculus Physics II with Lab

Faculty have several opportunities for ongoing professional development in pedagogy. Cecil College's instructional technologist offers regular workshops on using technologies to improve both face-to-face and online teaching. In addition, each semester she offers the Quality Matters-based Professional Development for Online Teaching (PDOT) course on best practices in online teaching. The College also funds faculty participation in academic conferences, including conferences focused on pedagogical topics. In January 2019, Cecil College hosted the annual conference of the Association of Faculties to Advance Community College Teaching (AFACCT); more than 35 full-time and adjunct faculty attended. In 2018-19, Cecil College also piloted the Faculty Guild professional development program with selected full-time and part-time faculty; six additional faculty members participated in this program in 2019-20.

J. Adequacy of library resources (as outlined in COMAR 13B.02.03.12).

Cecil College's Cecil County Veterans Memorial Library is a member of Maryland Digital Library (MDL) and the Maryland Community College Library Consortium (MCCLC). CCVM Library has reciprocal borrowing privileges with other community college libraries within the state of Maryland. CCVM Library also subscribes to Inter-Library Loan, where students and faculty can request physical books, eBooks, and scholarly articles from institutions nationwide.

Students can make an appointment to meet one-on-one or in groups with the Instructional Librarian for assistance with the following: narrowing down a research topic, finding articles in the library databases,

finding books and eBooks, evaluating resources, and crafting citations. The Instructional Librarian also visits classes upon request to teach library information sessions tailored to class projects and curricula.

The library subscribes to approximately 85 online databases that cover most disciplines offered at Cecil College. The following databases may help most with varying aspects of the Pre-Engineering Certificate: Academic Search Complete, ProQuest Central, ProQuest Research Library, American Chemical Society's Guide to Scholarly Communication, ProQuest Arts & Humanities, ProQuest Biology, ProQuest Career & Technical Communication, ProQuest Computing, EBSCO's Humanities International Complete, ProQuest Psychology, ProQuest Sociology, ProQuest Science, ProQuest Social Sciences, JSTOR, and more.

CCVM Library offers both a 20,000 volume physical book collection, and 209,000 volume online eBook collection for student use with texts directly related to courses in the Pre-Engineering Certificate, as well as a list of open resources on its Open Educational Resources (OER) LibGuide that both students and faculty can utilize. The library also has several course textbooks on reserve for students to use in the library. CCVM Library staff welcomes and encourages faculty to submit requests for books, multi-media resources, and databases to support student projects and teacher instruction throughout the academic year.

K. Adequacy of physical facilities, infrastructure and instructional equipment (as outlined in COMAR 13B.02.03.13)

All students have the opportunity to utilize all physical facilities on campus including the Library; the Arts and Sciences Building; the Engineering and Math Building; Physical Education Complex; and the Technology/Conference Center, housing the computer lab, a student lounge / dining area and a Conference Center.

The department has sufficient dedicated office space for program faculty, staff, and students. Faculty offices include a desk and multiple chairs available for private conferences with students and/or faculty, bookshelves for department resources, and a locked file cabinet to secure program materials.

There is also dedicated office space for adjunct faculty. The adjunct offices are equipped with computers, desks, chairs, and telephones.

Multiple conference rooms are available for faculty meetings and or private conferences with students in the Engineering and Math Building, the Arts and Science Building, and the Physical Education Complex.

Available technology includes state-of-the-art smart classrooms with interactive white boards, projection systems, immediate capture and documentation cameras, wireless internet access, and the College-wide course management system, Blackboard, which can provide on-line learning to supplement courses.

The North East campus computer lab, housed in the Technology Center, provides 28 computers and technology resource staff, during regular lab hours, to assist students. The Writing Center is a free service to all Cecil College students. Tutors are available during a variety of day and evening hours to assist students with reading and writing assignments in any subject. Free subject matter tutoring is also available to all students upon request.

L. Adequacy of financial resources with documentation (as outlined in COMAR 13B.02.03.14)

1. Complete Table 1: Resources (pdf) and Table 2: Expenditure(pdf). Finance data(pdf) for the first five years of program implementation are to be entered. Figures should be presented for five years and then totaled by category for each year.

TABLE 1: RESOURCES

	Resource Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1.	Reallocated funds	$0	$0	$0	$0	$0
2.	Tuition/Fee Revenue (c + g below)	$23,250	$26,523	$29,970	$35,377	$39,252
a.	Number of F/T students	2	2	2	3	3
b.	Annualized Tuition/Fee Rate[1]	$4,125	$4,249	$4,376	$4,507	$4,643
c.	Total F/T Revenue (a x b)	$8,250	$8,498	$8,752	$13,522	$13,928
d.	Number of P/T students	6	7	8	8	9
e.	Credit Hour Rate	$125	$129	$133	$137	$141
f.	Annualized Credit Hour Rate[2]	$2,500	$2,575	$2,652	$2,732	$2,814
g.	Total P/T Revenue (d x e x f)	$15,000	$18,025	$21,218	$21,855	$25,324
3.	Grants, Contracts & other External Sources	$0	$0	$0	$0	$0
4.	Other Sources	$2,688	$2.998	$3,308	$3,722	$4,032
	Total (add 1-4)	**$25,938**	**$29,521**	**$33,278**	**$39,099**	**$43,284**

Cecil College expects that this program will enroll approximately 8 students in the first year, with subsequent modest growth.

We are projecting tuition increases of 2% each year. Other sources of revenue include Student Development fees ($8/credit) and Registration fees ($75/semester). On average, full-time Cecil students take 33 credits per year; part-time students take 20 credits per year on average.

TABLE 2: EXPENDITURES

	Expenditure Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1.	Faculty (b + c below)	$5,902	$6,004	$6,109	$6,215	$6,324
a.	# FTE	0.1	0.1	0.1	0.1	0.1
b.	Total Salary	$4,500	$4,567	$4,636	$4,705	$4,776
c.	Total Benefits	$1,402	$1,437	$1,473	$1,510	$1,548
2.	Admin. Staff (b + c below)	$0	$0	$0	$0	$0
a.	#FTE	0	0	0	0	0
b.	Total Salary	$0	$0	$0	$0	$0
c.	Total Benefits	$0	$0	$0	$0	$0

[1] Assumes Cecil County resident taking 35 credits per year.
[2] Assumes Cecil County resident taking 20 credits per year.

3.	Support Staff (b + c below)	$0	$0	$0	$0	$0
a.	# FTE	0	0	0	0	0
b.	Total Salary	$0	$0	$0	$0	$0
c.	Total Benefits	$0	$0	$0	$0	$0
4.	Equipment	$0	$0	$0	$0	$0
5.	Library	$0	$0	$0	$0	$0
6.	New or Renovated Space	$0	$0	$0	$0	$0
7.	Other Expenses	$0	$0	$0	$0	$0
	Total (Add 1-7)	**$5,902**	**$6,004**	**$6,109**	**$6,215**	**$6,324**

This program will be implemented with existing faculty resources and administrative staff, so there are no new expenses for personnel. Faculty FTE is estimated based on the expected amount of time one faculty member will devote to advising and administering this program, or .1 FTE.

Salaries are forecasted to increase 1.5% each year, while health benefits are forecasted to increase 3.5% each year. Library resources and equipment are budgeted within the general operating budget on an ongoing basis.

M. Adequacy of provisions for evaluation of program (as outlined in COMAR 13B.02.03.15).

Faculty members are evaluated every semester by students enrolled in their courses. The College uses an electronic survey process (Evaluation Kit) and students are required to complete the evaluation within a specified time frame at the end of the semester or they are locked out of the learning management system (Blackboard) until they complete the survey. This has resulted in a very high response rate for all courses. In addition, faculty members are assessed in the classroom by the appropriate dean or designee each semester for their first year at Cecil College, annually for the next two years, and every three years thereafter. Student course evaluations are an important component in the College's process of monitoring student satisfaction.

All faculty members are contractually obligated to complete an annual report that includes assessment results. Faculty satisfaction is monitored through the Great Colleges to Work For Survey, which is administered every two years.

The College's Assessment Plan requires that each learning goal for an academic program be reviewed at least once every four years. These assessments are used to make improvements to the program. In addition, the College has an established Comprehensive Program Review process through which programs evaluate their strengths, opportunities, and cost effectiveness every eight years.

Student retention rates are regularly monitored by the division dean.

N. Consistency with the State's minority student achievement goals (as outlined in COMAR 13B.02.03.05 and in the State Plan for Postsecondary Education).

Cecil College embraces the value of diversity, and strives to continuously foster inclusiveness, and has identified "Graduates will illustrate knowledge of …the Diversity of Human Cultures" as one of the institution's six General Education learning goals.

O. Relationship to low productivity programs identified by the Commission:

This program is not related to low productivity programs identified by the Commission.

P. If proposing a distance education program, please provide evidence of the Principles of Good Practice (as outlined in COMAR 13B.02.03.22C).

Cecil College is a member of NC-SARA and follows C-RAC guidelines for distance education.