UNIVERSITY OF MARYLAND
OFFICE OF THE PRESIDENT

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October 2, 2019

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

Dear Secretary Fielder:

I am writing to request approval for a new bachelor's program in Immersive Media Design. The proposal for the new program is attached. I am also submitting this proposal to the University System of Maryland for approval.

The proposal was endorsed by the appropriate faculty and administrative committees, and was recommended for approval by the University Senate at its meeting on October 2, 2019. I also endorse this proposal and am pleased to submit it for your approval.

Sincerely,

Wallace D. Loh
President

MDC
cc: Antoinette Coleman, Associate Vice Chancellor for Academic Affairs
Mary Ann Rankin, Senior Vice President and Provost
Bonnie Thornton Dill, Dean, College of Arts and Humanities
Amitabh Varshney, Dean, College of Computer, Mathematical, and Natural Sciences

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

Institution Submitting Proposal	University of Maryland, College Park

Each action below requires a separate proposal and cover sheet.

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

Payment Submitted: ( ) Yes (●) No	Payment Type: ( ) R*STARS (●) Check	Payment Amount: 850	Date Submitted:

Department Proposing Program	Department of Art and Department of Computer Science	
Degree Level and Degree Type	Bachelor's Level; Bachelor of Arts and Bachelor of Science (two tracks)	
Title of Proposed Program	Immersive Media Design	
Total Number of Credits	120	
Suggested Codes	HEGIS: 0704.00	CIP: 11.0804
Program Modality	(●) On-campus ( ) Distance Education (*fully online*)	
Program Resources	( ) Using Existing Resources (●) Requiring New Resources	
Projected Implementation Date	(●) Fall ( ) Spring ( ) Summer	Year: 2020
Provide Link to Most Recent Academic Catalog	URL: https://academiccatalog.umd.edu/	
Preferred Contact for this Proposal	Name: Mike Colson	
	Title: Senior Coordinator for Academic Programs	
	Phone: (301) 405-5626	
	Email: mcolson@umd.edu	
President/Chief Executive	Type Name: Wallace D. Loh	
	Signature: [signature]	Date: 10-2-2019
	Date of Approval/Endorsement by Governing Board:	

Revised 3/2019

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Revised 3/2019

A. Centrality to the University's Mission and Planning Priorities

Description. The University of Maryland proposes to establish a bachelor's program in Immersive Media Design (IMDM) through a unique cross-campus collaboration of expert faculty and resources, predominantly in Studio Art and Computer Science. This multidisciplinary major will strengthen the creative, scientific, and scholarly foundations needed to advance the extraordinary potential applications in Maryland of emerging technologies in immersive media. Such technologies include most notably Augmented and Virtual Reality (AR and VR), but also advanced interfaces with projective, gestural and other real time, interactive media that surround or immerse the user. The creation of effective, inventive immersive environments and supporting technologies demands a new way of thinking and teaching. The program will contribute to economic sectors and industries that are focal points for Maryland, including defense, life sciences, computing, virtual gaming technologies, and digital health care. In addition, it will catalyze direct linkages to the computer games industry that is heavily influenced by synergies between computing, education, engineering, art, and design. These disciplines contribute to some of the existing top workforce needs, including positions in software development, computer systems analysis, computer programmers, and graphic designers.

The proposed major will have two tracks, one in Computing leading to a Bachelor of Science, and the other called "Emerging Creatives" leading to a Bachelor of Arts. The curriculum are deeply intertwined and thus one track would not be offered without the other. As directed by MHEC, we are submitting two separate proposals although the majority of the material in the proposals is common. ***This proposal focuses on the Bachelor of Arts track (Track 2, "Emerging Creatives").***

Relation to Strategic Goals. The proposed Immersive Media Design major relates directly to UMD's strategic goals by adding to its STEM program offerings in a rapidly expanding workforce area. The applications for immersive media that include virtual and augmented reality (VR and AR) are vast. This major will serve the University of Maryland's mission in pursuing five strategic goals: 1) developing educational opportunities in immersive media; 2) creating a new multidisciplinary major that offers alternate, yet high-demand academic pathways for students; 3) drawing exceptional undergraduate talent with a nationally-unique program in arts and computing; 4) fostering new opportunities for research, scholarship, and creativity that are interdisciplinary and will define future disciplines for the new media landscape; and 5) synergizing with key economic drivers in Maryland, including the digital media industry.

Funding. Resources for the new program will be drawn from funds allocated to the University by the Governor's Workforce Development Initiative, from the sponsoring departments and colleges, and reallocated funds from the campus. It is anticipated that this major will also be a catalyst for securing multi-institutional research and education grants from nearby federal agencies and other sources.

Institutional Commitment. The program will be administered jointly by the departments of Computer Science (within the College of Computer, Mathematical, and Natural Sciences) and Art (within the College of Arts and Humanities) through a new multidisciplinary partnership. Once the program is established, it is anticipated that other departments and colleges will join through their existing faculty expertise in digital media design, digital storytelling, videography and computational storytelling.

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

Need. The National Academy of Engineering has identified enhancing virtual reality as one of the grand challenges for the 21st century. VR and AR are on their way to evolving as an eighth mass market, following print, recordings, cinema, radio, TV, the Internet, and mobile technology. Just as mobile technology has connected everyone to the world around them, immersive virtual and augmented reality is the next leap forward in the ever-expanding information revolution. By overlaying, or augmenting, digital information on top of real-world settings, immersive augmented reality allows people from all walks of life—health care professionals, educators, industrial workers, artists, and everyday people—to see and use the information that matters most to them. The creation of such media demands a skill set that represents a blend of training in aesthetics, media theory and formalism concatenated with technically demanding skills in programming, mathematics, and related fields such as data visualization.

State Plan. The proposed program aligns with strategies 7 and 8 in the *Maryland State Plan for Postsecondary Education*.[1] Strategy 7, to "enhance career advising and planning services and integrate them explicitly into academic advising and planning," will be pursued through senior capstone projects in which students use their education to work on real-world applications of immersive media. A required component of the capstone year of the IMDM program is that each student work with an external mentor. While the mentor can come from within the university community, students will be encouraged to identify a professional from a relevant industry or field outside the campus. The IMDM curriculum is also ideally suited to address strategy 8, which is to "develop new partnerships between colleges and businesses to support workforce development and improve workforce readiness." The State Plan also specifically outlines trends that underscore the need for educational innovation to include the need for more high-tech, cyber security, health, and education workers. The IMDM program explicitly addresses this need.

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

Broadly speaking, the field of Immersive Media Design encompasses a constellation of industries from computer science, entertainment, game design, graphic design, industrial design, the fine arts, architecture, and other related fields. Virtual and Augmented Reality as a field unto itself is in its infancy, and as such, employment and market data are sparse. While market projects vary considerably, all indicate that AR/VR as a field is set to expand rapidly over the next five to ten years. A 2019 five-year projection of total AR/VR spending by Markets and Markets suggests that AR/VR markets will grow from $8B in 2018 to nearly $45B in 2024. A recently updated forecast by Statista predicts $160B worldwide in 2023. Govini – a government spending analysis firm – showed that Department of Defense spending alone on AR/VR grew at a 16.9% compound annual growth rate between 2012 and 2017. Given the importance of federal spending in Maryland, the potential for AR/VR use in governmental training and similar applications is significant. A January, 2017 report by TechCrunch anticipates that by 2021, AR/VR fields could command a market of $108B annually[2], and a recent International Data Corporation (IDC) study shows that spending on AR/VR services will reach $27B in 2018, a 92% increase over spending in 2017; a 2018 IDC study expects a five year compound annual growth rate of 72% (2017-2022)[3].

A campus committee that was formed to explore establishing an IMDM major assessed the student demand for the program by conducting a survey of current UMD students from December 11 to December 16, 2016.

[1] Maryland Higher Education Commission. (2017): *Maryland State Plan for Postsecondary Education.*
[2] https://techcrunch.com/2017/01/11/the-reality-of-vrar-growth/
[3] https://www.zdnet.com/article/demand-for-augmented-and-virtual-reality-expected-to-soar-this-year/

Of the 1134 responses received, nearly half of the students (48%) either strongly agreed or agreed that they would have an interest in enrolling in an Immersive Media Design major if it were offered on campus. Majors represented by those who strongly agreed included Computer Science, Art, Electrical/Computer Engineering, and Mechanical Engineering.

D. Reasonableness of Program Duplication

A number of universities within the state of Maryland offer programs that have degree programs that explore, to varying degrees, the overlap of technology and the arts. These include:

1) University of Maryland, Baltimore County – Degrees Offered: BA, BFA Visual Arts with a Concentration in Animation/Interactive Media
2) Bowie State University – Degrees Offered: BS in Visual Communication and Digital Media Arts (VCDMA) with a Concentration in Animation & Motion Graphics, Digital Cinema & Time-Based Media, and Digital Media Arts
3) University of Maryland, Baltimore County – Game Development track in the Computer Science BS degree
4) Notre Dame of Maryland University – Degree Offered: Digital Media Arts BA
5) Maryland Institute College of Art - Degrees Offered: BFA Animation, Interaction Design and Art; MFA Illustration Practice
6) Salisbury University - Degrees Offered: BA, BFA Art with a New Media Track. Note: Video, Audio, Animation, Web Design, and Screen Graphics are all components of the New Media Track.
7) Towson University - Degrees Offered: BFA Art and Design with Concentration in Digital Art and Design, Illustration; MFA Studio Art; Post-Baccalaureate Certificate in Interactive Media Design
8) University of Baltimore – Degree Offered: BS in Simulation and Game Design

An examination of the curricula seems to indicate that an IMDM major at UMD will not replicate these other programs or their learning outcomes, primarily due to a few defining characteristics of what is proposed here. For the most part, the above programs exist within a singular disciplinary home, without the multiple course collaborative experience between the arts and computing proposed here. While encompassing a range of immersive media, the proposed IMDM major also has a unique focus on AR/VR, building on the considerable research strengths of UMD's faculty in this area. Students enter the curriculum as freshmen, rather than adding the digital media component as an addendum to an existing disciplinary program. That said, the emerging market is sufficiently large that it will demand graduates from a large number of programs, institutions, and specific areas of expertise.

E. Relevance to Historically Black Institutions (HBIs)

Of programs in the state at Historically Black Institutions, the 'Visual Communications & Digital Media Arts' program at Bowie State University appears to be the sole program with meaningful overlap in curriculum with the IMDM proposal. This comes in the form of several courses within the Bowie State University program's Digital Media Arts concentration, namely: ART 342 – New Media Public Art Installation, ART 230 – Introduction to Computer Graphics, ART 470 – Self-Promotion & Marketing in the Arts, and ART 479 Animation and Modeling II. Although these courses overlap in subject matter with several courses in the IMDM proposal, they cover subject matter which may be said to be foundational practices within the media, and therefore overlap is expected. The Visual Communications and Digital Media Arts concentrations at Bowie State University are offered entirely within the context of a department of Fine and Performing Arts. The program does not have the similar interdisciplinary bent as put forth in this proposal. Further, there is no mention of

software development, tangible computing, digital fabrication, and related Immersive Media Design fields within the curriculum at Bowie State University. With this in mind, we do not anticipate that the IMD program will adversely affect the existing program at Bowie State University.

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

UMD has already established itself in the field of Augmented and Virtual Reality through its extensive research program affiliated with the University of Maryland Institute for Advanced Computer Studies (UMIACS). Accordingly, the proposed program is not expected to have an impact on the uniqueness or institutional identity of any Maryland HBI.

G. Adequacy of Curriculum Design, Program Modality, and Related Learning Outcomes

Curricular Development. The IMDM curriculum was developed over several years, starting with a campus-wide committee that began convening in 2016, chaired by Dr. Amitabh Varshney, who is presently the Dean of the College of Computer, Mathematical, and Natural Sciences. More recently, the detailed structure of the curriculum emerged from a collaboration of faculty within the departments of Computer Science and Art. The team consulted with working professionals in relevant fields, and explored similar programs at other universities. The design of the curriculum was influenced by work undertaken by the Institute of Electrical and Electronics Engineers (IEEE) through its Digital Reality Initiative (https://digitalreality.ieee.org/). There is also significant interest from other units on campus that may result in a proposal to expand the major into other areas, such as storytelling and computational journalism, in the future.

Faculty Oversight. The University of Maryland Institute for Advanced Computer Studies (UMIACS) will initially serve as the home for the program. The governance structure will consist of an academic director, advising and administrative staff, and faculty who have responsibility for development or delivery of the IMDM-specific courses.

Appendix A has a listing of faculty involved in the program along with their credentials.

Educational Objectives and Learning Outcomes. The program consists of two tracks, a Bachelor of Science track (track 1) that is more focused on computing, and a Bachelor of Arts track (track 2) that has a stronger focus on Art, although much of the coursework is designed to be in common so that students from both areas will interact with each other and collaborate on projects. However, the learning outcomes from each track differ as a result of their two foci. **THIS PROPOSAL FOCUSES ON THE BACHELOR OF ARTS TRACK (Track 2).**

Upon graduation from the program, students in both tracks of the major will demonstrate:

1. Technical proficiency, skill, and contextual knowledge of immersive media technologies, products, and applications so as to produce physical and digital works that are technically proficient, aesthetically engaging, and which demonstrate conceptual sophistication.
2. Deep learned cross-disciplinary problem-solving and collaborative skills in both technical and creative arenas.
3. Knowledge and proficiency in user-centered practices as they pertain to the development and application of immersive media projects.
4. Capacity to adapt to new technologies, concepts and processes as well as anticipate new technical and conceptual developments in this emerging field.

Upon graduation from the program, students in Track 2 (Emerging Creatives) will demonstrate:

1. Ability to effectively communicate ideas and concepts visually through the use of immersive media conventions.
2. Technical proficiency in common methods of content creation for immersive media such as creative coding, digital fabrication, physical computing, and 3-D modeling.
3. Ability to critically evaluate works of creative technology in terms of their formal, conceptual, historical and social impacts.
4. Ability to appropriately couple new technologies with traditional media in the creation of tangible immersive media projects.
5. Ability to market and promote ones work through portfolio development and business planning.

The degree to which the IMDM is meeting its goals will be assessed by means of the program's Learning Outcomes Assessment Plan (Appendix B).

Institutional assessment and documentation of learning outcomes. Undergraduate programs complete annual assessments, with each learning outcome evaluated at least once in a four-year cycle. Programs report findings each fall in summary form following a template structure and are informed by a "best practices" guide and a rubric. Assessment summary reports for each college are collected by the College Coordinator, who works to promote high standards through support and guidance to programs and with continuous improvement practices.

Course requirements. The IMDM major consists of 120 credits. In both IMDM tracks, Track 1 (Computing) and Track 2 (Emerging Creatives), students take a set of CMSC, ARTT and IMDM courses as part of the major, so that all students are introduced to the practices of the base disciplines. In the first year, both tracks take IMDM101 (Introduction to Immersive Media) and IMDM150 (Introduction to Digital Media Theory and Culture). In the fall, IMDM101 students will be introduced to the practice of immersive media, both experiencing and creating examples, with a group project to introduce the collaborative nature of the field. This course will be self-contained for students who elect not to continue. In the spring, IMDM150 students will approach immersive media from a larger, theoretical and cultural context, to understand the historical and social aspects.

In the second year, both tracks take IMDM227 (Introduction to Computational Media) and IMDM290 (Collab. Studio I: Image + Time). In IMDM227, students will build more substantial immersive media projects, with an emphasis on interactive technologies and virtual/augmented reality. In IMDM290, students will take that technology knowledge, plus knowledge from ARTT and CMSC courses, and work in collaborative, cross-disciplinary groups to build projects of their own initiative and design.

The third year will focus on developing specific artistic, technical and programming skills that they will explore in a collaborative studio course. Track 1 majors will take IMDM327 (Augmented and Virtual Reality) in the fall, and further develop skills in this technology. Track 2 majors will take a digital ARTT digital course. Then both will take IMDM390 (Collab. Studio III: Experiential Computing) in the spring to again work collaboratively on innovative projects, either of their design or chosen from projects offered by external mentors. The fourth year focuses on a Capstone experience in which students will initiate, carry out and exhibit substantial projects of their own design, or in coordination with external mentors.

In both tracks the four year plans are designed so majors can take more CMSC or ARTT, as appropriate, to strengthen their mastery of each field, as well as electives from other disciplines and General Education.

A steady state enrollment of about 300 students is anticipated, with about 40 per year in track 1, and 20 per year in track 2. Given the high demand for computing-related degree programs at UMD, the major will be reviewed for limited enrollment status, requiring students to either be admitted to the program at the time of matriculation or to complete a set of gateway requirements before officially declaring the major. All students (both tracks) will require a portfolio review at 45 credits, similar to what is required for the Graphic Design track of the Art major. All interested students will be able to take the gateway courses before 45 credits.

See Appendix C for course descriptions.

General Education. Students will complete some of their general education requirements by way of fulfilling major requirements (see the table above for which courses count for general education requirement). Otherwise, students will have room in their schedules to fulfill the other general education requirements. The curriculum plans in Appendix D show examples of how students will progress through the major at the same time completing the General Education requirements.

Accreditation or Certification Requirements. There are no specialized accreditation or certification requirements for this program.

Other Institutions or Organizations. No contracts with another institution or non-collegiate organization for this program are anticipated.

Student Support. Students enrolled in this program will have access to all the resources necessary in order to succeed in the program and make the most of the learning opportunity. Students entering the university as either first-time college students or transfer students will learn about the program through their orientation program. Students entering the major as internal transfers will meet with an advisor in the program when they declare the major. Students in the first three semesters of study will be counseled not only by dedicated IMDM academic advisors, but also mentored by faculty and staff within the program with careful attention being paid to a student's potential routes through the program.

Marketing and Admissions Information. The program will be clearly and accurately described in the university website and be marketed at university recruiting events.

H. Adequacy of Articulation

The mathematics, art, and a variety of General Education supporting courses are widely available at Maryland community colleges. Maryland community college students who complete the Associates degree prior to transfer to UMD are deemed to have completed their General Education requirements, with the exception of Professional Writing.

It is unlikely that any of the IMDM courses would articulate with existing courses at transfer institution partners, but their requirements may be met through a combination of courses offering similar material. IMDM advisors will work with students to appropriately place them in the curriculum sequence.

IMDM Course Requirements – Track 2 – Emerging Creatives

Number	Title	Credits
ENGL elec.	Choice: ENGL: 143 /245/255/290/294	3
MATH 115	Precalculus	3
CMSC 122	Introduction to Programming via Web	3
ARTT 100	Two-Dimensional Design Fundamentals	3
ARTT 110	Elements of Drawing	3
ARTT 200	Three-Dimensional Art Fundamentals	3
ARTT 210	Drawing II	3
ARTT 255	Introduction to Digital Art and Design Practices	3
ARTT 37x	Choice: ARTT: 370 / 371	3
ARTT 47x	Advanced Digital Media choice: 479a/c/d/e	3
IMDM 101	Introduction to Immersive Media	3
IMDM 127	Creative Coding for Digital Media	3
IMDM 150	Introduction to Digital Media Theory and Culture	3
IMDM 227	Introduction to Computational Media	3
IMDM 290	Collab. Studio I: Image + Time	3
IMDM 350	Advanced Digital Media Theory	3
IMDM 390	Collab. Studio III: Experiential Computing	3
IMDM 490	Capstone I	4
IMDM 491	Capstone II	4
	Total required credits	**59**

I. Adequacy of Faculty Resources

Program faculty. Faculty will be drawn primarily from the Computer Science and Art departments. Almost all courses that do not use the IMDM acronym exist and are currently taught. All of the IMDM courses will be new and will constitute additional teaching requirements. As a result, it is anticipated that both units will hire additional faculty to complement their existing strengths. See Appendix A for faculty biographies of those currently expected to teach in the program.

Faculty training. The University offers numerous opportunities for faculty training and support in the classroom, through the Teaching and Learning Transformation Center, workshops by the Office of Faculty Affairs, and by the Division of Information Technology's Learning Technology Design group.

J. Adequacy of Library Resources

The University of Maryland Libraries has conducted an assessment of library resources required for this program. The assessment concluded that the University Libraries are able to meet, with its current resources, the curricular and research needs of the program.

K. Adequacy of Physical Facilities, Infrastructure, and Instructional Resources

As a high-tech, studio-based, innovative curriculum, the program will require development of new instructional resources that are not yet in place. These include additional faculty, graduate teaching assistants (TA's), technical and administrative staff, and instructional facilities. A multi-year staffing plan for faculty, TA's, and administrative support has been developed and will be implemented as needed as the program gets underway. The program will need studio space outfitted with appropriate supporting technology including green screens, AR/VR headsets, 3D printer access and other digital fabrication technology. Various spaces exist on campus already, and we are developing a strategy for shared access, along with additional dedicated space. At least one laboratory in the new Brendan Iribe Center for Computer Science and Engineering has been allocated to the program for the AR/VR component, along with a nearby collaborative classroom for shared use. Additional resource needs are included in the budget pages. All UMD students have access to the institutional electronic mailing system. This program is not a distance education program, however, student will have access to the campus learning management system for the elements of the courses that exist online.

L. Adequacy of Financial Resources

Resources for the new program will be drawn from existing instructional resources in the two sponsoring academic units, from some reallocation of central university funds, from one-time expenditures of the University's fund balance for physical infrastructure, and new resources to the university provided through state legislation, for which computing-related degree programs is an identified priority area.

(See Tables 1 and 2 for estimated resources and expenditures)

M. Adequacy of Program Evaluation

Formal program review is carried out according to the University of Maryland's policy for Periodic Review of Academic Units, which includes a review of the academic programs offered by, and the research and administration of, the academic unit (http://www.president.umd.edu/policies/2014-i-600a.html). Program Review is also monitored following the guidelines of the campus-wide cycle of Learning Outcomes Assessment (https://www.irpa.umd.edu/Assessment/LOA.html). Faculty within the department are reviewed according to the University's Policy on Periodic Evaluation of Faculty Performance (http://www.president.umd.edu/policies/2014-ii-120a.html). Since 2005, the University has used an online course evaluation instrument that standardizes course evaluations across campus. The course evaluation has standard, university-wide questions and also allows for supplemental, specialized questions from the academic unit offering the course.

N. Consistency with Minority Student Achievement goals

The University as a whole has many ongoing strategies to recruit and retain underrepresented minority students with participation by all academic units. The Education Program Director will be tasked with ensuring that we effectively recruit and retain an appropriately diverse student population. Utmost attention will be

paid to ensure that both faculty and staff advisor hires for the new major include individuals who represent, and have experience working with, students from diverse backgrounds.

O. Relationship to Low Productivity Programs Identified by the Commission

N/A

P. Adequacy of Distance Education Programs

N/A

Table 1: Expenditures

Expenditure Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1. Full-time Faculty (b+c below)	$478,800	$772,624	$1,269,897	$1,307,994	$1,347,234
a. #FTE	4.0	6.0	9.0	9.0	9.0
b. Total Salary	$360,000	$580,920	$954,810	$983,454	$1,012,958
c. Total Benefits	$118,800	$191,704	$315,087	$324,540	$334,276
2. Part time Faculty (b+c below)	$12,000	$24,000	$60,000	$60,000	$60,000
a. #FTE	0.2	0.4	1.0	1.0	1.0
b. Total Salary	$12,000	$24,000	$60,000	$60,000	$60,000
c. Total Benefits	$0	$0	$0	$0	$0
3. Admin. Staff (b+c below)	$139,650	$143,840	$246,924	$254,332	$261,962
a. #FTE	1.5	1.5	2.5	2.5	2.5
b. Total Salary	$105,000	$108,150	$185,658	$191,227	$196,964
c. Total Benefits	$34,650	$35,690	$61,267	$63,105	$64,998
4. Total Support Staff (b+c below)	$133,000	$205,485	$211,650	$217,999	$224,539
a. #FTE	2.0	3.0	3.0	3.0	3.0
b. Total Salary	$100,000	$154,500	$159,135	$163,909	$168,826
c. Total Benefits	$33,000	$50,985	$52,515	$54,090	$55,713
5. Graduate Assistants (b+c)	$148,832	$229,945	$276,318	$325,265	$335,023
a. #FTE	4.0	6.0	7.0	8.0	8.0
b. Stipend	$80,000	$123,600	$148,526	$174,836	$180,081
c. Tuition Remission	$68,832	$106,345	$127,792	$150,429	$154,942
6. Equipment	$60,000	$60,000	$60,000	$60,000	$60,000
7. Library	$5,000	$5,000	$5,000	$5,000	$5,000
8. New or Renovated Space	$500,000	$125,000	$100,000	$100,000	$100,000
9. Other Expenses: Operational Expenses	$80,000	$80,000	$80,000	$80,000	$80,000
TOTAL (Add 1 - 8)	**$1,557,282**	**$1,645,894**	**$2,309,789**	**$2,410,591**	**$2,473,759**

Table 2: Resources

Resources Categories	Year 1	Year 2	Year 3	Year 4	Year 5
1.Reallocated Funds	$1,002,282	$1,090,894	$1,754,789	$1,855,591	$1,918,759
2. Tuition/Fee Revenue (c+g below)	$0	$0	$0	$0	$0
a. #FT Students	50	100	250	300	300
b. Annual Tuition/Fee Rate	$13,575	$13,982	$14,402	$14,834	$15,279
c. Annual FT Revenue (a x b)	$11,600	$23,200	$46,400	$46,400	$46,400
d. # PT Students	5	10	20	20	20
e. Credit Hour Rate	$565	$582	$600	$618	$636
f. Annual Credit Hours	20	20	20	20	20
g. Total Part Time Revenue (d x e x f)	$0	$0	$0	$0	$0
3. Grants, Contracts, & Other External Sources	$0	$0	$0	$0	$0
4. Other Sources	$555,000	$555,000	$555,000	$555,000	$555,000
TOTAL (Add 1 - 4)	**$1,557,282**	**$1,645,894**	**$2,309,789**	**$2,410,591**	**$2,473,759**

"Other Sources" refers to the Governor's Workforce Development Initiative funding provided to support technical staff and infrastructure for development and ongoing support of the program.

The university is not anticipating overall enrollment growth as a result of this major, rather a shift in major selection by matriculating students. Therefore no new tuition revenue is assumed in identifying resources. Resources will come from redirection of tuition revenue at the campus level, some reallocation of instructional resources from the collaborating departments, fund balance use for one-time funding for physical renovations, and from other reallocated resources within the university.

Appendix A: Faculty and Organization

Faculty Name	Title/Expertise	Credentials	Potential courses taught in program:
Brandon Morse	Associate Professor, ARTT Digital and physical instantiation of generative systems, video and installation works. Full-time.	MFA, Art & Technology from The Ohio State University	ARTT37x/47x IMDM470 IMDM390 IMDM490 IMDM491
Shannon Collis	Associate Professor, ARTT Digital installations and interactive environments. Full-time.	MFA, University of Alberta with post-graduate work in Digital Media and Computation Arts	ARTT255 ARTT37x IMDM290 IMDM490 IMDM491
Justin Strom	Associate Professor, ARTT Mixed-media print, digital imaging. Full-time.	MFA, University of Wisconsin-Madison	ARTT34x IMDM290 IMDM490 IMDM491
Cy Keener	Assistant Professor, ARTT Digital fabrication and media. Full-time.	MFA, Stanford University M.Arch, University of California, Berkeley	ARTT37x ARTT47x IMDM390 IMDM490 IMDM491
David Jacobs	Professor, CMSC AI and Robotics, Computer Vision and Machine Perception. Full-time.	Ph.D., Massachusetts Institute of Technology	CMSC426
David Mount	Professor, CMSC Algorithms and Theory, Information Retrieval and Geographic Information Systems (GIS) . Full-time.	Ph.D., Purdue University	CMSC425
Matthias Zwicker	Professor, CMSC Graphics Visualization and VR AR. Full-time.	Ph.D., ETH Zurich	IMDM327 CMSC427
Dinesh Manocha	Professor, CMSC AI and Robotics, Graphics Visualization and VR AR, High Performance and Scientific Computing. Full-time.	Ph.D., University of California at Berkeley	CMSC427
Larry Davis	Professor, CMSC Computer vision, Artificial intelligence, High performance computing. Full-time.	Ph.D., University of Maryland	CMSC426

Cornelia Fermuller	Assoc. Research Scientist, CMSC Bio-inspired solutions for active vision. Full-time.	Ph.D., Technical University of Vienna	CMSC426
Huaishu Peng	Asst. Professor, CMSC Human Computer Interaction, IoT and Wearables Technology. Full-time.	Ph.D., Cornell University	IMDM101 IMDM227 CMSC434
Roger Eastman	Professor of the Practice, CMSC AI and Robotics, Computer Vision and Machine Perception, Graphics Visualization and VR AR. Full-time.	Ph.D., University of Maryland	IMDM101 IMDM227 IMDM327 CMSC425 CMSC426 CMSC427
Evan Golub	Senior Lecturer, CMSC Human Computer interaction, ubiquitous computing, computer science education, information technology and non-majors. Full-time.	Ph.D., University of Maryland	IMDM101 IMDM227 IMDM327 CMSC434

Appendix B: Learning Outcomes Assessment Plan

The IMDM program will work to set, monitor, and maintain high standards for the program under a shared vision of an excellent student learning experience leading to outstanding educational outcomes. The program will apply these standards to courses, activities, advising, faculty effectiveness, administrative services and technical support for students, and regular assessment under the standards will be use to guide the development and revision of curriculum and services for continual improvement.

The program goals, outcomes, courses and services will be assessed regularly under an Assessment Plan developed and monitored by the Undergraduate Programs Committee (UPC), and consistent with UMD Undergraduate Program Learning Outcomes Assessment Plan. The program plan will lay out responsibilities, metrics, timelines and procedures for assessment. Performance of the overall curriculum will be assessed by two factors: direct evaluation of student mastery of program learning outcomes during the senior year, and indirect evaluation by tracking of alumni career performance over time. To assess senior year mastery, selected senior projects and portfolios will be evaluated by faculty and external partners under metrics developed by the UPC. To evaluate professional success, the UPC will work with the Career Center to appropriately track initial placement and mid-career status, and survey graduate and employers.

Performance of individual courses and course outcomes will be regularly assessed on a rotating basis, with a subset of courses assessed in detail each year and all courses assessed every four years. The focus will be on IMDM courses for which the program has primary responsibility, with coordination with assessment processes in departments (notably CMSC and ARTT) which support the program with required courses. Mastery of course material will be assessed by performance on examinations or projects as appropriate for the course. The Undergraduate Program Committee will direct assessment of the curriculum and courses, with assessments conducted annually in the spring semester, beginning in the first year of the program. The Undergraduate Program Committee will direct the assessment process. Assessments will be conducted annually in the spring semester, beginning in the first year of the program. The assessment report to the Provost each fall will include the results of the assessment and recommendations for program improvement that are based on these results.

Performance of administrative and technical support services will be evaluated regularly by the program administration in consultation with the UPC to insure high quality delivery to students of services such as course technology, learner support, advising and accessibility.

Appendix C: Course Descriptions

Note: IMDM courses have not yet been created and therefore are not in current undergraduate catalog. They will be created once the program proposal is approved.

IMDM course listings

IMDM 101 – Introduction to Immersive Media (3 credits)
Prerequisite: N/A
IMDM 101 is an introduction to the basic practices, concepts and issues in the field of Immersive Media Design. This course is a hybrid studio / lecture course in which students will work collaboratively in teams to complete both research and practical projects related to the field. Topics covered include: creative labs with software and interactive hardware, surveying the contemporary and historic works of Immersive Media Design, and speculative project design.

IMDM 127 – Creative Coding for Digital Media (3 credits)
Prerequisite: N/A
An introduction to program supported by exercises in creative coding, creating code for algorithmic and interactive art. Students will use a problem-driven approach to design and build software for the visual and auditory arts. The course also includes an introduction to a wide variety of issues relating to computational including software design and construction, supporting mathematics, and how computational approaches impact artistic choice. The course assumes no background in programming and is targeted to students with a broad diversity in backgrounds and interests.

IMDM 150 – Introduction to Digital Media Theory and Culture (3 credits)
Prerequisites: N/A
IMDM 150 is an introduction to the fundamental structures and themes of digital culture in contemporary society as related to immersive media. This course will provide examples of contemporary works of Immersive Media Design, New Media Art, and emerging cultural technologies to demonstrate pathways towards becoming active producers, critics, and consumers of digital culture. It will explore the dynamic interplay between culture and emerging digital technologies and examine the many ways in which they influence our lives.

IMDM 227 - Intro to Computational Media (3 credits)
Prerequisites: IMDM 127 or CMSC 131
IMDM 227 is an introduction to practices in computational media as they pertain to the implementation and creation of virtual and augmented reality applications. This course will cover this subject matter from both technical and aesthetic viewpoints. Students are introduced to basic programming constructs, digital asset creation processes, algorithms, and data structures associated with Augmented and Virtual Reality (AR/VR) production pipelines.

IMDM 290 – Collaborative Studio I: Image + Time (3 credits)
Prerequisites: IMDM 101, IMDM 150, ARTT255, IMDM 227, Candidate Portfolio Review
IMDM 290 is concept-driven team-taught studio course in which you will work together in groups to create intellectually engaging and technically innovative works of time-based media. It bridges the technical and creative tracks of the major to expose students to the process of working collaboratively on team-based projects in a manner that reflects contemporary practices in the fields of art, design, and creative technical

industries. Topics include: image manipulation, audio/video production, generative and procedural image manipulation processes, as well as effective teamwork, exhibition, installation and presentation design.

IMDM 327 – Augmented and Virtual Reality (3 credits)
Prerequisites: IMDM227, CMSC132
Introduction to mechanisms and programming for virtual reality, augmented reality, and related technologies. Covers elements of a standard VR system, including creating, managing and rendering visual and audio VR content, tracking orientation and positions of head mounted display (HMD) and controller, rendering stereo imagery for VR headsets, and implementing approaches for user interactivity.

IMDM 350 – Advanced Digital Media Theory (3 credits)
Prerequisites: IMDM 290
IMDM 350 is a lecture course covering advanced theories and concepts in the fields of immersive media design, new media art, design, and cultural technology. Building on the foundation of IMDM 150, this course looks at ways in which contemporary societal norms are being shaped by game culture, social and mobile media, AR/VR escapism, network aesthetics, hacktivism, open-source culture, neural networks, artificial intelligence, and machine learning, among others. This course addresses the broad range of ways in which the accelerating pace of technological advances influence how we mediate the world around us and examines the environmental, social, political, and ethical implications of its use.

IMDM 351 – Digital Innovation Marketing and Business (3 credits)
Prerequisites: IMDM 290
IMDM 351 is a lecture course in which students research and learn how to implement best practice strategies in building support for wide ranging projects in the fields of applied creativity (such as entrepreneurial ventures, media startups, public media arts and design projects). Students in IMDM 310 will learn how to effectively build a modern promotional portfolio that supports their entrepreneurial, creative, emerging technology, new-media, and artistic endeavors. Topics include: portfolio building, grant writing, social media public relations, oral presentation and promotion.

IMDM 358 – Experiential Learning (2-6 credits)
Prerequisites: IMDM 290
IMDM 358 supports those students wishing to seek out professional experience in relevant Immersive Media Design fields. This course is an elective open to students from all tracks of the major who wish to participate in internships in a position or at an organization which will offer real-word experience, knowledge and feedback from mentors working in a relevant field.

IMDM 390 – Collaborative Studio II: Experiential Computing (3 credits)
Prerequisites: IMDM 290, ARTT37x or IMDM 327
IMDM 390 is an intermediate-level concept-driven team-taught studio course wherein students work in groups consisting of students across both tracks of the major. The objective of the course is to create multi-sensorial works of art, design, and cultural technology through the use of inventive digital processes such as 3-D modeling, procedural animation, audio synthesis, and interactivity. Emphasis is placed on the development of works which envelop the viewer or participant and exhibit a physicality which manifests from the ephemera of digital media. Topics covered include: 3-D modeling, digital cinematography and lighting design, digital fabrication, projection design, sound design and electronics.

IMDM 470 – Performative Computing (3 credits)

Prerequisites: IMDM 390
IMDM 450 is a studio course which introduces intermediate and advanced level practices and theories of designing physically interactive immersive media experiences. Through the use of emerging systems of interaction design, digital sensing, fabrication, and display, students explore the methods and processes involved in the creation of materialized media for a broad range of multi-sensorial applications. Topics include: technology-augmented live performance, audio and visual responsive environments, data responsive design, media architecture, site specific new-media installation.

IMDM 490 – Capstone 1 (4 credits)
Prerequisites: IMDM 390
The first in a two-semester series of courses (with IMDM 491), this team-taught studio course examines the generative process of creating a large-scale immersive media design project. Students will commence pre-production and early-stage production processes for a large-scale capstone project. Topics covered include: project ideation, feasibility studies, computational tool-building and pipeline logistics, external mentorship, and in-class peer critiques of in progress work.

IMDM 491 – Capstone II (4 credits)
Prerequisites: IMDM 490
The second in a two-semester series of courses (with IMDM 490), in this team-taught studio course you will complete the process of creating and publicly exhibiting a large-scale immersive media design project. Topics covered include exhibition design, exhibition venue research, public relations, and team-based collaboration.

ARTT Course listings required in tracks 1 or 2

ARTT 100 – Two-Dimensional Design Fundamentals (3 credits)
Prerequisites: N/A
Principles and elements of two-dimensional design. Introduction to visual communication.

ARTT 110 – Elements of Drawing I (3 credits)
Prerequisites: N/A
Fundamental concepts, media, and processes of drawing. Emphasis on observation and representation in combination with individual expression. Subject matter includes still life, human figure, nature, the built environment, and conceptual projects.

ARTT 200 – Three-Dimensional Art Fundamentals (3 credits)
Prerequisites: ARTT 100, ARTT 110
Fundamental concepts of three-dimensional form and space examined through the manipulation and organization of various materials.

ARTT 210 – Elements of Drawing II (3 credits)
Prerequisites: ARTT 110
Continuation of ARTT110 with additional emphasis on color, figure drawing, and contemporary issues.

ARTT 255 – Introduction to Digital Art and Design Processes (3 credits)
Prerequisites ARTT 100, ARTT 110

Introduction to basic software and principles of digital imaging, and how they are applied to art and design. Topics covered: Digital image construction and manipulation, Vector-Based digital techniques layout, typography, etc), time-based digital techniques (video and audio composition and manipulation), and basic interactivity (web-design). Digital media used to explore visual principles established in ARTT100.

ARTT 370 – Elements of Digital Media (3 credits)
Prerequisites: ARTT 255 or permission of ARHU-ARTT
Exploration of creativity through code and software development, image creation and manipulation, interactivity, and linkages between digital audio and video. Emphasis on issues in contemporary digital art.

ARTT 371 – Digital Video and Sound Installation (3 credits)
Prerequisites: ARTT 255
This course focuses on the acquisition of practical and theoretical skills integral to digital video and sound installation as an evolving form that extends beyond the screen and into site-specific, immersive, and multiple-channel environments. Through technical demonstrations, individual projects, assigned readings, and class discussions, students will develop and extend their understanding of time-based media and installation practices, learn the historical/cultural significance of the medium, and discuss the work of various artists.

ARTT479A – Advanced Digital Media Studio: Code and Form (3 credits)
Prerequisites: ARTT 370
Advanced level course in Digital Media emphasizing contemporary practices and theories in the area of Digital Fabrication. 3-D modeling, 3-D printing and related digital fabrication techniques are covered.

ARTT 479D – Advanced Digital Media Studio: Immersive and Virtual Environments (3 credits)
Prerequisites: ARTT 370
Introduction to the uses of game development software in an artistic context. Practical examination of interactive, immersive and installation art as mediated through the context of real-time computer generated imagery and game engine methodologies.

Course Descriptions: CMSC Course listings required in tracks 1 or 2:

CMSC 122 – Introduction to Computer Programming via the Web (3 credits)
Prerequisites: None
Must not have completed any courses from CMSC131-499 course range; and must not be concurrently enrolled in CMSC131. Credit only granted for: CMSC106, CMSC122, or INST126**.**
Introduction to computer programming in the context of developing full featured dynamic web sites. Uses a problem solving approach to teach basics of program design and implementation using JavaScript; relates these skills to creation of dynamic web sites; then explores both the potential and limits of web-based information sources for use in research. Intended to help relate a student's major to these emerging technologies.

CMSC131 – Object-Oriented Programming I (4 credits)
Corequisites: MATH140; and permission of CMNS-Computer Science department
Introduction to programming and computer science. Emphasizes understanding and implementation of applications using object-oriented techniques. Develops skills such as program design and testing as well as implementation of programs using a graphical IDE. Programming done in Java.

CMSC132 – Object-Oriented Programming II (3 credits)
Prerequisites: Minimum grade of C- in CMSC131; or must have earned a score of 5 on the A Java AP exam. Or permission of the department based on satisfactory performance on the department placement exam; and minimum grade of C- in MATH140; and permission of CMNS-Computer Science department
Introduction to use of computers to solve problems using software engineering principles. Design, build, test, and debug medium -size software systems and learn to use relevant tools. Use object-oriented methods to create effective and efficient problem solutions. Use and implement application programming interfaces (APIs). Programming done in Java.

CMSC250 – Discrete Structures (3 credits)
Prerequisites: Minimum grade of C- in CMSC131; or must have earned a score of 5 on the A Java AP exam. Or permission of the department based on satisfactory performance on the department placement exam; and minimum grade of C- in MATH140; and permission of CMNS-Computer Science department
Introduction to use of computers to solve problems using software engineering principles. Design, build, test, and debug medium -size software systems and learn to use relevant tools. Use object-oriented methods to create effective and efficient problem solutions. Use and implement application programming interfaces (APIs). Programming done in Java.

CMSC330 – Organization of Programming Languages (3 credits)
Prerequisites: Minimum grade of C- in CMSC250 and CMSC216; and permission of CMNS-Computer Science department.
The semantics of programming languages and their run-time organization. Several different models of languages are discussed, including procedural (e.g., C, Pascal), functional (e.g., ML, LISP), rule-based (e.g., Prolog), and object-oriented (e.g., C++, Smalltalk). Run-time structures, including dynamic versus static scope rules, storage for strings, arrays, records, and object inheritance are explored.

CMSC351 – Algorithms (3 credits)
Prerequisites: Minimum grade of C- in CMSC250 and CMSC216; and permission of CMNS-Computer Science department.
A systematic study of the complexity of some elementary algorithms related to sorting, graphs and trees, and combinatorics. Algorithms are analyzed using mathematical techniques to solve recurrences and summations.

Course Descriptions: CMSC Course listings recommended in track one

CMSC420 – Data Structures (3 credits)
Prerequisites: Minimum grade of C- in CMSC351 and CMSC330; and permission of CMNS-Computer Science department. Or must be in the (Computer Science (Doctoral), Computer Science (Master's)) program.
Description, properties, and storage allocation of data structures including lists and trees. Algorithms for manipulating structures. Applications from areas such as data processing, information retrieval, symbol manipulation, and operating systems.

CMSC425 – Game Programming (3 credits)
Prerequisites: Minimum grade of C- in CMSC420.
An introduction to the principles and practice of computer game programming and design. This includes an introduction to game hardware and systems, the principles of game design, object and terrain modeling, game physics, artificial intelligence for games, networking for games, rendering and animation, and aural rendering. Course topics are reinforced through the design and implementation of a working computer game.

CMSC426 – Computer Vision (3 credits)
Prerequisites: Minimum grade of C- in CMSC330 and CMSC351; or must be in the (Computer Science (Doctoral), Computer Science (Master's)) program.
Restriction: Permission of CMNS-Computer Science department.
An introduction to basic concepts and techniques in computer vision. This includes low-level operations such as image filtering and edge detection, 3D reconstruction of scenes using stereo and structure from motion, and object detection, recognition and classification.

CMSC427 – Computer Graphics (3 credits)
Prerequisites: MATH240; and minimum grade of C- in CMSC420; and permission of CMNS-Computer Science department. Or must be in the (Computer Science (Doctoral), Computer Science (Master's)) program.
An introduction to the principles of computer graphics. Includes an introduction to graphics displays and systems. Introduction to the mathematics of affine and projective transformations, perspective, curve and surface modeling, algorithms for hidden-surface removal, color models, methods for modeling illumination, shading, and reflection.

CMCS434 – Introduction to Human-Computer Interaction (3 credits)
Prerequisites: Minimum grade of C- in CMSC330 and CMSC351; and permission of CMNS-Computer Science department. Or must be in the (Computer Science (Doctoral), Computer Science (Master's)) program.
Assess usability by quantitative and qualitative methods. Conduct task analyses, usability tests, expert reviews, and continuing assessments of working products by interviews, surveys, and logging. Apply design processes and guidelines to develop professional quality user interfaces. Build low-fidelity paper mockups, and a high-fidelity prototype using contemporary tools such as graphic editors and a graphical programming environment (e.g., Visual Basic, Java).

Appendix D: Sample Four Year Plans with Benchmarks

The central thread of the major is the sequence of IMDM courses, and most specifically the collaborative studio series IMDM290, 390 and 491/491. We hope to develop cohorts of majors that proceed through these as a group. However, students come to majors with many backgrounds. They may have coursework from high school, they may be an internal transfer from another major, they be an external transfer from another school, or they may have started in ARTT or CMSC and wish to switch. We expect to work on different routes through the major for students of different backgrounds and interests. The major already accommodates artistically minded students in Track 2, and technically minded students in Track 1. We expect to accommodate other variations in the sequence in which students take CMSC and ARTT courses.

Track 2: Emerging Creatives

	Fall	Spring
Year 1	ARHU 158 (3) MATH 115 - Precalculus (3) FSMA• CMSC 122 - Intro to Programming via Web (3) ARTT 100 - Two-Dimensional Design Fundamentals (3) IMDM 101 - Intro to Immersive Media (3)† DSSP Credits: 15 (Semester 1)	Gen Ed (3) ENGL101 FSAW • IMDM 127 - Creative Coding for Digital Media(3) [NEW] ARTT 200 - Three-Dimensional Art Fundamentals (3) IMDM 150 - Intro to Digital Media and Theory & Culture (3)† DSHU ARTT 110 - Elements of Drawing (3) Credits: 15 / 30 (semester 2)
Year 2 Benchmark Requirements - Semester three: Successfully complete portfolio review process between 30 & 45 credits ARTT210,255 IMDM 290, 227	Gen Ed (3) FSAR Gen Ed (3) FSOC ARTT 210 - Drawing II (3) ARTT 255 - Intro to Digital Art and Design Practices (3) IMDM 227 - Intro to Computational Media (3) [New] Credits: 15 / 45 (Semester 3)	ENGL Elective (143/245/255/290/294) (3) DSHU Gen Ed (3) DSNS Gen Ed (3) DSHS Gen Ed (3) DSSP (Non-major) IMDM 290 - Collaborative Studio I: Image + Time (3)[NEW] Credits 15 / 60 (Semester 4)
Year 3 Benchmark requirements - Semester five: ARTT 34x, 37x IMDM 350	Gen Ed (3) DSHS Gen Ed (4) DSNL Global Engagement #1 ARTT 37X elective (3) IMDM 350 - Advanced Digital Media Theory (3) [NEW]IS Credits: 16 / 76 (Semester 5)	Professional Writing (3) FSPW Open Elective (3) Global Engagement #2 IMDM 351 - Digital Innovation Marketing and Business (3)[NEW] IS IMDM 390 - Collaborative Studio II: Experiential Computing (3) [NEW] Credits: 15 / 91 (Semester 6)
Year 4	Open Elective 3xx/4xx (3) Open Elective (3) Open Elective(3) IMDM 470 - Performative Computing (3)[NEW] IMDM 490 - Capstone I (4)[NEW] Credits: 16 / 107 (Semester 7)	Open Elective 3xx/4xx (3) Open Elective 3xx/4xx (3) ARTT 37X / 47X elective (3) IMDM 491 - Capstone II (4)[NEW] Credits 13 / 120 (Semester 8)

* All students must complete two Distributive Studies courses that are approved for I-series courses. The Understanding Plural Societies and Cultural Competence courses may also fulfill Distributive Studies categories. † - offered every semester

University of Maryland General Education Requirements Overview		
Fundamental Studies: 15 Credits		
Fundamental Studies Academic Writing	3	FSAW
Fundamental Studies Professional Writing	3	FSPW
Fundamental Studies Oral Communication	3	FSOC
Fundamental Studies Mathematics	3	FSMA
Fundamental Studies Analytic Reasoning[1]	3	FSAR
[1] If a student passes an Analytic Reasoning course that requires a Fundamental Studies Math course as a prerequisite, then the Fundamental Studies Math course is considered to be fulfilled (e.g., students who place into and pass a calculus course, which counts for FSAR, do not need to take a less advanced Math course to fulfill the FSMA requirement).		
Distributive Studies: 25 Credits		
Distributive Studies Natural Sciences	3	DSNS
Distributive Studies Natural Science Lab Course[2]	4	DSNL
Distributive Studies History and Social Sciences	6	DSHS
Distributive Studies Humanities	6	DSHU
Distributive Studies Scholarship in Practice[3]	6	DSSP
[2] A second DSNL course can fulfill the DSNS course requirement. [3] Students learn and practice skills of critical evaluation and participate in the process of applying knowledge in the pursuit of a tangible goal. At least one course must be outside of the major.		
I-Series Courses: 6 Credits [4] The signature courses of the UMD General Education program, I-Series courses investigate a significant issue in depth and demonstrate how particular disciplines and fields of study address problems.		
I-Series Course	6	SCIS
[4] I-Series credits may be double-counted with courses taken for the Distributive Studies requirement.		
Diversity: 4-6 Credits[5]		
Diversity Understanding Plural Societies[6] Courses examine how diverse cultural and ethnic groups co-exist.	3-6	DVUP
Diversity Cultural Competence Courses help students develop skills to succeed in a diverse world.	0-3	DVCC
[5] These credits may be double-counted with courses taken for the Distributive Studies requirement. [6] Students may take either two DVUP courses or one DVUP course and one DVCC course.		