McDANIEL
COLLEGE

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July 10, 2019

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

Dear Secretary Fielder:

McDaniel College is submitting New Program Proposals for eight undergraduate Bachelor of Arts programs. All programs were approved by the McDaniel College faculty during the spring semester and the Board of Trustees at their May meeting.

The programs are as follows:
- Actuarial Science
- Applied Mathematics
- Biochemistry
- Biomedical
- Criminal Justice
- Health Sciences
- Marketing
- Writing and Publishing

The complete proposals have been sent under separate cover in addition to the checks for each program proposal.

Thank you for your consideration and we look forward to hearing from you.

Sincerely,

Julia Jasken, Ph.D.
Executive Vice President/Provost

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

Institution Submitting Proposal	McDaniel College

Each __action__ below requires a separate proposal and cover sheet.

◉ New Academic Program   ○ Substantial Change to a Degree Program

○ New Area of Concentration   ○ Substantial Change to an Area of Concentration

○ New Degree Level Approval   ○ Substantial Change to a Certificate Program

○ New Stand-Alone Certificate   ○ Cooperative Degree Program

○ Off Campus Program   ○ Offer Program at Regional Higher Education Center

Payment Submitted:	◉ Yes ○ No	Payment Type:	○ R*STARS ◉ Check	Payment Amount:	$850.00	Date Submitted:	8/13/2019

Department Proposing Program	Mathematics
Degree Level and Degree Type	Undergraduate, Bachelor of Arts
Title of Proposed Program	Applied Mathematics
Total Number of Credits	128
Suggested Codes	HEGIS: 17.03 CIP: 27.0301
Program Modality	◉ On-campus ○ Distance Education (*fully online*) ○ Both
Program Resources	◉ Using Existing Resources ○ Requiring New Resources
Projected Implementation Date	◉ Fall ○ Spring ○ Summer Year: 2019
Provide Link to Most Recent Academic Catalog	URL: http://catalog.mcdaniel.edu

Preferred Contact for this Proposal	Name:	Wendy Morris
	Title:	Dean of the Faculty
	Phone:	(410) 857-2521
	Email:	wmorris@mcdaniel.edu

President/Chief Executive	Type Name: Roger Casey
	Signature: Date: 08/20/2019
	Date of Approval/Endorsement by Governing Board: 05/11/2019

Revised 12/2018

Applied Mathematics - MHEC proposal
NEW ACADEMIC DEGREE PROGRAMS, NEW STAND-ALONE CERTIFICATE PROGRAMS, AND SUBSTANTIAL MODIFICATIONS

A. Centrality to Institutional Mission and Planning Priorities:

1. Provide a description of the program, including each area of concentration (if applicable), and how it relates to the institution's approved mission.

Among the projected growth for mathematics programs, one of the largest areas of growth is in Applied Mathematics. Many prospective students indicate that they are looking for Applied Mathematics majors. The proposed Applied Mathematics major emphasizes mathematics courses used in common applications.

The core of the new Applied Mathematics major is a three-part sequence of courses focusing on mathematical modeling. The first semester of Modeling (MAT 1xxx – Intro to Mathematical Modeling in STEM) has only Calculus I (MAT 1117) as a prerequisite, and we expect the course to appeal to students across the sciences as well as our first-year Applied Mathematics majors. This course will teach students how to build mathematical models to predict outcomes of decisions in, for example, environmental conservation, business management, or engineering; this will bring Environmental Studies, Business Administration, and Engineering majors to the course. It will also teach students how to use the most common software applications for working with data. The second semester of Modeling (MAT 3xxx – Mathematical Modeling), taken in the students' Junior year, will use the mathematical skills learned in intermediate level courses to build more sophisticated and accurate models. The Senior Capstone, taken immediately after Mathematical Modeling, will allow students to build on the two semesters of Modeling to create a large project showcasing all of the skills learned in their applied mathematics courses.

To further emphasize the applied side of mathematics, the new Applied Mathematics major will require Differential Equations, a course essential to nearly all sophisticated models. We will also introduce or reactivate applied electives such as Numerical Methods, Operations Research, Data Analysis, and Financial Mathematics.

The new Applied Mathematics major will include a Data Analysis track. This track will require our Data Analysis course and require that the electives for the Applied Mathematics major be chosen from courses that will be directly applicable to the track, such as Probability, Mathematical Statistics, or our Computer Science course in Data Science. Students in this track can also take courses in McDaniel College's graduate program in Data Analytics.

Institutional Mission
McDaniel College is a diverse student-centered community committed to excellence in the liberal arts and sciences and professional studies. With careful mentoring and attention to the individual, McDaniel changes lives. We challenge students to develop their unique potentials with reason, imagination, and human concern. Through flexible academic programs, collaborative and experiential learning, and global engagement, McDaniel prepares students for successful lives of leadership, service, and social responsibility.

The proposed Applied Mathematics major falls squarely in the intersection between the liberal arts and sciences and professional studies. The major will provide students with the tools, and -- with our Modeling courses and Capstone Experiences -- the experiential learning opportunities to succeed in any endeavor that requires quantitative tools.

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

Strategic Vision

Sustained by the transformative power of the liberal arts, we will enhance McDaniel's reputation and strengthen our resources by increasing our focus on the unique potentials of individuals. We will challenge all students academically in a supportive environment of genuine care and graduate an increasing number of diverse, successful, and engaged alumni.

Our Goal of Excellence with Genuine Care: *We will attract, retain, and graduate more students by providing a challenging education that develops students' abilities and ambitions, ignites their passions, and prepares them for successful twenty-first century careers.*

It is our intention that the proposed will ignite students' passions as they prepare for successful 21st century careers while receiving a liberal arts education. The proposed Applied Mathematics major was developed during a year-long review process at McDaniel College and within our department. This review focused on the institution's strategic goals, and which programs might be appealing and useful to future students. At the end of this strategic process, our proposal for the new major was approved by the President and the Board of Trustees, and deemed a high priority for the institution.

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 strategic enrollment plan (SEP) for this program involved careful collaboration with our VP of Admissions, the Provost, and faculty members who will teach in this major. Based on discussions with these faculty, the VP of Admissions worked with the Provost to determine the investments needed. This major was developed assuming that the program could continue to be sustained through existing institutional resources, but with plans for increased investments needed with the assumption of program growth (described in Section L, Table 2). Assuming the projected enrollment growth materializes, the institution is committed to hiring an additional full-time faculty member for each additional 15 students who enroll in this major and increasing the departmental budget proportionately as enrollment increases.

4. Provide a description of the institution's a commitment to:

  a) ongoing administrative, financial, and technical support of the proposed program

  The institution is committed to supporting the needs of this new program fully and can launch the program immediately using already existing institutional resources. Administrative support will be provided by the administrative assistant for the Mathematics and Computer Science Department. Should enrollment in the program increase to the point of requiring additional resources, our Strategic Enrollment Plan (SEP) describes our plans and timeline for supporting increasing needs for infrastructure and new faculty (see Section L, Table 2).   Any technical needs described in the SEP

(physical infrastructure, hardware, or software) will be incorporated into our annual budgeting process.

b) continuation of the program for a period of time sufficient to allow enrolled students to complete the program.
Given the demand for this program (as described below in section C), the institution is committed to offering this program for the foreseeable future. However, should there come a time when the institution decides to inactive this program, a multi-year plan would be developed to continue offering the required courses to any enrolled students such that they would be guaranteed to graduate with their intended major.

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:
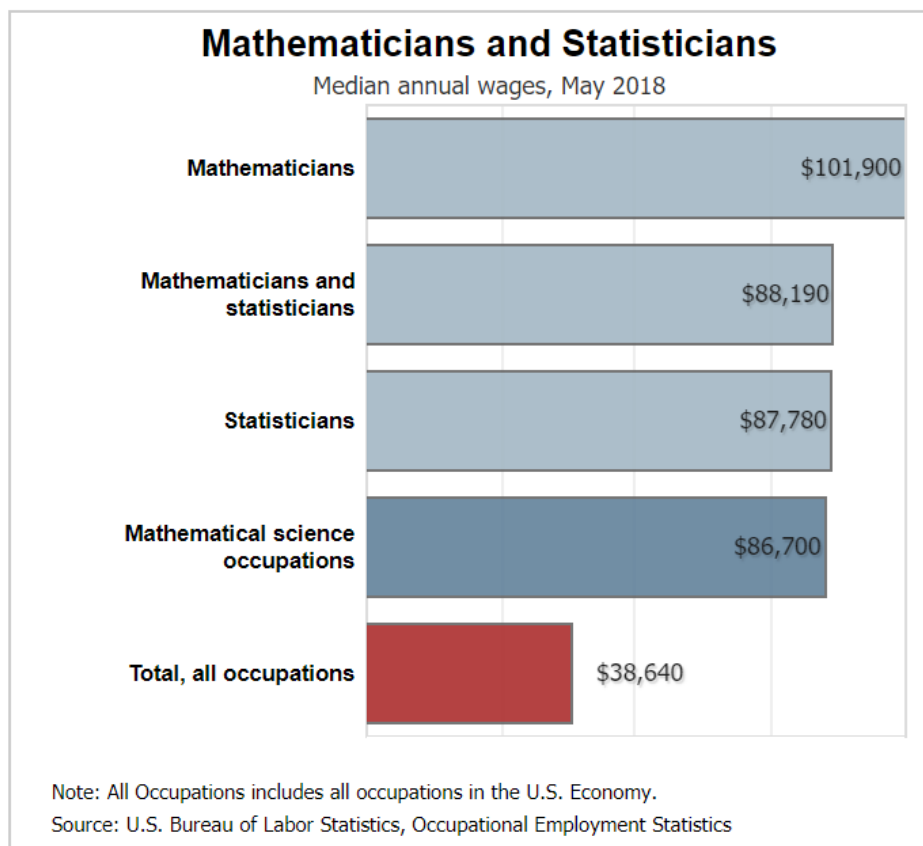a) The need for the advancement and evolution of knowledge
Mathematics is being used as a fundamental tool in more and more disciplines. As such, there is high demand for graduates who can apply mathematical tools. Many of the branches of mathematics that deal with these applications are relatively young and are still evolving; graduates of our proposed Applied Mathematics program will help advance knowledge in these areas.

b) Societal needs, including expanding educational opportunities and choices for minority and educationally disadvantaged students at institutions of higher education
Given the fact that applied mathematical skills are required in the many STEM professions which lead to the improvement of our society, there is clearly a need to provide applied mathematics skills to those entering the workforce.

With median salary ranges well above average, McDaniel's program will provide all graduates of the program the opportunity to begin a career in an established profession

with excellent compensation:

Mathematicians and Statisticians
Median annual wages, May 2018

Mathematicians	$101,900
Mathematicians and statisticians	$88,190
Statisticians	$87,780
Mathematical science occupations	$86,700
Total, all occupations	$38,640

Note: All Occupations includes all occupations in the U.S. Economy.
Source: U.S. Bureau of Labor Statistics, Occupational Employment Statistics

This is especially important to the students of color at McDaniel College. The Fall 2019 entering class at McDaniel College is highly diverse:
- 34.6% African American
- 7% Hispanic
- 5.7% two or more races

According to the report *African Americans College Majors and Earnings* from the Georgetown University Center on Education and the Workforce (https://cew.georgetown.edu/wp-content/uploads/AfricanAmericanMajors_2016_web.pdf), black students are more likely to choose majors that don't lead to lucrative careers. The report concludes that "African Americans represent 12 percent of the US population but are underrepresented in the number of degree holders in college majors associated with the fastest-growing, highest-paying occupations...STEM, health and business." By offering this program, we will have expanded the opportunity for our students of color and provided them a path that disrupts these major patterns and their corresponding socio-economic impact for students of color.

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.

We believe this program aligns with Strategy 8 of the Maryland State Plan for Postsecondary Education:

- Develop new partnerships between colleges and businesses to support workforce development and improve workforce readiness.

As Strategy 8 states, "the contemporary workplace is changing rapidly, and long-held beliefs about academic majors, career paths, and the connections between them have been transformed. More than ever, employers seek employees who have the flexibility to understand changing conditions and solve emerging problems. Technical knowledge is not enough." By housing a program that prepares students with technical knowledge for a specific profession but does so in an interdisciplinary way with a liberal arts core, our graduates will be uniquely positioned to impact the workforce. But the education is not enough. Direct relationship development with businesses that employ mathematicians will be essential. To accomplish this, we will follow our already established models through the Center for Experience and Opportunity and our academic departments, such as interview days, support for internships, and panels of local professionals (https://www.mcdaniel.edu/information/headlines/news-at-mcdaniel/archive/interviewing-day-at-mcdaniel-jobs-internships-and-career-contacts). These relationships will provide students direct access to employers while giving employers an opportunity to provide feedback on the program.

Additionally, this program offers a direct path to our Master of Science in Data Analytics. Our graduate classes are taught by well-recognized experts in their field, and the Data Analytics program is no exception. Faculty bring with them relationships with their business and organizations, and students who choose to pursue the data analytics path will get additional exposure to employers in this way.

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

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

According to Department of Labor statistics, mathematician jobs in 2016 were distributed in the following industries:

Federal government	35%
Research and development in the physical, engineering, and life sciences	17
Colleges, universities, and professional schools; state, local, and private	16
Finance and insurance	8
Management, scientific, and technical consulting services	7

In addition, mathematicians and statisticians "will be needed in the scientific research and development services and pharmaceutical and medicine manufacturing industries" (Department of Labor). McDaniel's location close to Washington D. C. provides an opportunity for graduates to meet the increasing needs of the federal government.

Because of the relationship with the college's Master of Science in Data Analytics program, graduates of the new undergraduate program will have two options; begin working immediately or pursue an advanced degree. This provides flexibility in the level of entry for our students and is beneficial to employers seeking professionals at different levels.

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

According to the Bureau of Labor Statistics, employment of mathematicians is projected to grow 30 percent from 2016 to 2026, much faster than the average for all occupations.

States with the highest employment level in this occupation:

State	Employment (1)	Employment per thousand jobs	Location quotient (9)	Hourly mean wage	Annual mean wage (2)
California	530	0.03	1.74	$48.08	$100,000
Virginia	440	0.11	6.40	$58.29	$121,240
New Jersey	270	0.07	3.72	$56.28	$117,060
Maryland	180	0.07	3.79	$55.74	$115,940
Texas	150	0.01	0.71	(8)	(8)

The location quotient is the ratio of the area concentration of occupational employment to the national average concentration. A location quotient greater than one indicates the occupation has a higher share of employment than average, and a location quotient less than one indicates the occupation is less prevalent in the area than average.

The location quotient for mathematicians in the state of Maryland is 3.79. Maryland is the state with the fourth highest employment level for mathematicians:

States with the highest employment level in this occupation:

State	Employment (1)	Employment per thousand jobs	Location quotient (9)	Hourly mean wage	Annual mean wage (2)
California	530	0.03	1.74	$48.08	$100,000
Virginia	440	0.11	6.40	$58.29	$121,240
New Jersey	270	0.07	3.72	$56.28	$117,060
Maryland	180	0.07	3.79	$55.74	$115,940
Texas	150	0.01	0.71	(8)	(8)

Additionally, the location quotient for Virginia is 6.40, second highest in the country. This is important because Virginia is proximate to Maryland and is the fourth largest sending state for McDaniel's enrolled students (and thus might return as graduates), indicating additional opportunities for employment.

3. 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 Bureau of Labor Statistics indicates that the employment change between 2016-2026 will be 13,500 positions.

Quick Facts: Mathematicians and Statisticians	
2018 Median Pay ?	$88,190 per year $42.40 per hour
Typical Entry-Level Education ?	Master's degree
Work Experience in a Related Occupation ?	None
On-the-job Training ?	None
Number of Jobs, 2016 ?	40,300
Job Outlook, 2016-26 ?	33% (Much faster than average)
Employment Change, 2016-26 ?	13,500

It is important to note that this growth is looking solely at the mathematician field. One of the powerful aspects of the applied mathematics program we have designed is that it prepares students for jobs in a variety of fields: healthcare and engineering for example. The Bureau of Labor Statistics notes that "the amount of digitally stored data will increase over the next decade as more people and companies conduct business online and use social media, smartphones, and other mobile devices. As a result, businesses will increasingly need mathematicians to analyze the large amount of information and data collected... In addition, mathematicians and statisticians will be needed in the scientific research and development services and pharmaceutical and medicine manufacturing industries."

When we consider these additional fields, the employment opportunities expand significantly.

Additionally, the impact of the aging workforce will be felt in the applied mathematics field. Though specific vacancies in the field have not been projected, it is reasonable to assume that this field will not be exempt from this phenomenon.

Figure 1

Percent of the labor force 55 years & older
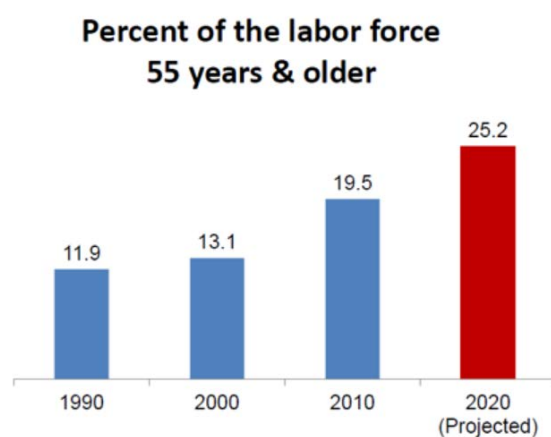
Source: **Toossi, M. 2012. "Labor Force Projections to 2020: A More Slowly Growing Workforce."** *Monthly Labor Review* **(January, 2010–2020).**

4. Provide data showing the current and projected supply of prospective graduates.
Though McDaniel's prospective student data does not reflect especially robust interest in our traditional math major, we believe that the applied focus of this new program will be of significant interest to both our Business and Economics students, both of which may be seeking

the applied math knowledge in their current fields of study. 14.4% of the deposited students for the Fall 2019 class (100 total students) express their primary program of interest as Math, Business, or Economics. These are students highly likely to have interest in the applied math program. An additional 80 students (13%) identify as Undecided and would be a group to introduce to the program.

Given our own internal interest and the number of college-bound students interested in math and its associated applied disciplines nationally (see section D.2 below), we project annual enrollment of no fewer than 8 students per year (though we do expect a small corresponding decrease in our traditional math majors). Applying standard attrition patterns, we project a minimum of 5 graduates per year.

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.
According to the State Academic Program Inventory, found at https://mhec.state.md.us/institutions_training/Pages/searchmajor.aspx, and the degree trend data downloadable from the MHEC website (http://data.mhec.state.md.us/Trend_Aux/DTRENDSD18.zip), we offer the following information on Maryland schools with similar undergraduate programs:

		Degrees Awarded				
Institution	Program	2014	2015	2016	2017	2018
Johns Hopkins University	Applied Mathematics & Statistics	11	17	14	5	7
Stevenson University	Applied Mathematics	5	8	7	0	3

The proposed Applied Mathematics is substantially different than the programs at Johns Hopkins and Stevenson. Though many of the courses in the program are the same (since all such majors need the same core courses), there are a few key differences:
- We provide a wider context and liberal arts approach in all of our mathematics courses. We want our student to know not only how to set up and use the necessary mathematical tools, but also why those particular tools are the best for the job, and how to develop new and better tools.
- The required modeling courses at the core of the Applied Mathematics major give students a framework through which to view all the courses in the major. The first course (MAT 1xxx - Introduction to Mathematical Modeling in STEM) gives students very early in their collegiate career a full sense of the power and usefulness of applied mathematics, and the second course (MAT 3xxx – Mathematical Modeling) helps student apply the knowledge they have gained to more complex real-world problems.

2. Provide justification for the proposed program.
According to the College Board Student Search Service, a data pool that covers nearly 90 percent of all college-bound students, out of the students planning to enroll in college in fall 2019, 5,220 of them indicated an intended major of "applied mathematics." When that analysis is expanded to include all students who indicated an intended major in "mathematics and statistics", the number increases significantly to 27,694. None of these projections include the

other major disciplines that this program is likely to attract; students who do not know how to identify applied math and therefore identify business, economics or engineering.

Given the limited number of programs in the state and the high need identified in Section C, we believe the benefits of the program are clear.

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 HBI's.
N/A

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.
N/A

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 Applied Mathematics major (and Data Analysis track) was assembled by (1) surveying Applied Mathematics majors and concentrations available at similar institutions, (2) assessing the strengths of our current departmental faculty and what they might teach within an Applied Mathematics program, and (3) examining what skills and courses will be and have been most useful to our Mathematics major alumni working in industry (based on our yearly alumni surveys).

All of the mathematics courses for the Applied Mathematics major (and Data Analysis track) will be taught by the three full-time faculty of the Mathematics and Computer Science Department (See Section I.1.). The Chair of the Math & Computer Science Department will oversee the program.

2. Describe educational objectives and learning outcomes appropriate to the rigor, breadth, and (modality) of the program.
The educational objective of the Applied Mathematics major is to provide students with the necessary tools to succeed in industry jobs that require mathematical, quantitative, and other problem-solving skills.

The learning outcomes for the Applied Mathematics major are:

AM SLO 1: Students will demonstrate an ability to design mathematical models and apply mathematical analysis, problem-solving skills, and numerical techniques to these models.
AM SLO 2: Students will be able to communicate technical information clearly and effectively to a range of audiences.
AM SLO 3: Students will demonstrate an understanding of the foundations of mathematics.

AM SLO 4: Students will exhibit the ability to learn mathematics independently.

3. Explain how the institution will:

a) provide for assessment of student achievement of learning outcomes in the program
Student achievement of learning outcomes in the program is overseen by the Academic Assessment Committee (AAC) as part of McDaniel's established faculty governance. This committee of five full-time teaching faculty is charged with fostering sound assessment of the College's academic programs, encouraging the collection of data that leads to action, and collecting departmental assessment plans and reports and responding to them as necessary. The program will provide a list of learning outcomes to the AAC along with a chart indicating the specific courses in which each outcome is developed as well as courses that serve as points of assessment. In the fall of each academic year, the program will select an outcome (or outcomes) to assess and provide a detailed plan for direct and indirect assessment to the AAC; the AAC will provide feedback on this plan, as needed. All the department's learning outcomes will be revisited and assessed on a regular basis so that changes made based on past assessments can be evaluated.

b) document student achievement of learning outcomes in the program
In the spring of each academic year, the program will document the degree to which students achieved the learning outcomes in the program by providing a report on the assessment of these outcomes to the AAC, based on the assessment plan submitted earlier in the year. These reports will include the assessment findings as well as a proposed plan of ways to address any areas in which students did not successfully meet the learning outcomes set forth by the department.

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

Proposed Applied Mathematics Major

Number	Title	Credits
CSC 1106	The Art of Programming	4
MAT 1xxx*	Introduction to Mathematical Modeling in STEM	2
MAT 1117	Calculus I	4
MAT 1118	Calculus II	4
MAT 2218	Linear Algebra	4
MAT 2219	Calculus III	4
MAT 2224	Fundamentals of Mathematics	4
MAT 3304	Differential Equations	4
MAT 3xxx*	Mathematical Modeling	2
MAT 3391	Mathematics Problems Seminar (2 semesters)	4
MAT 4405	Real Analysis I	4
MAT 4406	Abstract Algebra	4
MAT 449x*	Capstone Experience in Applied Mathematics	4
MAT xxxx	2 Applied Math Electives at the 2000 level or higher	8
DEPARTMENTAL WRITING REQUIREMENT: Students who major in Applied Mathematics are required to take MAT 3391 and ONE of the following any semester after the first year.		

ENG 2206 - Creative Writing—Poetry ENG 2207 - Creative Writing—Fiction ENG 2208 - Advanced Composition ENG 2212 - Professional Communication PHI 3200 - Writing in Philosophy Any 3000-level History (HIS) course	Credits included in general education table below
Total number of credits: (Not including Departmental Writing)	**56**

These three courses have been approved by the Curriculum Committee and will be assigned course numbers once they have been presented at the September faculty meeting.

Proposed Data Analysis track within the Applied Mathematics Major

The data analysis track includes 4 additional credits (60 credits total) and a more structured focus on the courses most relevant to data analysis within the Applied Mathematics major. To complete the Data Analysis track within the Applied Mathematics major, students must complete all of the required courses from the Applied Mathematics major, plus MAT 3xxx - Data Analysis. In place of the Capstone Experience in Applied Mathematics (MAT 449x), students must complete the Capstone Experience in Applied Mathematics – Data Analysis (MAT 449x). Additionally, the two electives from the Applied Mathematics major must come from the following list of courses:

- MAT 2210 - Numerical Methods
- MAT 3323 - Probability
- MAT 3324 - Mathematical Statistics
- MAT 3328 - Operations Research
- CSC 3365 - Data Science

Additional credits outside for the Major

Type of Course	Details	Credits
First Year Seminar	General education requirement	4
ENG 1101	Introduction to College Writing, general education requirement	4
Writing in the Discipline	General education requirement that students take course(s) to learn how to write in the discipline of their major.	4
Second Language	General education requirement is 2 semesters in the same language or placement/proficiency above the 2nd semester level.	8
Multicultural	Category of courses for general education requirement	4
International Nonwestern	Category of courses for general education requirement	4
International Western OR Nonwestern	Choice of 2 categories of courses for general education requirement	4

Quantitative Reasoning	Majors will take Calculus I to meet general education requirement	Credits included in major
Scientific Inquiry with Lab	Category of courses for general education requirement	4
Quantitative Reasoning OR Scientific Inquiry	Majors will take Calculus II to meet general education requirement	Credits included in major
Textual Analysis	Category of courses for general education requirement	4
Creative Expression	Category of courses for general education requirement	4
Social, Cultural, Historical Understanding	Category of courses for general education requirement	4
Physical Activity & Wellness	General education requirement is 1 credit of physical activity courses OR participation in intercollegiate sports, ROTC, or some other approved experience.	0-1
Jan Term	General education requirement of 1 course during a January Term. Most students complete this by taking My Design.	2
My Career	General education requirement	1
Experiential Learning	General education requirement is that students complete credited or non-credited experiential learning which could include courses, internships, experiential independent studies, or study abroad.	0-4
Total number of general education credits outside of the major		**51-56**
Remaining elective courses (these could count toward a minor, another major, and/or elective credit)		**16-21**
Combined credits from general education and elective coursework		**72** (or 68 for data analysis track)
Total number of credits from the major (see previous table)		**56** (or 60 for data analysis track)
Total number of credits required for the B.A. degree		**128**

COURSE DESCRIPTIONS FOR THE MAJOR:
CSC 1106 - The Art of Programming
Credits: 4

An introduction to the use of algorithms for problem solving. The course will focus on finding algorithmic solutions for a given problem and expressing these solutions in a programming language. This course includes a laboratory.
Prerequisites Placement above MAT 1002.
McDaniel Plan: *Quantitative Reasoning.*

CSC 3365 – Data Science
Credits: 4
This course is an introduction to the field of Data Science. The latest concepts and principles in Data Science such as understanding data, data modeling, computational techniques for analyzing data, data visualization, data quality and the basics of security issues regarding data will be introduced. This course will equip students with applied and hands-on skills to use data analysis techniques for solving practical problems.
Prerequisites CSC 2217

MAT 1117 - Calculus I
Credits: 4
Initial study of limits, derivatives and integrals; review of trigonometric functions; differentiation techniques and formulas applied to rational and trigonometric functions; applications of derivatives including curve sketching; extrema and rate problems; definition of the integral; elementary applications of integrals.
Prerequisites MAT 1107 or placement by the Department.
McDaniel Plan: *Quantitative Reasoning.*

MAT 1118 - Calculus II
Credits: 4
Further study of the trigonometric, exponential, and logarithmic functions and their derivatives, methods of integration; parametric equations; polar coordinates; sequences, infinite series, and power series.
Prerequisites MAT 1117 or placement by the Department.
McDaniel Plan: *Quantitative Reasoning.*

MAT 1xxx - Introduction to Mathematical Modeling in STEM
Credits: 2
Making good decisions requires understanding the consequences of those decisions. In this course we will explore how to use various mathematical models to predict outcomes of decisions in fields as diverse as environmental conservation, business management, and engineering. Students will also gain experience using software to both analyze their models and communicate their results and recommendations. Emphasis will be on providing quantitative evidence for a decision using mathematical tools including basic probability, calculus, graph theory, and game theory.
Prerequisites MAT 1117 or placement by the Department.

MAT 2210 – Numerical Methods
Credits: 4

An introduction to numerical methods for solving problems from calculus and linear algebra, including the solution of a single nonlinear equation, the solution of linear systems, interpolation and approximation, differentiation and integration, and the solution of eigenvalue problems.
Prerequisites MAT 1118

MAT 2218 - Linear Algebra
Credits: 4
A study of the theory of finite-dimensional vector spaces, linear transformations, matrices, determinants, inner products, and eigenvalues.
Prerequisites MAT 1117 or 1118 or placement by the Department.
McDaniel Plan: *Quantitative Reasoning.*

MAT 2219 - Calculus III
Credits: 4
A study of functions of several variables. Topics include partial derivatives, directional derivatives, multiple integrals, the structure of Euclidean n-space, En, functions from Em to En, line and surface integrals, Green's and Stokes' Theorems.
Prerequisites MAT 1118 and MAT 2218 or PHY 2201 or placement by the Department.
McDaniel Plan: *Quantitative Reasoning.*

MAT 2224 - Fundamentals of Mathematics
Credits: 4
A transition course from the technical problem solving of the calculus courses to the rigorous theorem proving courses of advanced mathematics. Introductions to logic and set theory, including the algebra of sets, functions, and relations, with examples from number theory, analysis and abstract algebra.
Prerequisites MAT 1118 or permission of the Department.
McDaniel Plan: *Quantitative Reasoning.*

MAT 3304 - Differential Equations
Credits: 4
Linear differential equations with applications in the physical, biological, and social sciences; series solutions; systems of linear differential equations; approximation methods; the Laplace transform; Fourier series; the heat equation.
Prerequisites MAT 1118.

MAT 3323 – Probability
Credits: 4
A study of sample spaces, counting techniques, discrete and continuous random variables and related moments; binomial, Poisson, normal and other probability distributions; Chebychev inequality, central limit theorem.
Prerequisites MAT 1118; MAT 2219 is recommended

MAT 3324 – Mathematical Statistics
Credits: 4

A systematic treatment of statistics from a theoretical point of view; sampling distributions, decision theory, estimation, hypothesis testing, modeling, and applications.
Prerequisites MAT 3323

MAT 3328 – Operations Research
Credits: 4
A survey of topics from Operations Research: linear programming, computer applications using the Simplex Algorithm, dynamic programming, inventory control, queuing problems, network analysis, and game theory.
Prerequisites MAT 3323 and CSC 1106

MAT 3391 - Mathematics Problems Seminar
Credits: 2
Consideration of problems chosen from diverse areas of mathematics and mathematical ideas outside of a course context. The problems considered vary from year to year.
Prerequisites/Co-requisites MAT 2224
McDaniel Plan: WID

MAT 3xxx - Mathematical Modeling
Credits: 2
This course will expand on the experience of MAT 1xxx -- Introduction to Mathematical Modeling in STEM by using techniques learned from linear algebra and differential equations to model complicated systems. The focus will be on students' creation of construction and evaluation of models. Students will develop formal written analyses of the models, including discussion of the limits of the models' validity, the uncertainties in the models, and the sensitivities of the conclusions to those limits and uncertainties.
Prerequisites/Co-requisites MAT 1xxx, MAT 2218, MAT 3304, and one of MAT 2219 or PHY 2201

MAT 3xxx – Data Analysis
Credits: 4
Data analysis is the study of the extraction of knowledge from data. This course is an introduction to the mathematical methods behind the scientific techniques developed for extracting information from large data sets. We will explore several fundamental topics in computational data analysis, including basic concepts in probability, Bayes' rule, central limit theory, linear regression, dimension reduction, gradient descent, principal component analysis, clustering and classification. We will use Python to demonstrate and explore basic concepts, but programming will not be the main focus of the course.
Prerequisites MAT 2218, MAT 2219, and CSC 1106

MAT 4405 - Real Analysis I
Credits: 4
A treatment of the theory of elementary calculus including functions limits, sequences, series, uniform continuity, derivatives and Riemann integration, topological properties of the real numbers.
Prerequisites MAT-2224; MAT-3316 is recommended

MAT 4406 - Abstract Algebra

Credits: 4

A presentation of the theory of groups, rings, and fields through a study of topics selected from: homomorphisms, isomorphism theorems, Lagrange's theorem, the Sylow theorems, principal ideal domains, Euclidean domains, unique factorization domains, polynomial rings over a field, construction with straight edge and compass, and finite fields.

Prerequisites MAT 2224.

MAT 4494 - Capstone Experience in Mathematics

Credits: 4

A large-scale independent project combining mathematical knowledge, problem-solving ability, and presentation, writing, and research skills. Projects most often involve mathematical research similar to summer research topics - working on unsolved problems and interesting questions. Other possibilities include historical research, mathematical modeling, or mathematical pedagogy.

MAT 449x - Capstone Experience in Applied Mathematics

Credits: 4

A large-scale independent project combining mathematical knowledge, problem-solving ability, and presentation, writing, and research skills. Projects will focus on an area of applied mathematics, such as mathematical modeling, operations research, or financial mathematics.

Prerequisites MAT 2224.

MAT 449x - Capstone Experience in Applied Mathematics – Data Analysis

Credits: 4

A large-scale independent project combining mathematical knowledge, problem-solving ability, and presentation, writing, and research skills. Projects will focus on a specific topic in data analysis.

Prerequisites MAT 2224.

ENG 2206 - Creative Writing—Poetry

Credits: 4

A workshop in writing poetry. Student poems will be critiqued weekly in the class workshop. Students will read and analyze modern and contemporary poetry by such authors as Robert Frost, Elizabeth Bishop, Gwendolyn Brooks, Sylvia Plath, William Stafford, and Robert Hayden.

Prerequisites ENG-1101

McDaniel Plan: *Creative Expression.*

ENG 2207 - Creative Writing—Fiction

Credits: 4

A workshop in writing short fiction. Student writing will be critiqued weekly in the class workshop. Students will read and analyze modern and contemporary short fiction by such authors as Welty, Hemingway, O'Connor, and Oates.

Prerequisites ENG-1101

McDaniel Plan: *Creative Expression.*

ENG 2208 - Advanced Composition
Credits: 4
Designed to support writers' development as prose stylists. Primary emphasis placed on students' own nonfiction writing – about objects, places local or distant, and people familiar or famous. Students learn to generate material, to revise prose for fluidity and grace, and to recognize how style affects readers. Students also read published literary nonfiction (profiles, literary journalism, nature writing, memoir) to learn about craft in prose, imitate the techniques of published writers, and reflect on the creative process.
McDaniel Plan: *Creative Expression.*

ENG 2212 - Professional Communication
Credits: 4
An opportunity for students to practice and think critically about communication in the workplace. Assignments will focus on writing forms and topics suitable for students' fields of major interest. Students will complete individual and collaborative projects designed to help them write clearly and effectively for audiences both within their professions and outside of them. Particular emphasis will be placed on electronic communication forms.
Prerequisites ENG 1101 and a minimum of 32 credits

PHI 3200 - Writing in Philosophy
Credits: 4
Focused, direct instruction in the writing skills necessary for successful research papers in Philosophy. Different topics are chosen for each offering, based on students interests and needs.
McDaniel Plan: *Departmental Writing*

5. Discuss how general education requirements will be met, if applicable.
Depending upon the specific courses a student chooses, the proposed Applied Mathematics major covers a minimum of 3 general education requirements and a maximum of 4 general education requirements. All applied mathematics majors would complete both Quantitative Reasoning requirements (2 courses, 8 credits) and the Writing in the Discipline requirement (1 course, 4 credits). Additionally, many of the courses that can be used to satisfy the Writing in the Discipline requirement satisfy the Creative Expression requirement for general education. Therefore, students will satisfy 12 credits of their general education requirements through the Applied Mathematics major. Students will meet the remaining general education requirements outside of their major.

6. Identify any specialized accreditation or graduate certification requirements for this program and its students.
N/A

7. If contracting with another institution or non-collegiate organization, provide a copy of the written contract.
N/A

8. 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. The college catalog includes information on approved programs including all required coursework and total program hours. The catalog also addresses degree and McDaniel Plan (general education) requirements for students.

The Schedule of Classes for each semester outlines how classes are offered and the nature of faculty/student interaction—face-to-face, online, or hybrid. The learning management system for the online and hybrid classes is Blackboard. When student accounts are created, students receive an automated email that contains information about Blackboard and the system requirements. This information is in the student's inbox when they first access their email. If specific technological competencies or skills are required for any courses within the approved program, this information is outlined in the course description.

The college website and intranet contain pertinent information about student support services, including academic support, financial aid, tuition and fees, billing and payment, and policies relating to each.

9. Provide assurance and any appropriate evidence that advertising, recruiting, and admissions materials will clearly and accurately represent the proposed program and the services available. At McDaniel College, recruitment materials are updated annually. This provides the college flexibility to ensure accuracy.

Additionally, it is the habit of the Office of Admissions to introduce prospective students to departmental faculty when possible. Campus visits include the opportunity to sit in on a class or to meet with faculty (https://www.mcdaniel.edu/undergraduate/admissions/visit-mcdaniel). Emails written by department chairs are deployed by the Office of Admission and admitted student events feature one-hour sessions that give faculty and current students an opportunity to share details about the major.

The college's website is currently undergoing a complete redesign, but departmental practice in the Office of Communication and Marketing is to review academic program pages monthly for accurate content. Academic pages link to the most recent version of the college's catalog, giving prospective students a clear and accurate view of the program requirements and coursework (https://www.mcdaniel.edu/undergraduate/the-mcdaniel-plan/departments/mathematics-computer-science).

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.

All of the mathematics courses for the Applied Mathematics major (and Data Analysis track) will be taught by full-time Mathematics and Computer Science Department tenure-track faculty with Ph.Ds.

Name	Terminal Degree	Academic Title/Rank	Status	Courses
Italo Simonelli	Ph.D. in Mathematics	Professor of Mathematics	Full-time Faculty	MAT 1117: Calculus I MAT 2218: Linear Algebra MAT 2219: Calculus III MAT 3xxx: Data Analysis
Spencer Hamblen	Ph.D. in Mathematics	Associate Professor of Mathematics	Full-time Faculty	MAT 1118: Calculus II MAT 2224: Fundamentals of Mathematics MAT 4406: Abstract Algebra MAT 4494: Capstone Experience in Applied Mathematics
Ben Steinhurst	Ph.D. in Mathematics	Associate Professor of Mathematics	Full-time Faculty	MAT 1xxx: Introduction to Mathematical Modeling in STEM MAT 3xxx: Mathematical Modeling MAT 3304: Differential Equations MAT 4405: Real Analysis 1
Paul Lin	Ph.D in Computer Science	Assistant Professor of Computer Science	Full-time Faculty	CSC 1106: The Art of Programming
Ting Zhang	Ph.D in Computer Science	Assistant Professor of Computer Science	Full-time Faculty	CSC 1106: The Art of Programming

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

McDaniel College prides itself on its excellent instruction and therefore provides many forms of faculty development to support professors in all stages of their careers. New faculty participate in a year-long orientation program of monthly professional development events which include a focus on evidence-based practices. Every August, new and returning faculty attend a day-long faculty development retreat which includes concurrent sessions on various topics including diversity, students with learning differences, evidence-based research about teaching and learning, best practices for hybrid and online teaching, handling challenging classroom situations, etc. Throughout the academic year, we offer 1 to 2 faculty development sessions each month which are open to all faculty. Each year, we run a faculty book group/learning community which approximately one third of our full-time faculty participate in; the book is always one which highlights evidenced-based practices. In addition to the group-based forms of faculty development described above, the institution also provides one-on-one support

to faculty who would like to receive formative feedback on their teaching through class observations and/or moderated focus groups with their students.

b) The learning management system
The Department of Instructional Design and Technology at McDaniel College offers the following resources to support faculty use of Blackboard: (a) 60-minute workshops throughout the year on Blackboard Basic, Intermediate, and Advanced features; (b) one-on-one Blackboard training for all new faculty members and anyone else who requests it; (c) a range of course design templates that enable/encourage backward design, outcome alignment, authentic assessment, appropriate rubrics, and a range of student-centered pedagogical methods; and (d) professional development lunch events about matters of instructional design.

c) Evidenced-based best practices for distance education, if distance education is offered.
All faculty who teach an online course are required to first take BPO 100: *Best Practices in Online Teaching and Learning*, a four-week (28-hour commitment) online course. By completing the course, participants (a) gain the benefit of the experience, research, and knowledge from those individuals and institutions who have been offering online instruction for many years, (b) develop specific strategies for maintaining social presence, teaching presence, and cognitive presence in an online classroom, and (c) develop specific strategies for facilitating collaboration, reflection, and learner-centered pedagogies. BPO 100--a constructivist, discussion-based class--is informed by the Community of Inquiry framework and standard best practices as measured by Quality Matters.

J. Adequacy of Library Resources (as outlined in <u>COMAR 13B.02.03.12</u>).

1. Describe the library resources available and/or the measures to be taken to ensure resources are adequate to support the proposed program.
McDaniel College's Hoover Library contains approximately 375,038 book volumes, access to 87 different databases, 77,676 titles of media, and 84,516 serials. The Hoover Library website (http://hoover.mcdaniel.edu) includes Research Guides—general and course specific—that assist students with identifying appropriate resources for academic writing. The guides also provide general assistance with the research process by covering topics such as source selection and evaluation.

The College's print collection is available for loan to all McDaniel College students, faculty, staff, and other community members. The library's website provides remote access to the online catalog and electronic databases so that students may access the library's resources from wherever they are working. No-fee interlibrary loans and document delivery from other institutions supplement the collection in support of research and classroom projects.

As part of the Carroll Library Partnership, Hoover Library shares an online catalog with Carroll County Public Library and Carroll Community College. Students, faculty, and staff may use, request, and check out titles from any of the three collections. This arrangement makes an additional 700,000 volumes available to the McDaniel College community. McDaniel College

students and faculty also have borrowing privileges at participating libraries at institutions in the Maryland Independent Colleges and Universities Association (MICUA), the Baltimore Area Library Consortium (BALC), and the Associated College Libraries of Central Pennsylvania (ACLCP).

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

<u>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.</u>
The Mathematics and Computer Science Department has 7 offices, and typically uses 6 classrooms, 1 seminar room, and 2 computer labs in Lewis Hall of Science and Lewis Recitation Hall. Students in the proposed Applied Mathematics major will have access to and training on mathematical software and web tools such as Excel, Mathematica, and SageMath/CoCalc. Students will be able to access these tools in the computer labs in Lewis Hall of Science.

<u>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:</u>
    <u>a) An institutional electronic mailing system, and</u>
    <u>b) A learning management system that provides the necessary technological support for distance education</u>
All McDaniel students are provided with email accounts. The institution uses Blackboard for course delivery, community engagement, and content management for all face-to-face and online courses. Our Blackboard system is fully integrated with our Student Information System (SIS), such that (a) all students and faculty automatically have Blackboard accounts, (b) all classes are automatically built, and (c) all enrollments are automatically managed via SIS integration.

Instructors and students utilize iDevices, Adobe Connect, Ensemble, video from Hoover Library databases, and fast Internet connections. The Student Academic Support Services (SASS) office provides on-loan assistive technology to students. The Instructional Technology Office provides training and support for faculty and students using any technology used in the course. The department has adequate information technology resources to support faculty and students.

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

<u>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.</u>
Rationale for enrollment projections
New student enrollment projections embedded in our strategic enrollment plans are developed by the Vice President for Enrollment. They are based on the VP's review of historical enrollment data in similar fields at McDaniel College, the size of the potential market in primary recruitment areas for the college, and enrollment trends nationally.

Rationale for reallocated funds

Last year, the College underwent a faculty-led review in response to a request from the McDaniel Board of Trustees to identify academic programs for possible reinvestment, as well as potential restructuring. The goal of this review was to strengthen the academic program of the College by aligning our academic offerings with current and prospective students' demonstrated interests.

In the spring of 2019, the Board of Trustees unanimously approved the recommendations that would suspend enrollment for future students in the following undergraduate majors: Art History, Religious Studies, French, German and Music. Minors in German, Music and Latin will also no longer be offered. These programs were selected, in large part, due to relative under-enrollment compared with other programs at the College.

The following chart indicates the number of students who were in the pipeline and in our prospective student pool as of November of 2018:

Program	5-yr avg degrees	Current majors	Current minors	F19 Admissions projections Apps→Admits→Yield
Art History Major (minor retained)	4.6	4	4	N/A: Art History not in survey General Art = **6 students**
Religious Studies Major (minor retained)	1.6	7	10	8 apps → 5 admits → **1 student**
French Major (minor retained)	3.8	8	6	9 apps → 6 admits → **1 student**
German Major and Minor	2.2	12	5	2 apps → 1 admits → **0 students**
Music Major and Minor (select music activities retained)	3.2	13	8	32 apps → 21 admits → **4 students**

Any prospective students who indicated an interest in these majors were notified of the program suspensions in advance of making their decision to enroll. The College guaranteed that all students who had declared a major in an impacted program would be able to graduate with their intended degree. McDaniel students were allowed to declare any major through the end of this spring semester regardless of whether there was a recommendation to suspend. And in every case except for German and Latin, courses will still be taught in these disciplines and students will be able to use these courses to fulfill their core education (McDaniel Plan) requirements. Specifically related to Music, select performance opportunities that have existed for all students, regardless of major, will still be available, including choir and band, as well as music lessons. Students can still select from five second languages: Arabic, ASL, Chinese, French, and Spanish.

Because of our commitment that all students in an affected major can graduate with their intended degree, existing faculty may continue to teach in the affected programs of study for a number of years. The College is closely following American Association of University Professors (AAUP) guidelines.

The recommendations approved by the board resulted in nearly a million dollars worth of savings over the next five years, 100% of which will be re-invested to strengthen our academic programs. Investments will support the reorientation of existing programs to better meet the needs of the 21st century, and to create new programs that will expand the curricular offerings of the College. This was not a budget cut.

The Board also voted to investigate these strategic re-investments in four categories of strong and growing interest to current and prospective students: Health Sciences/STEM, Business and Technology, the Liberal Arts core curriculum, and professional certificates.

None of these changes will adversely affect our ability to deliver our hallmark McDaniel Plan and McDaniel Commitment. Our students will continue to experience a broad education in the liberal arts and sciences while delving deeply into their program areas of special interest.

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.
FTE & operating budget calculations were based upon existing departments which will contribute at least 25% of the courses in the proposed major. Using only those high-contributing departments, FTE & operating budgets were then calculated based on proportionate contributions.

M. **Adequacy of Provisions for Evaluation of Program (as outlined in <u>COMAR 13B.02.03.15</u>).**

1. Discuss procedures for evaluating courses, faculty and student learning outcomes.
Courses are evaluated via online student course evaluations which are reviewed by department chair and the individual faculty member at the end of each semester; these evaluations include quantitative and qualitative components. Programmatic student learning outcomes are assessed via direct and indirect measures under the guidance of the standing Academic Assessment Committee as described in G.3

Faculty teaching in the program will be evaluated in accordance with the faculty evaluation procedures of McDaniel College specified in the McDaniel College Faculty Handbook. At the time when franchised faculty are eligible for reappointment, tenure, promotion, or periodic review, the faculty member critically evaluates his or her performance as a teacher, reviews course evaluations, and provides evidence of effective teaching, service to the college, and scholarly and/or professional activity. The 5 elected members of the Faculty Affairs Committee review the materials submitted by the faculty member as well as the student course evaluations, rate the candidate's performance, and make a recommendation to the Provost for employment action. Adjunct faculty are reviewed by their department chair on a regular basis; adjunct faculty are evaluated based on their course evaluations and other materials they may submit to document their teaching effectiveness.

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.

In addition to the annual assessments of student learning outcomes overseen by the Academic Assessment Committee described earlier (see G.3), the program will engage in a periodic program review. The program review process is overseen by the Academic Planning Committee (APC) – a standing committee that is part of our faculty governance system. Faculty who teach in the program will prepare a self-study that includes data about course and program enrollment, faculty professional activity, student retention/graduation rates, assessments of student learning outcomes, alumni outcomes and satisfaction, a comparison of the program to similar programs at other colleges, nationwide trends in the discipline, an evaluation of the current strengths and challenges of the program, and a five-year strategic plan. The self-study is reviewed by the APC and feedback is provided. External consultants review the self-study and make an on-site visit to further evaluate the program's educational effectiveness and make recommendations based for improvement. The last step of this year-long review process is the revision of the five-year plan to address any weaknesses or areas of improvement.

The student body is surveyed using several different methods. Annually, we complete the Higher Education Data Sharing (HEDS) Consortium's "Senior Survey," which asks seniors to report on five dimensions of their undergraduate experience: good teaching and high-quality Interactions with faculty, challenging assignments and high faculty expectations, interactions with diversity, growth on intellectual outcomes, and growth on civic outcomes. Secondly, we use the Student Satisfaction Inventory (SSI) from Ruffalo Noel Levitz, which measures student satisfaction and which issues are most important to them. Finally, we also utilize the National Survey of Student Engagement (NSSE), which looks at engagement indicators and high-impact practices. With each of these assessment methods, data can be disaggregated to a departmental/programmatic level. These reports are provided to department chairs for integration into their own assessment plans and departmental reviews as a measure of student satisfaction.

Regarding cost effectiveness, McDaniel College engages in a strategic planning process to determine the viability of its programs. This process involves developing a unique Strategic Enrollment Plan (SEP) for the program. As defined by Ruffalo Noel Levitz, Strategic Enrollment Planning is "a data-informed process that aligns an institution's fiscal, academic, co-curricular, and enrollment resources with its changing environment to accomplish the institution's mission and ensure the institution's long-term enrollment success and fiscal health." At McDaniel, this means each proposed academic program is reviewed through the lens of not only curricular innovation and mission alignment, but also program demand, departmental costs, investment needs, and long-term viability. This data is reviewed by the Provost and a faculty committee whose focus is strategic planning and the budgetary health of the institution. This program was developed with the assumption that the program could continue to be sustained through existing institutional resources, but with plans for increased investments when the expected program growth occurs.

N.   Consistency with the State's Minority Student Achievement Goals (as outlined in <u>COMAR 13B.02.03.05</u>).

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

McDaniel College is committed to minority student access and success. In accordance with this commitment, the College has articulated cultural diversity goals which include general education courses related to cultural diversity, co-curricular student programming, and faculty and staff development regarding working with a diverse student body.

Students of all ages, interests, professions, and backgrounds are encouraged to apply for undergraduate and graduate study. Fall enrollment data from 2018 show that 28% of our student population identified as students of color, a number that has steadily increased since 2010. The majority of students at McDaniel College (65%) come from the State of Maryland, and 26% are considered first-generation college students. McDaniel College actively recruits prospective students through campus events and career fairs throughout the mid-Atlantic region.

All the students in the proposed program will complete general education courses which have been designed to educate students about different forms of diversity. Students will complete at least one multicultural course which will give students an understanding of the cultural pluralism of American society. Multicultural courses focus on the cultures and experiences of diverse groups in the United States that have been historically subordinated or marginalized and defined by such categories as race, gender, sexuality, class, religion, and disability. Students will complete at least two international courses, one of which must focus on a non-western region. International courses examine the perspectives and customs of cultures outside the U.S. or the relationship between the U.S. and world cultures. In addition to these general education course, our orientation program for first year students includes 3 sessions focused on diversity-related issues relevant to college students and those sessions span from the summer orientation through the end of the first semester so that we can address diversity education at multiple stages of their first year.

Many co-curricular, cultural activities are sponsored by the Office of Diversity and Inclusion, while other activities are initiated by our many student organizations which provide social support and co-curricular events for students.   (e.g., the Black Student Union, the Gender Sexuality Alliance, the Hispano-Latinx Alliance, the Asian Community Coalition, the Muslim Student Association, and the Jewish Student Union).

The faculty members who will teach in the proposed program participate in multiple professional development events focused on teaching and supporting students from diverse groups. Every August, McDaniel College holds a faculty development retreat and requires that faculty attend at least one session focused on diversity-related issues. Our newest full-time faculty members participate in a year-long orientation series which includes sessions about teaching our diverse student body as well. In addition, throughout the academic year, professional development sessions focused on diversity-related issues are open to all faculty and staff.

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.

This proposed program is not directly related to an identified low productivity program.

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

<u>1. Provide affirmation and any appropriate evidence that the institution is eligible to provide Distance Education.</u>
While we are eligible to provide Distance Education as an institution at the Graduate level, this proposed Undergraduate program will not be offered in Distance Education format.

<u>2. Provide assurance and any appropriate evidence that the institution complies with the C-RAC guidelines, particularly as it relates to the proposed program.</u>
While we are eligible to provide Distance Education as an institution at the Graduate level, this proposed Undergraduate program will not be offered in Distance Education format.

TABLE 1: PROGRAM RESOURCES						
Resource Categories	Year 1	Year 2	Year 3	Year 4	Year 5	Narrative
1. Reallocated Funds	$0.00	$0.00	$0.00	$0.00	$0.00	
2. Tuition/Fee Revenue (c + g below)	$0.00	$45,518.00	$93,767.08	$120,725.10	$149,216.22	
a. Number of F/T Students	0	2	4	5	6	Because we did not market this new major when recruiting students for Fall 2019, any students who might declare this major in Year 1 will be already-enrolled students. Therefore, we are projecting no NEW students and no additional tuition revenue during Year 1 attributed to this program.
b. Annual Tuition/Fee Rate	$0.00	$22,759.00	$23,441.77	$24,145.02	$24,869.37	
c. Total F/T Revenue (a x b)	$0.00	$45,518.00	$93,767.08	$120,725.10	$149,216.22	
d. Number of P/T Students	0	0	0	0	0	We have so few part-time undergraduates that we are not including part-time students in our projected enrollments.
e. Credit Hour Rate	0	0	0	0	0	
f. Annual Credit Hour Rate	$1,391.89	$1,433.07	$1,476.07	$1,520.35	$1,565.96	
g. Total P/T Revenue (d x e x f)	$0.00	$0.00	$0.00	$0.00	$0.00	
3. Grants, Contracts & Other External Sources	$0.00	$0.00	$0.00	$0.00	$0.00	
4. Other Sources	$0.00	$0.00	$0.00	$0.00	$0.00	
TOTAL (Add 1 – 4)	$0.00	$45,518.00	$93,767.08	$120,725.10	$149,216.22	

TABLE 2: PROGRAM EXPENDITURES:						
Expenditure Categories	**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**	**Narrative**
1. Faculty (b + c below)	$0.00	$0.00	$0.00	$0.00	$0.00	
a. Number of FTE	6	6	6	6	6	No new faculty needed. Projected new students: Y2 = 2 students, Y3 = 4, Y4 = 5, Y5 = 6, add new faculty for every 15 new students.
b. Total Salary	$0.00	$0.00	$0.00	$0.00	$0.00	
c. Total Benefits	$0.00	$0.00	$0.00	$0.00	$0.00	
2. Admin. Staff (b + c below)	0	0	0	0	0	
a. Number of FTE	0	0	0	0	0	We do not need to hire new administrative staff because the department within which this major will be offered has sufficient staffing.
b. Total Salary	$0.00	$0.00	$0.00	$0.00	$0.00	
c. Total Benefits	$0.00	$0.00	$0.00	$0.00	$0.00	
3. Support Staff (b + c below)	0	0	0	0	0	
a. Number of FTE	0	0	0	0	0	We do not need to hire new support staff because the department within which this major will be offered has sufficient staffing.
b. Total Salary	$0.00	$0.00	$0.00	$0.00	$0.00	
c. Total Benefits	$0.00	$0.00	$0.00	$0.00	$0.00	
4. Technical Support and Equipment	$0.00	$0.00	$0.00	$0.00	$0.00	Technical support and equipment will be provided from existing resources in the Mathematics & Computer Science Department.
5. Library	$0.00	$1,027.00	$1,068.08	$1,110.80	$1,155.24	Cost of adding 2 journals. Other resources are already available through existing databases. Assumes annual 4% increase.
6. New or Renovated Space	$0.00	$0	$0	$0	$0	
7. Other Expenses	$0.00	$692.00	$1,384.00	$1,730.00	$2,076.00	Current Math & Computer Science department operating budget = $16,610, 50% for majors (vs. 50% gen ed) = $8,305. Divided by 24 majors = $346 cost per student X new student projections.
TOTAL (Add 1 – 7)	$0.00	$1,719.00	$2,452.08	$2,840.80	$3,231.24	