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April 2, 2020

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

Dear Secretary Fielder:

Frostburg State University (FSU) is proposing a climate-change and emergency preparedness-oriented Life-Cycle Facilities Management bachelor's program, which would focus on: 1) techniques uniquely critical to responding to climate-change forecasts, and 2) innovative instruction to prepare industry leaders to properly plan and build environments that would be sustainable for structures' lifetimes. The following themes would be infused into the curriculum: sustainable site development; water savings; energy efficiency; materials selection; and indoor environmental quality. In keeping with FSU's emphasis on experiential learning, the program would also require two summer internships for a total of 12 credits and allow prior learning credits to be awarded for individuals with experience.

The proposed program supports FSU's mission to address workforce needs in the region and state. It also affirms the university's commitment to sustainability, with a number of courses being focused on environmental issues and sustainable construction practices.

| | |
|-----------------------------------|--|
| Proposal Type: | New Academic Program |
| Program: | Life-Cycle Facilities Management |
| Title of Proposed Program: | Bachelor of Science in Life-Cycle Facilities Management |
| Award Level: | Bachelor's Degree |
| CIP: | 309999 |
| HEGIS: | 490400 |

We would appreciate your support for this request. Enclosed please find the completed proposal and cover sheet. If you have any questions, please do not hesitate to contact me or our Assistant VP for Analytics, Dr. Sara-Beth Bittinger at sbittinger@frostburg.edu.

Yours truly,

Dr. Elizabeth Throop
Provost and Vice President for Academic Affairs

pc: Dr. Emily Dow, Assistant Secretary, Academic Affairs, MHEC
Dr. Antoinette Coleman, Associate Vice Chancellor for Academic Affairs, USM
Dr. Sara-Beth Bittinger, Interim Assistant VP for Analytics, FSU
Dr. Kim Hixson, Dean of the College of Liberal Arts and Sciences, FSU



Cover Sheet for In-State Institutions

New Program or Substantial Modification to Existing Program

| | |
|---------------------------------|----------------------------|
| Institution Submitting Proposal | Frostburg State University |
|---------------------------------|----------------------------|

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: | Date Submitted: |
|--|-----------|---------------|--|-----------------|--|
| Department Proposing Program | | | | | |
| Degree Level and Degree Type | | | | | |
| Title of Proposed Program | | | | | |
| Total Number of Credits | | | | | |
| Suggested Codes | | | HEGIS: | CIP: | |
| Program Modality | | | On-campus | | Distance Education (<i>fully online</i>) |
| Program Resources | | | Using Existing Resources | | Requiring New Resources |
| Projected Implementation Date | | | Fall | Spring | Summer Year: |
| Provide Link to Most Recent Academic Catalog | | | URL: | | |
| Preferred Contact for this Proposal | | | Name: | | |
| | | | Title: | | |
| | | | Phone: | | |
| | | | Email: | | |
| President/Chief Executive | | | Type Name: | | |
| | | | Signature: <i>Ronald Nowaczynski</i> | | Date: |
| | | | Date of Approval/Endorsement by Governing Board: | | |

Revised 3/2019

A. Centrality to Institutional Mission and Planning Priorities:

1. Program description and relationship to mission:

Frostburg State University (FSU) is proposing a climate-change and emergency preparedness-oriented Life-Cycle Facilities Management bachelor's program, which would focus on: 1) techniques uniquely critical to responding to climate-change forecasts, and 2) innovative instruction to prepare industry leaders to properly plan and build environments that would be sustainable for structures' lifetimes.

The proposed interdisciplinary program would require 105 undergraduate semester hours of credit. This would include 59 credits of Life-Cycle Management courses and 19 credits of Geography. The following themes would be infused into the curriculum: sustainable site development; water savings; energy efficiency; materials selection; and indoor environmental quality. In keeping with FSU's emphasis on experiential learning, the program would also require two summer internships for a total of 12 credits and allow prior learning credits to be awarded for individuals with experience.

The proposed program supports FSU's mission to address workforce needs in the region and state. It also affirms the university's commitment to sustainability, with a number of courses being focused on environmental issues and sustainable construction practices.

2. Explain how the proposed program supports the institution's strategic goals and provide evidence that affirms it is an institutional priority.

As part of the overall strategic plan of the institution to meet workforce demands and all graduates have High Impact Practices with a focus on internships and integrative capstone experiences, the Life-Cycle Facilities Management degree will support these institutional priorities. With a rich experiential learning curriculum and a high workforce need, the LCFM program will affirm.

Specifically, this proposed program supports the following institutional goals (FSU Strategic Plan, <https://www.frostburg.edu/about-frostburg/strategic-plan-2018-2023/strategic-goals.php>):

Goal I. Focus learning on both the acquisition and application of knowledge:

- A. Ensure students acquire the essential knowledge and skills needed to succeed.
- B. Infuse applied learning throughout the FSU curriculum.

Goal IV. Align university resources – human, fiscal, and physical – with strategic priorities:

- C. Ensure academic programs meet student and workforce expectations.

3. Provide a brief narrative of how the proposed program will be adequately funded for at least the first five years of program implementation. (Additional related information is required in section L).

The new program will be funded via Workforce Development Initiative (WDI) enhancement funding via the state of Maryland. Frostburg State University submitted a proposal for funds to support the creation of a program to develop curriculum for a workforce need. FSU was awarded these funds, which are part of our base state appropriation.

4. Provide a description of the institution's a commitment to:
 - a) ongoing administrative, financial, and technical support of the proposed program

Funds to support this program provided by the Workforce Development Initiative are part of FSU's base state appropriation. The program, which would be housed in FSU's College of Liberal Arts and Sciences, has its curriculum and syllabi already developed.

- b) continuation of the program for a period of time sufficient to allow enrolled students to complete the program.

FSU will offer this program for an initial period of at least 7 years. At the end of the first three-year period, the program will be reviewed to determine if enrollment projections are being met. If enrollment projections are not being met, a recovery plan will be instituted to increase enrollment.

B. Critical and Compelling Regional or Statewide Need as Identified in the State Plan:

1. Demonstrate demand and need for the program in terms of meeting present and future needs of the region and the State in general based on one or more of the following:
 - a) The need for the advancement and evolution of knowledge

The advancement and evolution of studies aimed to assess managerial, economical, and environmental credentials of any products/projects is directed towards the study of an entire product/project lifecycle from inception, through engineering design and manufacture, to service and disposal of manufactured products. The LCFM program planned to be offered at FSU would provide the essential knowledge and help organizations and companies in coping with the increasing complexity and engineering challenges of developing and managing new or existing products for the global competitive markets, in search of resiliency, durability, and sustainability.

- b) Societal needs, including expanding educational opportunities and choices for minority and educationally disadvantaged students at institutions of higher education

FSU fulfills a unique role as the only public comprehensive university west of the Baltimore-Washington corridor in providing educational opportunities to students in western Maryland. During fall 2019, FSU served 40.7% undergraduate minority students (FSU Office of Assessment & Institutional Research, <https://www.frostburg.edu/academics/air/files/pdfs/fast-facts/factsheetfsu2019.pdf>).

- c) The need to strengthen and expand the capacity of historically black institutions to provide high quality and unique educational programs

N/A

2. Provide evidence that the perceived need is consistent with the [Maryland State Plan for Postsecondary Education](#).

In line with FSU's emphasis on experiential learning, the proposed Life-Cycle Facilities Management program would require two summer internships (with a recommendation for a third) and allow prior learning credits to be awarded for individuals with experience. It aligns with the institutional commitment to regional economic development and engagement, as well as with Strategy 8 of the Maryland Higher Education Commission's 2017-2021 State Plan for Postsecondary Education. The program also has the support and involvement of the local skilled trades unions and the Association of General Contractors in Washington, DC.

C. Quantifiable and Reliable Evidence and Documentation of Market Supply and Demand in the Region and State:

- Describe potential industry or industries, employment opportunities, and expected level of entry (*ex: mid-level management*) for graduates of the proposed program.

Life-cycle facilities management is a field that is rapidly evolving from construction management. Based upon inputs from the LCFM stakeholder group (attachment B) and the designed curriculum, graduates of this proposed program will be well-prepared for a variety of employment opportunities that include not only Construction Manager but also the following: Project Manager, Cost Estimator, Product Life-Cycle Specialist/Manager, Fleet Life-Cycle Manager, Building and Systems Analyst, and Facility Manager. Potential employers include general contractors, sub-contractors, projects and construction management firms, real estate developers, architectural engineering firms, research firms, manufacturing companies, and technology solution companies.

Need for Program: (Briefly describe the need – internal and/or external – for the proposed program and its importance to the programmatic emphases in the approved institutional mission.)

Currently across the world, there is a paramount need of leaders able to design, build, and managing companies with environment, society, and long-term sustainable development goals in mind. This need is transforming the temporary and conventional trend of doing business to a mainstream and interdisciplinary approach, often adapting project management practices to a cost and environmental efficient process. The increasing awareness of environmental issues, such as global warming and sea level rise problems, are becoming topics of discussion in communities across the globe. The growing awareness of sustainable construction's and facilities management's potential to positively impact environmental issues is pushing green practices to the forefront. As a result, more local governments are adopting green building standards and regulations by providing permitting and financial incentives for sustainable development. However, by delivering green building projects with different risk-associated impacts, the building and management process requires adjustments to the conventional methodologies.

Ultimately, the mission of the bachelor's Program in Life-Cycle Facilities Management is to provide an interdisciplinary, flexible and state-of-the-art curriculum that provides students with knowledge and marketable skills to become future leaders of construction or manufacturing related organizations worldwide.

- Present data and analysis projecting market demand and the availability of openings in a job market to be served by the new program.

Below, there is provided an outline of jobs, projecting market demand and median-pay data retrieved from the U.S. Bureau of Labor Statistics (www.bls.gov). The list below refers only to the available BLS data. Since Life-Cycle Facilities Management is an evolving field, the jobs listed below are those which the degree program would most prepare students to attain. There are a large number of other jobs possible within firms specializing in that part of the industry, such as Product Life-Cycle Specialist/Manager, Fleet Life-Cycle Manager, Building and Systems Analyst, Data Engineer/Specialist, Facility Manager, and Project Manager.

- **Construction Managers:** 2018 employment: **471,800**. 2018 median pay: **\$93,370**. Projected employment change, 2018–28: Number of new jobs: **46,200**. Growth rate: **10 percent (Faster than average)**. Education and training: Typical entry-level education: **Bachelor's degree**.
- **Cost Estimators:** 2018 employment: **217,400**. 2018 median pay: **\$64,040**. Projected employment change, 2018–28: Number of new jobs: **18,700**. Growth rate: **9 percent (Faster than average)**. Education and training: Typical entry-level education: **Bachelor's degree**.
- **Environmental Science and Protection Technicians:** 2018 employment: **34,800**. 2018 median pay: **\$46,170**. Projected employment change, 2018–28: Number of new jobs: **3,200**. Growth rate: **9 percent (Faster than average)**. Education and training: Typical entry-level education: **Bachelor's degree**.
- **Environmental Scientists and Specialists:** 2018 employment: **85,000**. 2018 median pay: **\$71,130**. Projected employment change, 2018–28: Number of new jobs: **7,000**. Growth rate: **8 percent (Faster than average)**. Education and training: Typical entry-level education: **Bachelor's degree**.

Source of all above information: www.bls.gov

- Discuss and provide evidence of market surveys that clearly provide quantifiable and reliable data on the educational and training needs and the anticipated number of vacancies expected over the next 5 years.

The above jobs listed require the following educational and training needs that are specific of the LCFM program planned to be offered at FSU. Additionally, for each job listed below, an anticipated growth rate for the next 10 years is provided in percentage. Information below has been mostly retrieved from www.bls.gov.

- **Construction managers:** Construction managers plan, coordinate, budget, and supervise construction projects from start to finish. Although there are various ways to enter this occupation, it is becoming increasingly important for construction managers to have a bachelor's degree in construction science, construction management, architecture, or engineering. As construction processes become more complex, employers are placing greater importance on specialized education. Large construction firms increasingly prefer

candidates with both construction experience and a bachelor's degree in a construction-related field. Employment of construction managers is projected to grow 10 percent from 2018 to 2028, faster than the average for all occupations. Construction managers are expected to be needed to oversee the anticipated increase in construction activity over the coming decade. Important skills: analytical skills, business skills, decision-making skills, leadership skills, technical skills, time-management skills, oral and writing skills. (source: www.bls.gov).

- **Cost Estimators:** cost estimators collect and analyze data in order to estimate the time, money, materials, and labor required to manufacture a product, construct a building, or provide a service. They generally specialize in a particular product or industry. Most cost estimators need a bachelor's degree. Employment of cost estimators is projected to grow 9 percent from 2018 to 2028, faster than the average for all occupations. Overall job opportunities should be good because companies require accurate cost estimates in order to operate profitably. Important skills: analytical skills, detail-oriented skills, time-management skills. (source: www.bls.gov).
- **Environmental science and protection technicians:** Environmental science and protection technicians monitor the environment and investigate sources of pollution and contamination, including those affecting public health. Environmental science and protection technicians typically need an associate's degree or 2 years of postsecondary education, although some positions require a bachelor's degree. Employment of environmental science and protection technicians is projected to grow 9 percent from 2018 to 2028, faster than the average for all occupations. Environmental science and protection technicians should have good job prospects overall. Important skills: analytical skills, critical-thinking skills, communication skills, interpersonal skills (source: www.bls.gov).
- **Environmental scientists and specialists:** Environmental scientists and specialists use their knowledge of the natural sciences to protect the environment and human health. Environmental scientists and specialists need at least a bachelor's degree. Employment of environmental scientists and specialists is projected to grow 8 percent from 2018 to 2028, faster than the average for all occupations. Heightened public interest in the hazards facing the environment, as well as increasing demands placed on the environment by population growth, are expected to spur demand for environmental scientists and specialists. Important skills: analytical skills, problem-solving skills, interpersonal skills, communication skills. (source: www.bls.gov).
- **Sustainability Specialists:** Sustainability Specialists are now a vital part of a business organization and planning due to their potential for considerable cost savings and vital link between organization and regulation. They are active in areas such as corporate branding, public and community outreach, project implementation, procurement, business ethics and policy on the corporate side, and project design, outreach, branding and public perception on the public side. They work alongside such professionals as Sustainability Program Coordinators in aiding program implementation and may report directly to senior management or Sustainability Directors. In some cases, they are expected to act as consultants for raw materials for packaging, encourage actions on waste reduction and in some cases - organize corporate away days. Their role is largely a practical one, looking at methods of encouraging sustainability at all levels of the business. They are expected to foster a positive image about the business in the public eye and internally, encouraging sustainability thinking in the employee base at all levels and (ideally) to examine ways of

cost-saving while promoting such green credentials. In some cases, they may be responsible for implementing policy based on industry regulation or state or Federal laws. Bachelor's degrees are usually required. They need good people skills as they will communicate with a variety of different stakeholders every day. It's important they have a good background in understanding environmental issues and may be expected to communicate this in layman's terms to different audiences including the vital business skills. (source: <https://www.environmentalscience.org/career/sustainability-specialist>)

- Provide data showing the current and projected supply of prospective graduates.

Eight associate's degree programs and a number of lower-division certificate programs are currently offered at Maryland community colleges in the area of construction technology/management. For those who want to continue on to earn a bachelor's degree, only two programs currently exist in the state. There are three master's level programs in related areas (e.g., Real Estate Development/Infrastructure and Construction Management).

| Institution | Program | Degree Type | 2016 degrees awarded |
|--------------------------------------|------------------------------------|-------------|----------------------|
| University of Maryland Eastern Shore | Construction Management/Technology | Bachelors | 17 |
| Morgan State University | Construction Management | Bachelors | 8 |
| University of Maryland College Park | Real Estate Development | Masters | 24 |
| Johns Hopkins University | Real Estate and Infrastructure | Masters | 62 |
| Morgan State University | Construction Management | Masters | 0 |

D. Reasonableness of Program Duplication:

1. Identify similar programs in the State and/or same geographical area. Discuss similarities and differences between the proposed program and others in the same degree to be awarded.

While currently there are several construction management programs at Maryland public universities (e.g., Morgan State University, the University of Maryland Eastern Shore, and the University of Maryland), no identical programs exist in the state. Additionally, several related associates' programs offered at community colleges do not meet the demand for bachelor's-prepared construction managers. Local industry leaders have also supported establishing a Life-Cycle Facilities Management program at FSU, based on recent construction projects and state regulations and expectations.

| School Name | Program Name | CIP | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 |
|---------------------------|------------------------------------|--------|------|------|------|------|------|------|
| Univ. of MD Eastern Shore | CONSTRUCTION MANAGEMENT/TECHNOLOGY | 150201 | 19 | 28 | 10 | 24 | 8 | 17 |

| | | | | | | | | |
|-------------------------|-------------------------|--------|---|---|---|---|----|---|
| Morgan State University | CONSTRUCTION MANAGEMENT | 522001 | 0 | 1 | 7 | 6 | 15 | 8 |
|-------------------------|-------------------------|--------|---|---|---|---|----|---|

2. Provide justification for the proposed program.

Local, state, national, and global municipalities are experiencing the consequences of ongoing and worsening climate change, including the need to design building codes to sustain conditions associated with increasingly violent weather. With this need in mind, Frostburg State University is proposing a climate-change and emergency preparedness-oriented Life-Cycle Facilities Management (LCFM) bachelor's program, which would focus on; 1) techniques uniquely critical to responding to climate-change forecasts, and 2) innovative instruction to prepare industry leaders to properly plan and build environments that would be sustainable for structures' lifetimes.

The proposed LCFM degree would focus uniquely on the sustainability of building construction and operation. These themes would be infused into the program's curriculum: sustainable site development; water savings; energy efficiency; materials selection; and indoor environmental quality. The LCFM program's focus on construction techniques specifically designed to counter climate change, encourage emergency preparedness, and foster community resilience would establish it as unique in Maryland, improve USM's ability to respond to critical workforce shortages, and reinforce Frostburg as the educational hub in western Maryland. Additionally, the program would serve as a job creator on state, region, and local levels; possibly also helping to meet the needs of retraining the existing workforce recently displaced by the closure of the Luke Paper Mill in Luke, MD.

E. Relevance to High-demand Programs at Historically Black Institutions (HBIs)

1. Discuss the program's potential impact on the implementation or maintenance of high-demand programs at HBIs.

The data related to Historically Black Institutions and Construction Management programs is provided in the previous table. These results indicate that University of Maryland Eastern Shore and Morgan State University have Construction Management degrees but the Life-Cycle Facilities Management degree as demonstrated in the curriculum is unique and distinctive by its focus on the sustainability of building construction and operation, as well as the number of internship hours required.

The numbers of graduates from these institutions do not contribute sufficiently to meet the projected state need for the anticipated number of construction managers needed in Maryland.

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

1. Discuss the program's potential impact on the uniqueness and institutional identities and missions of HBIs.

It is not anticipated that the proposed Life-Cycle Facilities Management program will affect the institutional identities and mission of HBIs.

G. Adequacy of Curriculum Design, Program Modality, and Related Learning Outcomes (as outlined in COMAR 13B.02.03.10):

1. Describe how the proposed program was established, and also describe the faculty who will oversee the program.

The Provost engaged with a stakeholder group over a two year planning process, which included a comprehensive group of professionals heavily involved in various aspects of industry (see attachment B). The LCFM program, which would be housed in FSU's College of Liberal Arts and Sciences, has its curriculum and syllabi already developed. Pending approval, the university anticipates hiring faculty using enhancement funding in AY 2020, enrolling its first cohort of students in AY 2021, and graduating approximately 30 students annually.

2. Describe educational objectives and learning outcomes appropriate to the rigor, breadth, and (modality) of the program.

This program will have the following educational objectives:

- Prepare leaders to properly plan and build environments that would be sustainable for structures' lifetimes.
- Outline an approach to sustainability for construction and manufacturing companies.
- Prepare graduates for a variety of employment opportunities, such as: Construction Manager, Cost Estimator, Product Life-Cycle Specialist/Manager, Fleet Life-Cycle Manager, Building and Systems Analyst, Environmental Engineer, Logistic Data Engineer/Specialist, Facility Manager, and more... Potential employers include general contractors, sub-contractors, projects and construction management firms, real estate developers, architectural engineering firms, research firms, manufacturing companies, and technology solution companies.
- Provide a foundation for those who want to effectively lead a business project, particularly within the area of sustainable construction management, manufacturing, environmental and architectural engineering.
- Create leaders who can balance both the pressure of short-term goals and priorities along with long-term goals and incorporate a new set of ideals centered on improving social and environmental issues in the world, while maintaining financial performance.
- Offer the technical proficiency, financial knowledge, entrepreneurial skills, and business vision needed for success in the continuously evolving industries of construction management, manufacturing, environmental and architectural engineering.
- Aim to integrate multiple professional requirements for bringing construction and business projects to successful completion, including cost estimating, risk management, project scheduling, project control, negotiation strategies by investigating new technologies available nowadays. Coursework also examines the essential skills of contracting, bidding, negotiating strategic business plans, and leadership.

3. Explain how the institution will:

- a) provide for assessment of student achievement of learning outcomes in the program

The assessment plan will focus on the evaluation of student work on key assignments (artifacts) in LCFM Building Materials and LCFM Capstone Experience. The Capstone Experience is one of the last courses students take prior to graduation, and Building Materials serves as a midpoint in our curricular sequence. The artifacts are assessed anonymously by an assessment committee of faculty from the College of Liberal Arts and Sciences (CLAS). These assessments use common rubrics in both courses to allow for pre- and post-assessment. In addition, CLAS participates in the assessment of institutional learning goals through General Education assessment using institutional rubrics based on the AAC&U LEAP rubrics.

- b) document student achievement of learning outcomes in the program

Annual learning outcome reports are deposited with and evaluated by the College of Liberal Arts and Sciences Assessment Council using a common report hosted by FSU's implementation of Campus Labs' Compliance Assist platform. The institution-wide Student Learning Assessment Advisory Group annually reviews the state of learning assessment campus-wide based on college-level assessment committee reports and recommendations.

Additionally, all academic programs at FSU undergo an intensive review every seven years. Student learning outcomes and the appropriateness of program learning goals and resources are a major component of this review. These reviewed are coordinated at FSU by the Office of Assessment and Institutional Research and the final reports are maintained by that office.

4. Provide a list of courses with title, semester credit hours and course descriptions, along with a description of program requirements

The courses required for this program are as follows. Some are existing courses at FSU. New courses are highlighted in red. Course descriptions are found in Appendix A.

Required Life-Cycle Facilities Management Courses (56 semester hours of credit):

| Course | Title | Semester Hours of Credit |
|----------|---|--------------------------|
| LCFM 103 | Applied CAD | 3.0 |
| LCFM 200 | Physical Sciences and Materials | 4.0 |
| LCFM 201 | Building Materials | 4.0 |
| LCFM 202 | Construction Methods of Structure and Infrastructures | 3.0 |
| LCFM 203 | Systems Life-Cycle Cost Analysis | 3.0 |
| LCFM 204 | Durability of Materials | 3.0 |
| LCFM 301 | Structures in a Resilient World | 3.0 |
| LCFM 302 | Facility and Maintenance Scheduling | 3.0 |
| LCFM 303 | Contracts and Bidding | 3.0 |
| LCFM 304 | Environmental Building Systems | 3.0 |
| LCFM 305 | Project Management for Life-Cycle Facilities | 3.0 |
| LCFM 306 | Estimating Life-Cycle Facilities in the Context of Climate Change Realities | 3.0 |
| LCFM 401 | Sustainable Building Design | 3.0 |

| | | |
|----------|---|-----|
| LCFM 402 | Emerging Technologies in Climate Change Context | 3.0 |
| LCFM 403 | Risk Management | 3.0 |
| LCFM 404 | Life-Cycle Assessment of Building Materials | 3.0 |
| LCFM 405 | Negotiation Strategies | 3.0 |
| LCFM 485 | Life-Cycle Facilities Management Capstone | 3.0 |

Required Geography Courses (19 semester hours of credit):

| Course | Title | Semester Hours of Credit |
|----------|----------------------|--------------------------|
| GEOG 103 | Physical Geography | 4.0 |
| GEOG 205 | Meteorology | 3.0 |
| GEOG 330 | Climate Change | 3.0 |
| GEOG 340 | Soils | 3.0 |
| GEOG 405 | Physical Climatology | 3.0 |
| GEOG 433 | Surveying | 3.0 |

Required Courses from Other Departments (18 semester hours of credit):

| Course | Title | Semester Hours of Credit |
|----------|----------------------------------|--------------------------|
| IDIS 150 | Life-Cycle Facilities Management | 3.0 |
| MATH 109 | Statistics | 3.0 |
| MATH 119 | College Algebra | 3.0 |
| ECON 201 | Principles of Economics (Macro) | 3.0 |
| PHIL 102 | Contemporary Ethical Problems | 3.0 |
| BLAW 291 | Legal Environment of Business | 3.0 |

Internship (12 credit hours)

1. Discuss how general education requirements will be met, if applicable.

Students in this program will be required to meet FSU's established general education program. Several courses required for the program are part of FSU's general education program.

| Course | FSU GEP Component |
|----------|---|
| IDIS 150 | Mode of Inquiry E - FSU Colloquium – Life-Cycle Facilities Management |
| MATH 109 | Core Skills 3 (Mathematics / Quantitative Reasoning) |
| MATH 119 | Core Skills 3 (Mathematics / Quantitative Reasoning) |
| PHIL 102 | Mode of Inquiry B (Humanities) |
| GEOG 103 | Mode of Inquiry C (Natural Sciences) |
| ECON 201 | Mode of Inquiry D (Social and Behavior Sciences) |

In addition to the courses required for the program, students in the Option will complete 18 additional credits of general education in first-year and advanced composition, fine and performing arts, humanities, social and behavioral sciences, identity and difference, and interdisciplinary studies. Students in the program will have their choice of available courses for the remainder to the GEP requirements.

2. Identify any specialized accreditation or graduate certification requirements for this program and its students.

N/A

3. If contracting with another institution or non-collegiate organization, provide a copy of the written contract.

N/A

4. Provide assurance and any appropriate evidence that the proposed program will provide students with clear, complete, and timely information on the curriculum, course and degree requirements, nature of faculty/student interaction, assumptions about technology competence and skills, technical equipment requirements, learning management system, availability of academic support services and financial aid resources, and costs and payment policies.

FSU provides all students with sufficient information on curriculum, course and degree requirements, cost financial aid, method of delivery, technology requirements, the Canvas learning management system, and support services through the Undergraduate and Graduate Catalogs, the FSU website, FSU admissions and recruiting materials, and FSU's student information system. All undergraduate students are also provided with an 8-semester plan of study for their chosen academic program(s). First-time students take ORIE 101 Introduction to Higher Education, which provides additional information about advising, registration, and campus resources. Transfer students receive this information through advising and orientation with the department chair or program representative. FSU also complies with the Higher Education Opportunity Act of 2008 (HEOA) related to disclosure requirements for postsecondary institutions.

5. Provide assurance and any appropriate evidence that advertising, recruiting, and admissions materials will clearly and accurately represent the proposed program and the services available.

All program materials will clearly represent the proposed program and services available. All such materials are checked by the academic department, the Admissions Office, and the Office of Publications for accuracy.

H. Adequacy of Articulation

1. If applicable, discuss how the program supports articulation with programs at partner institutions. Provide all relevant articulation agreements.

N/A

I. Adequacy of Faculty Resources (as outlined in COMAR 13B.02.03.11).

1. Provide a brief narrative demonstrating the quality of program faculty. Include a summary list of **faculty with appointment type, terminal degree title and field, academic title/rank, status (full-time, part-time, adjunct) and the course(s) each faculty member will teach in the proposed program.**

Two full-time tenure track positions will be hired to teach the core LCFM courses with Workforce Development Initiative (WDI) funds awarded by the state of Maryland.

This program will be supported by faculty members in the Department of Geography teaching the required geography courses.

| Name | Appointment Type | Terminal Degree | Rank | Status | Courses |
|---------------|----------------------|-----------------------------|---------------------|-----------|---------------------------|
| Phillip Allen | Tenured/Tenure-Track | Ph.D. in Quaternary Science | Associate Professor | Full-Time | Geography |
| Tianna Bogart | Tenured/Tenure-Track | Ph.D. in Climatology | Associate Professor | Full-Time | Meteorology and Geography |

This program will be supported by faculty members in the Department of Physics and Engineering teaching the required physical science and life-cycle facilities management courses.

| Name | Appointment Type | Terminal Degree | Rank | Status | Courses |
|------------------|----------------------|----------------------------|---------------------|-----------|--|
| Eric Moore | Tenured/Tenure-Track | Ph.D. in Applied Physics | Associate Professor | Full-Time | LCFM 200 Physical Sciences and Materials |
| Thomas Cadenazzi | Non-Tenure Track | Ph.D. in Civil Engineering | Lecturer | Full-Time | Various LCFM courses |

The courses in Business Law, Mathematics, English Composition, Philosophy, and Economics are general education courses or other high demand services courses taught by a variety of instructors in those departments.

2. Demonstrate how the institution will provide ongoing pedagogy training for faculty in evidenced-based best practices, including training in:
 - a) Pedagogy that meets the needs of the students

Free training and professional development in pedagogy is provided by FSU's Center for Teaching Excellence which hosts a regional conference on teaching and learning annually in January, annual teaching orientations for new faculty, and periodic workshops on various topics throughout the academic year. Additionally, each of the university's academic departments are committed to supporting faculty development within the discipline through the attendance at regional and national conferences.

- b) The learning management system

FSU uses Canvas as its LMS. The Office of Instructional Design and Technology provides support and training through the onboarding process for new faculty as well as regularly throughout the year.

- c) Evidenced-based best practices for distance education, if distance education is offered.

N/A

J. Adequacy of Library Resources (as outlined in COMAR 13B.02.03.12).

1. Describe the library resources available and/or the measures to be taken to ensure resources are adequate to support the proposed program.

Current library subscriptions cover subjects related to the new proposed academic program in Facilities Life-cycle Management, including construction engineering, materials engineering, life-cycle facilities management, and project management.

| Journal Title | Database Source | Coverage |
|--|---|----------------------------------|
| Architectural Record | Academic Search Ultimate; Business Source Complete; Humanities International Complete; Nexis Uni | 1992-Present |
| Architectural Review | Academic Search Ultimate | 2206-Present |
| Construction Management & Economics | Business Source Complete | 1983-Present with 18-month delay |
| Construction Materials Industry Profiles | Business Source Complete | 2006-Present |
| Concrete Products | Business Source Complete; Computers & Applied Sciences Complete | 1997-Present |
| Public Management | Business Source Complete | 1993-Present |
| Public Management Review | Business Source Complete | 2001-Present with 18-month delay |
| Structural Concrete | Academic Search Ultimate | 2012-Present with 12-month delay |

In addition to the titles in the table above, the Library's Find It service that accompanies its OneSearch search engine and databases provides links to articles in open access journals, such as Construction Science, Engineering Management Research, and Project Management Research and Practice.

Additional journal titles and pricing information has been obtained to ensure access for students and faculty to all necessary library resources pending program approval.

K. Adequacy of Physical Facilities, Infrastructure and Instructional Equipment (as outlined in COMAR 13B.02.03.13)

1. Provide an assurance that physical facilities, infrastructure and instruction equipment are adequate to initiate the program, particularly as related to spaces for classrooms, staff and faculty offices, and laboratories for studies in the technologies and sciences.

The proposed Life-Cycle Facilities Management Program will be offered within existing resources. Courses will utilize dedicated laboratory space with appropriate and modern equipment. Geography facilities include environmental science and soils laboratories, as well as PC-based computer labs equipped with programs used in mapping, geography, environmental science and engineering design. Within the Physics and Engineering Department, physical science and materials science laboratories will be available for use by the Life-Cycle Facilities Management courses. These laboratory spaces are sufficient to hold the number of sections currently offered with room to accept the initial cohort of students in this program. Should the program grow, there are sufficient and appropriate laboratory spaces for additional sections to be offered.

As this program requires additional faculty positions, faculty office space will be need to be identified.

2. Provide assurance and any appropriate evidence that the institution will ensure students enrolled in and faculty teaching in distance education will have adequate access to:

- a) An institutional electronic mailing system, and

N/A

- b) A learning management system that provides the necessary technological support for distance education

N/A

L. Adequacy of Financial Resources with Documentation (as outlined in COMAR 13B.02.03.14)

1. Complete [Table 1: Resources and Narrative Rationale](#). Provide finance data for the first five years of program implementation. Enter figures into each cell and provide a total for each year. Also provide a narrative rationale for each resource category. If resources have been or will be reallocated to support the proposed program, briefly discuss the sources of those funds.

| TABLE 1: PROGRAM RESOURCES | | | | | |
|--------------------------------------|---------------|---------------|---------------|---------------|---------------|
| Resource Categories | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| 1. Reallocated Funds | 44,000 | 45,100 | 46,228 | 47,383 | 48,568 |
| 2. Tuition/Fee Revenue (c + g below) | 91,955 | 156,395 | 205,848 | 273,279 | 344,568 |

| | | | | | |
|---|---------|---------|---------|---------|---------|
| a. Number of F/T Students – In-state | 6 | 9 | 13 | 16 | 19 |
| a. Number of F/T Students – Out of state | 1 | 2 | 2 | 3 | 4 |
| b. Annual Tuition/Fee Rate In-state | 9,692 | 9,983 | 10,282 | 10,590 | 10,908 |
| b. Annual Tuition/Fee Rate Out of state | 23,579 | 24,286 | 25,015 | 25,765 | 26,538 |
| c. Total F/T Revenue (a x b) | 81,731 | 138,419 | 183,696 | 246,735 | 313,404 |
| d. Number of P/T Students – In-state | 3 | 3 | 4 | 5 | 6 |
| d. Number of P/T Students – Out of state | - | 1 | 1 | 1 | 1 |
| e. Credit Hour Rate – In state | 284 | 293 | 302 | 311 | 320 |
| e. Credit Hour Rate – Out of state | 601 | 619 | 638 | 657 | 677 |
| f. Annual Credit Hour Rate | 12 | 12 | 12 | 12 | 12 |
| g. Total P/T Revenue (d x e x f) | 10,224 | 17,976 | 22,152 | 26,544 | 31,164 |
| 3. Grants, Contracts & Other External Sources | 0 | 0 | 0 | 0 | 0 |
| 4. Other Sources | 375,000 | 375,000 | 375,000 | 375,000 | 375,000 |
| TOTAL (Add 1 – 4) | 510,955 | 576,495 | 627,076 | 695,662 | 768,136 |

Resource Narrative:

1. Based on full-time salary of \$75,000 per faculty member and benefits of \$30,000; \$2,220 per 3-credit course for adjuncts, FICA \$176 each.
2. Tuition/Fee Revenue Assumptions – Revenue projections are based on the fall 2019 overall university proportions of in-state (84%) vs. out-of-state students (16%). The program will serve students who could be interested in the geography or engineering field who may not succeed in the advanced math skills. Since this program is expected to appeal widely to non-traditional students already working in the field, it is estimated that 25% of students enrolled will be part-time. Estimates for part-time students are based on 6

credit hours. Revenue is calculated using annual undergraduate tuition and fee schedules with a 3% increase each year.

3.Grants, Contracts, & Other External Sources – None projected.

4.Other Sources – MHEC enhancement funding.

2. Complete [**Table 2: Program Expenditures and Narrative Rationale**](#). Provide finance data for the first five years of program implementation. Enter figures into each cell and provide a total for each year. Also provide a narrative rationale for each expenditure category.

Expenditure Narrative:

| TABLE 2: PROGRAM EXPENDITURES: | | | | | |
|---------------------------------------|---------------|---------------|---------------|---------------|---------------|
| Expenditure Categories | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 |
| 1. Faculty (b + c below) | 308,000 | 315,700 | 326,701 | 337,898 | 346,190 |
| a. Number of FTE | 2 | 2 | 2.5 | 2.75 | 2.75 |
| b. Total Salary | 220,000 | 225,500 | 233,358 | 241,356 | 247,279 |
| c. Total Benefits | 88,000 | 90,200 | 93,343 | 96,542 | 98,912 |
| 2. Admin. Staff (b + c below) | 0 | 0 | 0 | 0 | 0 |
| a. Number of FTE | 0 | 0 | 0 | 0 | 0 |
| b. Total Salary | 0 | 0 | 0 | 0 | 0 |
| c. Total Benefits | 0 | 0 | 0 | 0 | 0 |
| 3. Support Staff (b + c below) | 17,269 | 17,701 | 18,143 | 18,596 | 19,062 |
| a. Number of FTE | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| b. Total Salary | 16,000 | 16,400 | 16,810 | 17,230 | 17,661 |
| c. Total Benefits | 1,269 | 1,301 | 1,333 | 1,366 | 1,401 |
| 4. Technical Support and Equipment | 40,000 | 31,000 | 20,000 | 8,000 | 1,000 |
| 5. Library | 7,500 | 8,025 | 8,587 | 9,188 | 9,831 |
| 6. New or Renovated Space | 0 | 0 | 0 | 0 | 0 |
| 7. Other Expenses | 5,000 | 5,000 | 5,000 | 5,000 | 5,000 |
| TOTAL (Add 1 – 7) | 377,769 | 377,426 | 378,431 | 378,683 | 381,083 |

Expenditure Narrative:

1. Faculty – years 1 and 2 - two full-time faculty members; year 3 – two full-time faculty and one adjunct; years 4 and 5 – two full-time faculty and two adjuncts

- 2. None
- 3. Half-time administrative assistant
- 4. Includes CAD software, SimaPro 40-user software license, three-D and blueprint printers, construction safety equipment, and miscellaneous construction equipment. Expenditures greater up front in the first three years, decreasing to maintenance level at year 5.
- 5. Journal subscriptions
- 6. None
- 7. Office supplies and miscellaneous construction supplies.

M. Adequacy of Provisions for Evaluation of Program (as outlined in COMAR 13B.02.03.15).

1. Discuss procedures for evaluating courses, faculty and student learning outcomes.

Faculty members at Frostburg State University are evaluated annually by a peer evaluation process that includes student evaluation of instruction data for each course. The student evaluation instrument is common to all courses at FSU and is administered by the Office of Assessment and Institutional Research. Student learning outcomes for the program are assessed as part of two courses, Building Materials and the Capstone Experience, using common departmental rubrics evaluated by a committee of departmental faculty. Learning outcomes for individual courses are assessed by individual instructors.

2. Explain how the institution will evaluate the proposed program's educational effectiveness, including assessments of student learning outcomes, student retention, student and faculty satisfaction, and cost-effectiveness.

All academic programs at FSU undergo an intensive review every seven years as required by the USM. This review covers educational and cost effectiveness, assessment of learning outcomes, and adequacy of human, capital, and fiscal resources.

Halfway through this cycle, FSU's Office of Assessment and Institutional Research collects information on enrollment and assessment activities using a midterm review template. Also at this time, the Institutional Priorities and Resources Committee will review the program to determine if the program is meeting its enrollment projections and receiving the required resources.

N. Consistency with the State's Minority Student Achievement Goals (as outlined in COMAR

13B.02.03.05).

1. Discuss how the proposed program addresses minority student access & success, and the institution's cultural diversity goals and initiatives.

FSU is a public institution committed to a campus environment that values human diversity, equity, and inclusion. FSU has a diverse undergraduate student body (40.7%) and implements a number of programs to enhance student success and increase underrepresented minority and first-generation student retention and graduation rates. The Life-Cycle Facilities Management Program will provide an option for the more economically disadvantaged students who may not have had the opportunity to take advanced mathematics in high school but have an interest in an engineering related field. It

will also serve non-traditional students with experience in the construction field who want to come back and earn a bachelor's degree. We expect this new Life-Cycle Facilities Management program to attract a diverse student population, and we are committed to the success of all students enrolled in the program.

O. Relationship to Low Productivity Programs Identified by the Commission:

1. If the proposed program is directly related to an identified low productivity program, discuss how the fiscal resources (including faculty, administration, library resources and general operating expenses) may be redistributed to this program.

n/a

P. Adequacy of Distance Education Programs (as outlined in COMAR 13B.02.03.22)

1. Provide affirmation and any appropriate evidence that the institution is eligible to provide Distance Education.

N/A

3. Provide assurance and any appropriate evidence that the institution complies with the C-RAC guidelines, particularly as it relates to the proposed program.

N/A

Appendix A

Undergraduate Course Descriptions

Geography courses

GEOG 103 Physical Geography**4 cr.**

Earth-sun relations, map reading and interpretations, landforms, elements of weather and climate, and climate regions. Three hrs. lecture and 2 hrs. lab. Every semester. GEP Group C.

GEOG 205 Descriptive Meteorology**3 cr.**

Aspects of the atmosphere, weather variables and measurement, radiation, clouds and precipitation, atmospheric stability, air masses and severe weather. Principles of weather forecasting. Also offered as PHSC 205. Spring. GEOG 103 recommended.

GEOG 330 Global Climate Change**3 cr.**

“What causes Earth’s climate to change?” is one of the most important questions of our time. This course includes an evaluation of the natural and anthropogenic factors that cause a change in global and regional climates. Modern climate change, future climate scenarios, policy, and mitigation strategies will also be explored. Spring, even numbered years. *Prerequisite: GEOG103/113.*

GEOG 340 Soil: Genesis, Nature and Characterization**3 cr.**

Origin and processes of soil formation, change with time and environmental factors including use, identification and delineation on the landscape, and interpretation and usage of soil surveys. Two hrs. lecture and 2 hrs. lab./field session. Not open to students who have credit for former GEOG 440. Fall. *Prerequisite: GEOG 103/113 or permission of instructor. GEOG 207 completion or co-registration strongly recommended.*

GEOG 405 Physical Climatology**3 cr.**

Overview of the physical processes that define Earth’s global climate. Movement of energy and water throughout the climate system, global circulation, distribution of climate types, natural and anthropogenic controls of climate, land-atmosphere COURSE DESCRIPTIONS | 169 interactions, spatial and temporal patterns, climate variability and change, and analysis of climate data. Two hrs. lecture and 2 hrs. lab. Fall. *Prerequisite: GEOG 103/113. GEOG 205/PHSC 205 and MATH 109 recommended.*

GEOG 433 Surveying and Field Techniques**3 cr.**

Theory of measurements, computation and instrumentation; field work, use of Global Positioning Systems (GPS) and compilation of topographic base maps; evaluation of errors; profiling, grading, slope and grade stakes. Fieldwork will include use of a variety of instruments. One hr. lecture and 4 hrs. lab. Fall. *Recommended: GEOG 275*

Life-cycle Facilities Management courses

LCFM 103 – Applied CAD

3 cr.

Students will be introduced to basic Computer-Aided drafting techniques to create and read construction drawings. The course prepares students to utilize AutoCAD (CAD) and Building Information Modeling (BIM) in a coordinated, integrated and consistent approach within the Architecture, Engineering and Construction Industry. Spring.

LCFM 200 – Physical Sciences & Materials

4 cr.

Provides an effective outline of the first essential knowledge of the basic principles and concepts of Physics, Chemistry, Materials, and Earth Science. This interdisciplinary course is designed for the science and non-science major, who are interested in applied material science, in order to provide students with an understanding of some of the methods, ideas and accomplishments in the field of Physical Sciences & Materials and their role in the development of civilization. This course can be taken by any major and it has no math requirement. Fall.

LCFM 201 – Building Materials

4 cr.

Covers the nature, composition, properties, characteristics, and applications of common building materials. The course focuses on principles for the selection of building materials, by providing background on the development and production of building materials, in view of life-cycle impacts. A laboratory experience is included and focuses on the analysis and testing of selected construction materials. Fall. *Prerequisites: LCFM 200.*

LCFM 202 – Construction Methods of Structures and Infrastructures

3 cr.

Covers the fundamentals of construction equipment and machinery planning and utilization for large infrastructural projects and architectural components, by investigating the latest technologies, capabilities and real-world applications. Topics such as handling of construction economics, earthworks, soil and rock specification and processing are discussed. Safety procedures and life-cycle considerations are thoroughly explained. Spring.

LCFM 203 – Systems Life-Cycle Cost Analysis

3 cr.

Estimated cost of developing, producing, deploying, maintaining, operating and disposing of a system over its life-cycle (from cradle to grave). Covers the life-cycle phases of an asset, project, or product from the acquisition to end-of-life. Methods and tools available for the selection and comparison of project alternatives that fulfill the same performance requirements but differ with respect to initial costs and operating costs, in order to select the one that maximizes net savings. Spring. *Prerequisites: ECON 201.*

LCFM 204 – Durability of Materials

3 cr.

Durability features, methods and estimation techniques for the assessment of deterioration mechanisms of building materials, including concrete, steel, wood, asphalt, masonry and Fiber-Reinforced-Polymer (FRP) composites. The course focuses on tools and methodologies to effectively estimate materials service life and life-cycle implications. Materials diagnosis and remediation measures are investigated. Regulations, standards, specifications, guidelines, and design codes currently available and in development are also discussed. Spring. *Prerequisites: LCFM 200.*

LCFM 301 – Structures in a Resilient World**3 cr.**

Review of basic structural principles for structural systems. Basic concepts and design examples are reviewed without in-depth mathematical derivations. Understanding of national, regional, and local infrastructure policies, emphasizing the ability to analyze networks and the environmental and boundary conditions in the context of the structure or infrastructure. Ultimately, students will apply the theory of critical structures resilience to a real-world structure or infrastructure, through a course project package. Scope of the project is to design a structure or infrastructure that address the relevant technical, social, environmental, political and financial dimensions that make a structure more resilient. Fall. *Prerequisites: LCFM 201.*

LCFM 302 – Facility & Maintenance Scheduling**3 cr.**

This course covers the basics of planning and scheduling industrial and construction projects, for the continuous life-cycle improvement. Workforce and equipment productivity, optimal resources allocation, preventive maintenance, maintenance cost control, coordination of maintenance schedules with production schedules, and performance improvement are throughout discussed. Fall. *Prerequisites: LCFM 202.*

LCFM 303 – Contracts & Bidding**3 cr.**

This course covers the basics of legal aspects, administration, and logistics relevant in the construction industry. Delivery methods, construction contracts, surety bonds, insurance techniques, labor law, and essential techniques for accurate cost estimating and effective bidding are deeply investigated and discussed. Students will be exposed to codes, standards, laws, and regulations crucial for up-to-date managers willing to run a business. Fall. *Prerequisites: BLAW 291.*

LCFM 304 – Environmental Building Systems**3 cr.**

The course provides students with tools and methods for planning and building with efficient, sustainable, mechanical, and electrical systems. Concepts such as building envelope and assemblies, plumbing, fixtures and pipes, safety systems, fire safety, emergency and signal systems are discussed. Modern practices and developments within electrical, lighting, telecommunications, plumbing, HVAC, and conveyors systems are throughout investigated, in view of a sustainable design. Spring. *Prerequisites: LCFM 201.*

LCFM 305 – Project Management for Life-Cycle Facilities**3 cr.**

Students will be introduced to the efficient planning and controlling of projects. Best practices of life-cycle project management, techniques of work planning, control and evaluation to achieve project goals are investigated. Course will intensively focus on resource allocation, and performance tracking tools that allow project managers to maximize productivity and profits, by reducing waste and minimize expenditures. Spring. *Prerequisites: MATH 109.*

LCFM 306 – Estimating Life-Cycle Facilities in Context of Climate Change Realities**3 cr.**

Generation and selection of life-cycle cost-efficient solutions among valid design alternatives. Long-term performance analysis of facilities under environmental and material constraints. Methods and tools to develop life-cycle cost analyses and elaboration of technical life-cycle cost reports. A course project package is included in the course. Spring. *Prerequisites: LCFM 203.*

LCFM 401 – Sustainable Building Design**3 cr.**

Drivers and foundations of sustainable building design. Integrated planning and design, life-cycle view of projects, resource selection and optimization, protection of the natural environment, toxics and pollutants elimination, durability and quality of the construct. Fundamentals and drivers of green building policies, along with current code regulations and impacts. Evaluation of the

environmental impacts of structures and infrastructures operations. Innovative design, green construction practices, and their economic feasibility. Case studies will be investigated, and a course project package is included in the course. Fall. *Prerequisites: LCFM 201.*

LCFM 402 – Emerging Technologies in Climate Change Context **3 cr.**

Current emerging technologies in construction such as robotics, drones, artificial intelligence, 3D printing, the next step for big data, and the impact of digital technology on money and markets. Related technical practices for the proper management of innovation in construction. Extensive and advanced readings, research, and writing assignments are also included. Fall. *Prerequisites: LCFM 201.*

LCFM 403 – Risk Management **3 cr.**

Introduction to Risk Management, and Resilience. Topics include: Hazards Risk Identification and Management, Risk Management for the Private Sector, Risk Approach, Mitigation Planning, and Risk Reduction Measures. Expose students to the concept of Capacity and Vulnerability, Analysis and Assessment of Risk, and Financing of Risk Reduction methods. Fall. *Prerequisites: MATH 109.*

LCFM 404 – Life-Cycle Assessment of Building Materials **3 cr.**

Environmental sustainability metrics and tools to qualitatively and quantitatively assess the environmental credentials accumulated during any project and/or product life-cycle. This course enables students to develop a full understanding of the frameworks, principles, techniques, and applications of life-cycle assessment (LCA). A course project package is included in the course in order to expose students to apply the knowledge acquired from theory through the use of professional software and databases that address social and environmental impacts. Spring. *Prerequisites: LCFM 201.*

LCFM 405 – Negotiation Strategies **3 cr.**

This course is structured in a way to offer hands-on and in-depth information on business negotiation strategies. The course will provide students with practical real-world examples, to better explain many of the negotiation concepts and offers a skills-based approach to complex, yet commonly occurring negotiating situations, such as negotiating with agents, mediation and arbitration, negotiating via email and conference calls, negotiating with competitor companies, and of course, negotiating cross culturally. Spring. *Prerequisites: LCFM 303.*

LCFM 485 – Life-Cycle Facilities Management Capstone **3 cr.**

Finalization of the theoretical and practical knowledge gained through the four years. Culmination of prior course work in Life-Cycle Facilities Management. Utilization of modern software, methodologies, and design tools to structure, design, operate, maintain, and dispose of a project from cradle to grave. Spring. *Prerequisites: LCFM 204, LCFM 301, LCFM 302, LCFM 305, LCFM 306, and permission of program coordinator.*

LCFM 495 – Life-Cycle Facilities Management Internship **6 cr.**

Supervised field experience for Life-Cycle and Facilities Management majors. Repeatable for up to 12 credits. *Prerequisites: LCFM 204, LCFM 301, LCFM 302, LCFM 305, LCFM 306, and permission of program coordinator.*

Mathematics courses

MATH 109 Elements of Applied Probability and Statistics

3 cr.

For the non-math major; less rigorous than MATH 380. Elementary probability theory; collection, organization and analysis of data; descriptive statistics; the normal and binominal distributions; introduction to inferential statistics; and applications. Every semester. *Prerequisite: a passing score on the Mathematics Placement test administered by the University or DVMT 095. MAY NOT BE USED TO SATISFY THE REQUIREMENTS FOR A MAJOR OR MINOR IN MATHEMATICS. MAY BE USED TO FULFILL CORE SKILL 3.*

MATH 110 Honors: Elements of Appl. Probability & Statistics

3 cr.

Introduction to statistics, with emphasis on probability theory and inferential statistics. More rigorous and broader than MATH 109/209. Use of the computer as a tool in statistical analyses. Probability theory, sampling distributions, estimation, hypothesis testing, parametric and nonparametric tests, correlation, regression and analysis of variance. Written research project required. Credit cannot be earned for both MATH 109/209 and MATH 110/219. Spring. *Prerequisite: acceptance into the University Honors Program or permission of the instructor. MAY NOT BE USED TO SATISFY THE REQUIREMENTS FOR A MAJOR OR MINOR IN MATHEMATICS. MAY BE USED TO FULFILL CORE SKILL 3.*

MATH 119 College Algebra

3 cr.

Functions and their graphs, inverse functions, solutions of equations and inequalities, polynomial and rational functions, exponential and logarithmic functions, systems of equations and matrices. Every semester. *Prerequisite: A passing score on the Mathematics Placement Test administered by the University or a grade of B or better in DVMT 100/099. MAY NOT BE USED TO SATISFY THE REQUIREMENTS FOR A MAJOR OR MINOR IN MATHEMATICS. MAY BE USED TO FULFILL CORE SKILL 3.*

Philosophy courses

PHIL 102 Contemporary Ethical Problems

3 cr.

Ethical issues such as abortion, euthanasia and physician-assisted suicide, the death penalty, censorship of pornography and hate speech, sex and marriage, social and economic justice, world hunger and global poverty, the environment and the treatment of animals. Every semester. GEP Group B.

Economics courses

ECON 201 Principles of Economics (Macro)

3 cr.

An introduction to Principles of Economics focusing primarily on the forces determining the economy-wide levels of production, employment, and prices. Examines monetary and fiscal policy and alternative views of how the economy should be managed. Every semester. *GEP Group D.*

ECON 211 Honors: Principles of Macroeconomics

3 cr.

An introduction into the forces at work in the national economy including income, employment, and the monetary system. A variety of written research assignments on current topics in macroeconomics required. Credit cannot be earned for both ECON 201 and 211. Fall. *Prerequisite: acceptance into the Honors program or permission of the instructor. GEP Group D.*

Business Law

BLAW 291 Legal Environment of Business

3 cr.

The workings and importance of legal institutions; the law as a system of social thought and social action. The analysis and study of the law of contracts, agency, employment, negotiable instruments, real property, personal property, sales and insurance. Credit cannot be earned for both BUAD 291 and BLAW 291. Every semester. *Additional prerequisite or corequisite: MGMT 110 for all ACCT, BUAD, and ECON majors (Business Economics Concentration) only.*

Appendix B: Life Cycles Facilities Management Stakeholder Group

| Name | Position | Organization |
|---------------------|--|---|
| Phillip Allen | Associate Professor/Geography | Frostburg State University |
| Carl Belt | Owner and Operator | The Belt Group |
| Sara Beth Bittinger | Interim Assistant VP for Analytics/Office of the Provost | Frostburg State University |
| Aaron Bittner | Operations Professional Arts/Theatre and Dance | Frostburg State University |
| Tianna Bogart | Associate Professor/Geography | Frostburg State University |
| Robert Boyce | Director Physical Plant/Facilities Management | Frostburg State University |
| John Brewer | Assistant Director/Planning and Construction/Physical Plant | Frostburg State University |
| Thomas Cadenazzi | Lecturer/College of Liberal Arts and Sciences | Frostburg State University |
| Michael Flinn | Associate Professor/Computer Science and Information Technologies | Frostburg State University |
| Scott Fritz | Associate Dean/College of Liberal Arts and Sciences | Frostburg State University |
| Greg Heflin | Principal, Development & Construction | Brickstone Companies |
| Former: Jason Hill | Former: Assistant Director of Maintenance/Physical Plant | Formerly associated with Frostburg State University |
| Kim Hixson | Dean, College of Liberal Arts and Sciences | Frostburg State University |
| Jason Howard | Manager of Specifications/Physical Plant | Frostburg State University |
| Robert Larivee | Professor/Chemistry | Frostburg State University |
| Michael Mathias | Interim Associate Provost/Office of the Provost | Frostburg State University |
| Brian Mattingly | President, Owner and Operator | Goldin and Stafford, LLC |
| Stephen Mayoryk | Senior Project Manager | Whiting-Turner Contracting |
| Eric Moore | Associate Professor/Physics and Engineering | Frostburg State University |
| Brett Pastorius | VP of Project Management | Clemens Construction Company, Inc. |
| Thomas Sigerstad | Associate Dean/College of Business | Frostburg State University |
| Linda Steele | Program Coordinator/College of Liberal Arts and Sciences | Frostburg State University |
| Tom Sullivan | Transportation Planner | Maryland Department of Transportation |
| Elizabeth Throop | Provost/VP for Academic Affairs | Frostburg State University |
| John Walewski | Associate Professor of Practice/Zachry Department of Civil Engineering | Texas A&M University |