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

Institution Submitting Proposal	Mount St. Mary's 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 # 27541 (●) Check # 27541
Payment Amount: $850.00
Date Submitted: 021825

Department Proposing Program	Math and Computer Science	
Degree Level and Degree Type	Bachelor of Science	
Title of Proposed Program	Computational Technology	
Total Number of Credits	120	
Suggested Codes	HEGIS: 799.00	CIP: 30.3001
Program Modality	( ) On-campus ( ) Distance Education (fully online) (●) Both	
Program Resources	(●) Using Existing Resources ( ) Requiring New Resources	
Projected Implementation Date (must be 60 days from proposal submisison as per COMAR 13B.02.03.03)	(●) Fall ( ) Spring ( ) Summer	Year: 2025
Provide Link to Most Recent Academic Catalog	URL: https://catalog.msmary.edu/	
Preferred Contact for this Proposal	Name: Christine McCauslin Ph.D.	
	Title: Dean, School of Science, Mathematics, and Technology	
	Phone: (301) 447-8399	
	Email: mccauslin@msmary.edu	
President/Chief Executive	Type Name: Gerard J. Joyce, Ph.D.	
	Signature: Gerard J. Joyce Date: 2/28/2025	
	Date of Approval/Endorsement by Governing Board:	

Revised 1/2021

MOUNT ST. MARY'S UNIVERSITY

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February 14, 2025

Sanjay K. Rai, Ph.D.
Secretary of Maryland Higher Education
Maryland Higher Education Commission
6 North Liberty Street
Baltimore, MD 21201

Dear Dr. Rai,
On behalf of Mount St. Mary's University, I am submitting to you proposals for a **new Bachelor of Science program** and an **undergraduate certificate** in Computational Technology. Mount St. Mary's is seeking approval from the Maryland Higher Education Commission to offer these programs through the School of Science, Mathematics, and Technology.

Enclosed, you will find the complete proposals and cover sheet for your review. A check in the amount of $1,100.00, representing the required fees ($850 for the new degree program and $250 for the new stand-alone certificate), is being sent under separate cover to the attention of Collegiate Affairs, Maryland Higher Education Commission.

Thank you in advance for your timely consideration of these proposals. I look forward to hearing from you.

Sincerely,

Boyd Creasman, Ph.D.
Provost

Proposal for a New Bachelor of Science in Computational Technology

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.

   The new major in Computational Technology will be a 39-credit major comprised of new courses in the Department of Mathematics and Computer Science and offered through the Mount St. Mary's University Division of Continuing Studies. This academic major is designed to graduate students with the most in-demand skills in mathematics, computer science, and data science. In addition, with a thorough foundation in multiple disciplines, graduates will be well-suited to work in a variety of fields that deal with multidisciplinary issues and methods. The goal of this program is to both train and graduate students who can apply a broad range of skills to in-demand careers that require a variety of technical computational skills.

   Mount St. Mary's University (MSMU) is a Catholic university committed to graduating ethical leaders who are inspired by a passion for learning and lead lives of significance in service to God and others (Mission Statement, 2019). The MSMU School of Natural Science and Mathematics (SNSM) mission is to "...form ethical leaders who are grounded in the content and methodologies of their disciplines and can identify opportunities for innovation across disciplinary boundaries." The interdisciplinary nature of this program fits well with the mission of the SNSM, as students will be trained to seek solutions to problems using techniques from computer science, data science, and mathematics. In addition, the SNSM mission seeks to graduate students that will ethically, creatively, and logically resolve challenges facing our world using their professional knowledge. This major in Computational Technology emphasizes problem solving built on real-world issues, so is consistent with the MSMU's and the SNSM's missions to graduate students who are well prepared to promote discovery and cross-disciplinary innovation. Complemented by a liberal arts education in a Catholic setting, the coursework within this major is relevant, comprehensive, rigorous, and stimulating, and will prepare students for impactful and lucrative technology careers.

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

   The major in Computational Technology supports numerous strategic priorities and goals of the 2018-2025 Mount St. Mary's University Strategic Plan. Student

Success is a priority of the strategic plan. More specifically, the Mount "prepares a diverse student body to be ethical leaders who lead lives of significance in service to God and others. We do this by immersing students in a rigorous intellectual, social and spiritual experience, grounded in the Catholic intellectual tradition. The Mount prepares graduates for excellence in their lifelong pursuits through cultivating a zeal for learning." The major in Computational Technology is consistent with the Student Success priority of the Mount, as it offers, for the first time, a technical degree in the Division of Continuing Studies. As a result of a carefully crafted and complementary courses in mathematics, computer science, and data science, students will develop a variety of skills and mind-sets that will allow them to contribute to teams, bridge disciplines, and tackle real-world problems. With the robust core curriculum and thoughtful inclusion of ethical issues in technology, graduates will be grounded in the necessary skills and mindset to emerge as ethical leaders in the technology sector, as well as manifest a curiosity in our world that can be explored through the use of technology.

The Mount's Strategic Plan also includes a goal to "develop new academic programs and systematically review existing programs in order to meet the needs of society." Regionally and statewide there is a demand for skilled technical workers; the major in Computational Technology will help fill this need and support the tremendous growth in the technology and biotech sectors in our local area.

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.)

Mount St. Mary's University is committed to adequately funding the proposed program for at least five years. The established Center for Instructional Design and One Button Studio will provide training and resources for online course development and maintenance, while the Information Technology Support Center will provide technical support. There are no specific hardware or software needs. Current faculty members have the expertise to fully teach the new major. When the program is fully established, the department will be offering five new courses in the fall semester, five new courses in the spring semester, two new courses over the winter term, and one new course in the summer. Thus, when fully established, the major will require a new faculty member to fill department staffing needs in mathematics, computer science, data science or cybersecurity, which may include teaching in the new major. Additional courses will be taught by adjunct instructors.

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

   a. Ongoing administrative, financial, and technical support of the proposed program.

      This new major in Computational Technology will receive administrative support from the Chair of the Department of Mathematics and Computer Science, the Dean of the School of Natural Science and Mathematics, the Associate Provost for the Division of Continuing Studies, as well as the Provost and President. The Chair and Dean work closely with the faculty and boards of advisors to enact a mission and vision that aligns to the University mission and strategic plan. The Chair will collect and analyze data from key assessments as well as staffing. Three administrative assistants—one assigned to the school, one assigned to the department, and one assigned to the Division of Continuing Studies - will provide the administrative support necessary for the program.

   b. Continuation of the program for a period of time sufficient to allow enrolled students to complete the program.

      The Department of Mathematics and Computer Science is home to three tenured professors, seven assistant professors, and one endowed professor. Most faculty have Ph.Ds. in mathematics, computer science, or data science. The department has a long history of graduating students and has done very well offering new programs in the last 10 years. Moreover, the President's signature on the proposal cover sheet indicates the University's confidence of the program's viability. University procedures for the discontinuation of programs, when necessary, include the preparation of teach-out plans and individual student program plans to ensure enrolled students have a pathway for program completion.

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 U.S. Bureau of Labor Statistics[1] states that, "Employment of computer and information research scientists is projected to grow 23 percent from 2022 to 2032, much faster than the average for all occupations." In addition, EAB[2] (formerly Education Advisory Board) forecast released in 2024 lists Project Management, Computer Science, Data Analysis, and Python as four of the top ten most sought job skills in Maryland in 2023. These skills are all part of the proposed major. In addition, EAB says software developers and computer systems engineers/architects are in the topmost commonly sought occupations in Maryland in 2023. These are career paths graduates of the major might choose. While there is some overlap between the proposed major and existing majors, in computer science and data science, the Computational Technology major gives students technical skills across multiple disciplines and a strong mathematical problem-solving background.

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

The initial motivation for this major comes from a desire to provide pathways for economically disadvantaged students to complete degrees at a private, four-year college in a STEM field. In particular, the major aims to present pathways for community college students to transfer to a private four-year college in a completely online program, so there are no additional housing costs. The major allows for students from a variety of STEM backgrounds to gain the most in-demand technical skills that employers are looking for. In addition, the major gives an opportunity for adult learners to complete a STEM degree.

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

Not Applicable

2. Provide evidence that the perceived need is consistent with the Maryland State Plan for Post-Secondary Education.

The major in Computational Technology is consistent and in alignment with all priorities of the Maryland State Plan. These include Access (Ensuring equitable access to affordable and quality post-secondary education for all Maryland

[1] https://www.bls.gov/ooh/computer-and-information-technology/computer-and-information-research-scientists.htm
[2] EAB. (2024). *Employer Demand Profiles*. EAB. Retrieved from https://eab.com/resources/tool/us-employer-demand-profiles/.

residents), Success (Promoting and implementing practices and policies that will ensure student success), and Innovation (Fostering innovation in all aspects of Maryland higher education to improve access and student success).

Access: The major in Computational Technology affords access by ensuring equal educational opportunities for all Marylanders. Mount St. Mary's University will individually work with each student to construct a completion plan that aligns their previous course work, if any, and their goals and financial resources. By offering an online asynchronous degree with various transfer pathways, students are able to complete a degree without paying for campus housing and in a way that is flexible with other demands, such as a job or caregiving.

Success: The major in Computational Technology will meet the needs of both traditional and non-traditional students by providing them with an opportunity to complete an asynchronous online STEM degree grounded in the Catholic intellectual tradition. This major in Computational Technology addresses a work force shortage in tech fields. Students in the program will be supported in their studies through our Center for Student Success and Learning Services and in a career pathway that is enriched by professional development through our Career Center.

Innovation: The major in Computational Technology is an innovative blend of mathematics, computer science, and data science that will provide each student with a foundational understanding of mathematical problem solving while providing technical skills in Python, R, Java, AI, machine learning, software development, and other innovative technological applications. As such, completers of this program will be exceedingly well placed to find immediate employment in a variety of STEM fields. The Dean of the School of Natural Science and Mathematics, the Associate Provost of the Division of Continuing Studies, and the Chair of the Department of Mathematics and Computer Science will seek out partnerships for internships and professional opportunities.

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.

The diverse nature of the curricula for the major in Computational Technology would prepare graduates for entry-level employment in a variety of fields. These areas could include programmers, software developers, data scientists, web

developers, database administrators, and applied mathematicians.

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

   The demand for skilled technical workers has constantly grown over the past decade, and given the nature of the proposed curriculum, graduates will be able to purse jobs in a variety of related and growing technical fields. For example, the Bureau of Labor Statistics predicts a 25% increase in demand for software developers[3] and data scientists[4], and 8% increase in demand for database administrators[5], and a 30% increase in demand for mathematicians[6].

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.

   Research for the major in Computational Technology is very promising and suggests there is both a regional and national need for graduates in this area. The data for the state of Maryland provided by Gray & Associates suggest that data analytics/data science, which includes skills of data science, programming, and problem solving, is in the 85th percentile for job postings over the past 12 months, the 86th percentile in the Bureau of Labor Statistics in current employment, and the 87th percentile for the BLS report on annual job openings. This data—when combined with the projected growth—suggest that this major in Computational Technology is both timely and in demand.

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

   As the responses above suggest, the research from Gray's and EAB strongly indicates that there is immediate employment available to graduates of the proposed major in Computational Technology. For example, in Maryland EAB found in n = 331,271 job postings, four of the ten most commonly sought skills are skills taught in the major. The below table lists the demand for these skills in 2023 in Maryland as reported by EAB.

Skill	Number of postings	Percent of

[3] https://www.bls.gov/ooh/computer-and-information-technology/software-developers.htm
[4] https://www.bls.gov/ooh/math/data-scientists.htm
[5] https://www.bls.gov/ooh/computer-and-information-technology/database-administrators.htm
[6] https://www.bls.gov/ooh/math/mathematicians-and-statisticians.htm

		Postings
Project Management	45,574	13.76%
Computer Science	40,794	12.31%
Data Analysis	25,313	7.64%
Python	22,386	6.76%

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.

   Within the state of Maryland, Hood College offers the only other Bachelor's degree in Computational Science. Several features distinguish the proposed degree from that offered by Hood College. Hood's degree is described as an interdisciplinary degree in applied mathematics and computer science designed to prepare students to solve problems in another science[7]. As such, this 49 credit degree requires 23 credits (7 courses) in traditional mathematics, 23 credits in traditional computer science, and a three credit senior capstone project. In addition, students majoring in this degree must designate a concentration in a natural science discipline. The emphasis on application of computer science and mathematical approaches to address questions in the natural sciences ensures that the focus of this program is more narrow than the proposed program.

   Mount St. Mary's proposed Bachelor of Science degree in Computational Technology is distinctive from Hood's degree in multiple ways. First, the proposed degree requires 39 credits divided between mathematics, computer science, and data science. In addition, the proposed degree requires exposure to project management principles. The inclusion of data science and project management serves to differentiate the proposed degree from other offerings and has been intentionally designed to prepare students to enter the workforce with technical skills that are in demand across industries and will appeal to a broader population of students. Finally, the proposed degree will be available in an online format making it more widely accessible to both traditional students and non-traditional adult learners.

[7] https://hood.smartcatalogiq.com/en/2018-2019/catalog/undergraduate-studies/undergraduate-majors/computational-science-major-b-s/

2. Provide justification for the proposed program.

The development of a major in Computational Technology is well supported, not only through externally acquired data from sources of the Bureau of Labor Statistics, but also through internal elements such as the support of the preexisting STEM majors and our university's mission. Indeed, the support of an online asynchronous STEM major in Computational Technology will also help the university to provide a pathway for prospective students who want to study a technical STEM field but need more flexibility than our current programs offer.

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

The proposed major will have little impact on preexisting programs at Historically Black Institutions. We might anticipate, however, that some graduates might elect to pursue graduate studies in a variety of technical areas, business, or science at HBIs following their graduation.

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

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

The proposed major will not have an impact on the uniqueness, institutional identities, or mission of the state's Historically Black Institutions.

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 proposed program was established based on preexisting strength of the faculty in the Department of Mathematics and Computer Science at Mount St. Mary's University and the desire to create a program that would allow students who are not able to live on campus or to attend a traditional in-person college schedule to complete a STEM degree at a small, Catholic liberal arts institution. In particular, the needs for such a program were identified through work on a National Science Foundation S-STEM grant, C3STEM, which was a partnership between Mount St. Mary's University, Montgomery College, and Frederick Community College. Academic research conducted during this administration of

this grant identified this need. Beyond these factors, the research strongly suggests that there is a local and national demand for skilled technical workers.

The faculty and administrators responsible for planning, implementation, and evaluation of the major in Computational Technology are listed below.

Dean			
Dr. Christine McCauslin	PhD	Biology	Full-time
Associate Provost, Division of Continuing Studies			
Dr. Jen Staiger	PhD	Biology	Full-time
Department Chair			
Dr. Jonelle Hook	PhD	Mathematics	Full-time
Faculty			
Dr. Melanie Butler	PhD	Mathematics	Full-time
Dr. Matt Gerhart	PhD	Mathematics	Full-time
Dr. Jon McCurdy	PhD	Data Science	Full-time
Dr. Ruth Lamprecht	PhD	Computer Science	Full-time
Dr. Daniel Salinas-Duron	PhD	Data Science	Full-time
Dr. Brian Heinold	PhD	Mathematics	Full-time
Professor Scott Weiss	MS	Computer Science	Full-time
Professor Kevin Rittie	MS	Cybersecurity	Full-time
Dr. Nadun Kulasekera Mudiyanselage	PhD	Mathematics	Full-time
Dr. Margaret Leary	PhD	Cybersecurity	Full-time

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

The 39-credit major in Computational Technology will consist of newly developed courses, designed specifically for the 8-week semesters and an asynchronous online environment. These courses will serve to provide the scaffolding of the following learning outcomes.

Outcome 1: Proficient Problem Solving
Outcome 2: Data Analysis and Interpretation
Outcome 3: Practical Software Skills
Outcome 4: Effective Algorithm Techniques
Outcome 5: Ethical and Responsible Computing

Outcome One	Outcome Two	Outcome Three	Outcome Four	Outcome Five
Graduates will	Students will	Students will	Graduates will	Graduates will

demonstrate advanced proficiency in applying mathematical concepts, algorithms, and computational techniques to solve complex problems in various domains, showcasing the ability to develop innovative solutions using computational thinking.	acquire the skills to collect, clean, analyze, and interpret large datasets using statistical methods, machine learning algorithms, and data visualization techniques, enabling them to derive meaningful insights and make data-driven decisions.	learn to create and improve software applications using modern programming languages and industry-standard practices, ensuring that their solutions are robust, scalable, and easy to maintain.	develop practical skills in designing and refining algorithms for real-world computational challenges, understanding how to analyze their efficiency and make them more effective in various computing environments.	understand the ethical, legal, and societal implications of computational technologies, including issues related to data privacy, algorithmic bias, and cybersecurity, and will demonstrate a commitment to responsible computing practices and ethical decision-making in their professional endeavors.

Specific course alignment is noted on page 9.

3. Explain how the institution will:
   a. Provide for assessment of student achievement of learning outcomes in the program.

      Each course in the major in Computational Technology will have assignments that specifically assess one (or more) of the five learning outcomes from the course in the curriculum. Each instructor will provide the appropriate assessment tool with continuous oversight by the Chair of the Department of Mathematics and Computer Science. The Chair and Dean will monitor objectives via assessment data at the course and program levels. In addition, the project in the capstone course will serve as a final, culminating assessment of the major.

   b. Document student achievement of learning outcomes in the program.

      Student achievement of learning outcomes will take the form of key assessments aligned to specific learning outcomes for the Computational

Technology major and also the learning outcomes for the Department of Mathematics and Computer Science. External validation will also occur through internal and external internships and career placement.

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

The major in Computational Technology contains 39 credits. All of these courses are new 3-credit courses that will be designed to meet the goals of the major and to meet the needs of Division of Continuing Studies students.

TECH 200 Data Analysis I
TECH 300 Data Analysis II
TECH 400 Machine Learning with R
TECH 210 Applications of Functions
TECH 310 Applied Calculus
TECH 410 Applied Numerical Methods
TECH 220 Introduction to Python
TECH 230 Introduction to Java
TECH 430 Modeling and Simulation
TECH 320 Algorithmic Analysis
TECH 420 Software Development Lifecycle
TECH 240 Technology Project Management
TECH 440 Capstone in Computational Technology

Outcome 1: Proficient Problem Solving
Outcome 2: Data Analysis and Interpretation
Outcome 3: Practical Software Skills
Outcome 4: Effective Algorithm Techniques
Outcome 5: Ethical and Responsible Computing

The following table details the course descriptions, connections to major goals and makes clear the sequencing of these courses.

Course	Description	Goals of the Major
TECH 200	This course provides a solid foundation in statistics, including an introduction to R. Sections covered include data collection, data frames, exploratory data analysis, including visual graphs, numerical summaries, and	1, 2, 3

	relationships between variables, basic probability, and statistical inference. Topics are taught using real data drawn from various fields, including economics, biology, political science and sports, allowing students to directly connect course material to solutions to real-world problems and to consider ethical issues surrounding the application of data science to these problems. Open only to DCS students.	
TECH 300	This course introduces students to obtaining and cleaning data using R. Students will work with real-world data in areas that interest them to experience exploratory data analysis at a practical level. Students will also work on skills involved in presenting results of data analysis. Open only to DCS students. Prerequisite: TECH 200 or permission of the instructor	1, 2, 3, 4
TECH 400	Machine learning methods for science and business applications will be explored using the R programming language. Methods such as regression, classification, and clustering will be discussed. Ethical issues surrounding machine learning will be discussed. Open only to DCS students. Prerequisite: TECH 300 or permission of the instructor	1, 2, 3, 4
TECH 210	With an emphasis on business and science applications, this course connects math to real world problems. Students will make use of data, graphs, and tables to develop math modeling skills through course projects.	1
TECH 310	Students will build conceptual understanding and develop skills to describe and model real-world issues using real-life data sets. Both differential and integral calculus will be	1, 2, 3

	discussed as tools for mathematical modeling in diverse settings. RStudio will be used to streamline computations. Prerequisite: TECH 210 or MATH 114 or permission of the instructor	
TECH 410	Students will use Python to learn and apply numerical methods to science and business. Real-world problems are used to motivate the methods. Prerequisite: TECH 310 or MATH 247 or permission of the instructor	1, 3, 4
TECH 220	Students will learn concepts of algorithmic thinking through Python programming. Using Python as a tool to solve problems, students will learn about designing, writing, debugging and documenting computer programs, and will consider ethical issues in computer science. Open only to DCS students.	1, 3, 4
TECH 230	Students will learn concepts of algorithmic thinking through Java programming. Using Java as a tool to solve problems, students will learn about designing, writing, debugging and documenting computer programs. Open only to DCS students.	1, 3, 4
TECH 430	Students will describe and simulate real-world systems, as an introduction to physical modeling. Python will be used to refine fundamental programming skills. Applications from business and science will be explored along with the ethical issues inherent in using computational technology to look for solutions. Prerequisites: TECH 220 or CMSCI 120 or permission of the instructor	1, 3, 4
TECH 320	This course explores and analyzes algorithms and their use in solving problems using computers as a tool. Stacks, queues, and links are discussed.	1, 3, 4

	Open only to DCS students. Prerequisites: TECH 220 and TECH 230	
TECH 420	Students will learn the process for planning, implementing and maintaining secure software systems. Topics include deployment technologies, threat modeling, and virtual cloud security. Open only to DCS students Prerequisites: TECH 320	1, 3, 4
TECH 240	Students will learn concepts and techniques to apply the methodologies of project management in a practical way to technology fields. The course will discuss project initiation and proposals, scope and task definition, scheduling, budgeting, risk analysis, control, project selection and portfolio management, program management, project organization, project leadership, team building, conflict resolution, and stress management.	1, 5
TECH 440	The capstone project leverages technology skills taught throughout the major to complete a large-scale project in an area of interest to the student. Students will engage in discussion and reflection on issues of data ethics. Open only to DCS students. Open only to students with a major in Computational Technology who have earned 100 or more credits or students who have completed five courses toward the Computational Technology certificate	1, 2, 3,4, 5

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

   General education requirements are met through the core curriculum in the Division of Continuing Studies at MSMU and remain unchanged.

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

   Not applicable

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

   Not applicable

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.

   Clear, complete, and timely information regarding the curriculum, course sequence and requirements, 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 will be provided in the Undergraduate Catalog. Additional information will be available on the MSMU website and be available in marketing materials. Creation of all Undergraduate Catalog and marketing content is under the supervision of the Dean of the School of Natural Science and Mathematics and Department Chair in Mathematics and Computer Science.

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.

   All electronic and print advertising, recruiting, and admissions materials clearly and accurately represent the program and services available. The admissions and recruitment staff are all extremely knowledgeable about the programs. All materials are reviewed by program coordinator/department chairs/deans prior to dissemination and list clearly the program, admissions requirements and

contact information.

H. Adequacy of Articulation (as outlined in COMAR 13B.02.03.19.):

1. Course equivalencies are currently being worked out with Frederick Community College, Montgomery College and the Community College of Baltimore County.

I. Adequacy of Faculty Resources (as outline 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.

   The Department of Mathematics and Computer Science currently has 11 full-time faculty members with graduate degrees in mathematics, computer science, data science, and cybersecurity. Faculty will develop and teach these courses in line with their expertise. In addition, adjunct instructors will be hired as necessary to teach additional courses, using the same rigorous hiring process as currently used for adjuncts instructors teaching in the department.

Department Chair					
Dr. Jonelle Hook	PhD	Mathematics	Full-time	Associate Professor	
Faculty					
Dr. Melanie Butler	PhD	Mathematics	Full-time	Professor	TECH 200, TECH 210, TECH 220, TECH 240, TECH 300, TECH 310, TECH 410, TECH 430, TECH 440
Dr. Matt Gerhart	PhD	Mathematics	Full-time	Assistant Professor	TECH 210, TECH 310, TECH 410, TECH 430
Dr. Jon McCurdy	PhD	Data Science	Full-time	Assistant Professor	TECH 400
Dr. Ruth Lamprecht	PhD	Computer Science	Full-time	Assistant Professor	TECH 230, TECH 320, TECH 400, TECH 420
Dr. Daniel Salinas-Duron	PhD	Data Science	Full-time	Endowed Professor	TECH 400,
Dr. Brian Heinold	PhD	Mathematics	Full-time	Associate Professor	
Professor Scott Weiss	MS	Computer Science	Full-time	Assistant Professor	TECH 230, TECH 320, TECH 420
Professor Kevin Rittie	MS	Cybersecurity	Full-time	Assistant	TECH 420

				Professor	
Dr. Nadun Kulasekera Mudiyanselage	PhD	Mathematics	Full-time	Assistant Professor	TECH 200, TECH 210, TECH 220, TECH 230, TECH 300, TECH 310, TECH 320, TECH 410, TECH 430, TECH 440
Professor Margaret Leary		Cybersecurity	Full-time	Assistant Professor	TECH 420

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

      The Center for Instructional Design and Delivery will provide training in effective pedagogy for advanced programs of study and for online delivery. This training will be conducted in collaboration with the Chair to ensure that content and pedagogy are appropriately integrated for this highly specialized course of study.

   b. The learning management system

      Mount St. Mary's University uses Canvas as the learning management system. The Center for Instructional Design and Delivery will provide mandatory Canvas training, including compliance and accessibility, for all instructors in the program.

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

      The Center for Instructional Design and Delivery will provide training in effective pedagogy for online programs of study. This training will be conducted in collaboration with the Chair to ensure that content and pedagogy are appropriate for an online course of study.

      .

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.

   Mount St. Mary's University's Phillips Library has adequate resources to support the introduction and continuation of the Graphic Design Concentration program. Because this program is to be implemented within existing institutional resources, no additional library acquisitions are required. The Phillip's Library maintains a collection

of 218,000 volumes with over 25,000 print and electronic journals. The Mount St. Mary's print collection in LC Class Q contains 8,330 titles and in R 2,013 titles.

Additionally Mount St. Mary's is a member of the Maryland Digital Library and Maryland Interlibrary Consortium which further expands resources to include a vast library of full-text electronic journals and books. The library's consortium partners recently purchased the ESCO Discovery Service to provide simultaneous Google-like searching for all databases. Mount St. Mary's also has an agreement with the National Cancer Institute (NCI) Frederick campus wherein any Mount St. Mary's student or faculty member visiting the NCI-Frederick library has full access to all NCI-Frederick holdings, either in person or by interlibrary loan using OCLC. The University also has access to JSTOR, perhaps the most applicable digital online resource for the proposed concentration.

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

The major in Computational Technology will be delivered as an online program.

1. Provide 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.

   Existing infrastructure, instructional equipment, faculty, and staff offices are adequate to initiate the program.

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 institution electronic mailing system

      All faculty, staff and students will have access to Outlook, the University's email platform. In addition, all faculty, staff and students will have access to J1 Portal, the University's platform for housing FERPA protected data.

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

      Mount St. Mary's University uses Canvas as the LMS. All faculty, staff and students will have access to and be trained in Canvas.

L. Adequacy of Financial Resources with Documentation (as outlined in COMAR 138.02.03.14):

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 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.

TABLE 1: RESOURCES					
Resources Categories	**Year 1 (2025-2026)**	**Year 2 (2026-2027)**	**Year 3 (2027-2028)**	**Year 4 (2028-2029)**	**Year 5 (2029-2030)**
a) Reallocated Funds	$0	$0	$0	$0	$0
b) Tuition/Fee Revenue (c+g)					
a) #F.T. Students	5	10	15	20	25
b) Annual Tuition/ Fee Rate (Discounted rate)	$25,650	$25,650	$25,650	$25,650	$25,650
c) Annual Full-Time Revenue (axb)	$128,250	$256,500	$384,750	$513,000	$641,250
d) Part-Time Students	2	4	6	8	10
e) Credit Hour Rate	$570	$570	$570	$570	$570
f) Annual Credit Hours	15	15	15	15	15
g) Total Part-Time Revenue {dxexf)	$17,100	$34,200	$51,300	$68,400	$85,500
3. Grants, Contracts, & Other External Sources	$0	$0	$0	$0	$0
4. Other Sources	$0	$0	$0	$0	$0

TOTAL (Add 1-4)	$145,350	$290,700	$436,050	$581,400	$726,750

Tuition: Per credit tuition in the Division of Continuing Studies accelerated undergraduate programs if $570/credit in 2024/2025. It is difficult to predict future tuition increases exactly, but typically do not surpass 2-5% annually.

Students: Based on past enrollments and projected need, we anticipate a steady rate of no less than 25 students once the program is fully enrolled. We also anticipate a thriving minor in this area, and that courses open to the traditional undergraduate on-campus population will find an eager student population outside of the Division of Continuing Studies.

Annual Credit Hours: Based on past enrollments, we anticipate each full-time accelerated student will be enrolled in approximately 30 credits annually.

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 Categories	Year 1 (2025-2026)	Year 2 (2026-2027)	Year 3 (2027-2028)	Year 4 (2028-2029)	Year 5 (2029 - 2030)
1. Faculty (b+c below)	$165,200	$165,200	$165,200	$165,200	$165,200
a) #FTE	1.25	1.25	1.25	1..25	1.25
b) Total Salary	$127,200	$127,200	$127,200	$127,200	$127,200
c) Total Benefits	$38,000	$38,000	$38,000	$38,000	$38,000
2. Admin., Staff (b+c below)	$0	$0	$0	$0	$0
a) #FTE	$0	$0	$0	$0	$0
b) Total Salary	$0	$0	$0	$0	$0
c) Total Benefits	$0	$0	$0	$0	$0
3. Support Staff (b+c) below	$0	$0	$0	$0	$0
a) #FTE	0	0	0	0	0
b) Total Salary	$0	$0	$0	$0	$0
c) Total Benefits	$0	$0	$0	$0	$0
4. Equipment	$0	$0	$0	$0	$0
5. Library	$0	$0	$0	$0	$0
6. New or Renovated	$0	$0	$0	$0	$0

Spaces					
7. Other Expenses	$0	$0	$0	$0	$0
8. Total (Add 1-7)	$165,200	$165,200	$165,200	$165,200	$165,200

Faculty: We anticipate faculty in the Department of Mathematics and Computer Science teaching many of the courses as part of their course load. This would total one full-time position. In addition, faculty would teach summer courses at the adjunct rate and/or adjunct faculty would teach some of these courses.

Admin Staff: There is no additional support staff anticipated for this program.

Support Staff: There is no additional support staff anticipated for this program.

Expenses: There are no major expenses associated with the major.

Additional Expenses: There are no additional expenses associated with the major.

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.

   Each course will have tailored learning outcomes based upon the above-mentioned learning outcomes. Courses will be approved by the faculty as part of the initial program approval process at the university. Faculty will be evaluated in accordance with MSMU's Shared Governance procedure including regular course evaluations and observations by the Chair. Student learning outcomes and department goals are aligned with the University's mission and strategic goals.

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 the programs in the School of Natural Science and Mathematics at Mount St. Mary's University engage in a cycle of continuous improvement. Student Learning Assessment Summary (SLAS) forms are completed annually by the Department Chair. A comprehensive annual review of the Computational Technology major will include data related to faculty satisfaction (as per regular data retreats), student satisfaction (as per course evaluations and program computer surveys), and cost effectiveness (as per program efficiency and effectiveness metrics provided by the Provost).

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.

   The proposed major in Computational Technology is aligned to Maryland's Minority Achievement Goals and the goals and strategic plan of Mount St. Mary's University. MSMU is committed to recruiting and supporting minority and educationally disadvantaged students. The Mount has a long-standing commitment to diversity, and equity. These needs include intentional efforts through targeted marketing, financial assistance, and ease of transfer credits from community colleges.

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.

   Not Applicable

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.

   Mount St. Mary's University is NC-SARA approved. **See Appendix B.**

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

   Mount St. Mary's University, as per full NC-SARA accreditation, complies with all C-RAC guidelines. See appendices. Appendix Bis our NC-SARA acceptance email, and Appendix C is our Five-Year Strategic Plan for Distance Education.

MOUNT ST. MARY'S UNIVERSITY | School of Science, Mathematics & Technology

APPENDIX A

Division of Continuing Studies
Center of Accelerated and Adult Education

Bachelor of Arts in Computational Technology
Recommended Full-Time 4-Year Course Sequence

Notes on curriculum pathways:

Your degree, your way: This is a sample curriculum for the Computational Technology degree showing a 4-year completion. Most courses in the Center for Accelerated and Adult Education are offered in an accelerated format. As such students can complete their degree at a pace that meets their personal and professional needs. It is likely that students will complete this curriculum in less than 4 years. Each student will be provided with a degree plan that specifies their desired timeframe to graduation.

Sub-term Format: The Division of Continuing Education offers two sub-terms each semester. As such sequenced courses listed in the same semester will still be completed sequentially.

	Year 1	Year 2	Year 3	Year 4
Fall	GE Mount Seminar (3) TECH 220 (3) Elective 1 (3) Elective 2 (3)	PHIL 200 (3) PHIL 301 (3) TECH 300 (3) Elective 5 (3)	THEOL 212 (3) THEOL 312 (3) TECH 430 (3) TECH 320 (3)	Non-West Core (3) Arts/Lit/Music/Theater core (3) Elective 10 (3) TECH 420 (3)
Winter	TECH 200 (3)	TECH 240 (3)	Elective (3)	Elective 11 (3)
Spring	Elective 3 (3) Elective 3 (3) TECH 230 (3) Arts/Humanities Core (3)	GNSCI Lab (4) TECH 310 (3) Elective 6 (3) Elective 7 (3)	History Core (3) TECH 410 (3) TECH 400 (3) Elective 8 (3)	TECH 440 (3) Elective 12 (3) Elective 13 (3) Elective 14 (3)
Summer	SOC 100 (3) TECH 210 (3)	COMM 200 (3)	Elective 9 (3)	
Total Credits Per Year	33	31	30	27

Total Credits: 121

MOUNT ST. MARY'S UNIVERSITY | School of Science, Mathematics & Technology

Bachelor of Arts in Computational Technology
Recommended Part-Time Course Sequence

Notes on curriculum pathways:

Your degree, your way: This is a sample curriculum for the Computational Technology degree showing a potential course sequence for part-time students. Most courses in the Center for Accelerated and Adult Education are offered in an accelerated format. As such students can complete their degree at a pace that meets their personal and professional needs. Each student will be provided with a degree plan that specifies their desired timeframe to graduation.

Graduation requirements: The below plan includes all of the needed courses to complete the Computational Technology major and six out of 13 required core courses. Students may bring in transfer credits for some of these core courses, some major courses, or some elective courses. Students need to earn a total of 120 credits for graduation; this plan includes 57 credits. Additional semesters may be required to reach a total of 120 credits.

Fall 1: TECH 220
Fall 2: Core
Winter 1: TECH 200
Spring 1: TECH 310
Spring 2: TECH 230
Summer 1: TECH 210
Summer 2: Core
Fall 1: TECH 300
Fall 2: TECH 430
Winter: TECH 240
Spring 1: TECH 400
Spring 2: Core
Summer 1: Core
Summer 2: Core
Fall 1: TECH 320
Fall 2: TECH 420
Winter: Core
Spring 1: TECH 410
Spring 2: TECH 440

APPENDIX B

From: NC-SARA info@nc-sara.org
Sent: Friday, August 23, 2019 11:09 AM **To:** Frazier, Laura frazier@msmary.edu **Subject:** SARA Annual Membership **Approval:** Payment and Verification

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Congratulations!

Mount St. Mary's University has been approved to participation in SARA! In order to complete the process and ensure participation, **please use the link below to verify information and for payment of the NC-SARA annual fee:**

Payment registration
http:/ncsara.force.com/institutions/InstitutionPaymentForm?id=0013600000078Z6o&contactic=0031R0 0002ABlrl

If you have any questions or issues, please don't hesitate to contact us at info@nc-sara.org. Have a great day!

NC-SARA Staff