

Accelerated
Bachelor of Science in Media Arts and Science and
Master of Science in Media Arts and Science
with Specializations in
3D Graphics and Animation,
Game Design and Development,
User Experience Design,
Video Production and Sound Design, and
Web Design and Development

Media Arts and Science Program
Department of Human-Centered Computing
Indiana University School of Informatics at IUPUI
Fall 2016

**Accelerated Bachelor of Science in Media Arts and Science and
Master of Science in Media Arts and Science with Specializations in
3D Graphics and Animation, Game Design and Development, User Experience
Design, Video Production and Sound Design, and Web Design and Development**

Existing Degrees:

Bachelor of Science in Media Arts and Science
Master of Science in Media Arts and Science (CIP Code 50.0102)

New Specializations within the existing Master of Science:

3D Graphics and Animation (CIP Code 10.0304)
Game Design and Development (CIP Code 50.0411)
User Experience Design (CIP Code 30.3101)
Video Production and Sound Design (CIP Code 50.0602)
Web Design and Development (CIP 11.0801)

To be offered by the Indiana University School of Informatics and Computing, IUPUI at Indianapolis, in Marion County, Indiana

Chair, Department of Human-Centered Computing	Date
Executive Associate Dean, School of Informatics and Computing	Date
Dean of the Graduate School	Date

Date Submitted:

1. Characteristics

- a. Campus Offering Program: Indiana University-Purdue University Indianapolis
- b. Scope of Delivery: IUPUI
- c. Mode of Delivery: Classroom
- d. Other Delivery Aspects: Internships
- e. Academic Unit(s) Offering Program: Indiana University School of Informatics and Computing, Department of Human-Centered Computing
- f. Anticipated starting semester: Spring 2016

Summary

The Department of Human-Centered Computing (HCC) in the Indiana University School of Informatics and Computing at IUPUI proposes an accelerated Bachelor of Science (BS) and Master of Science (MS) degree program, enabling students to complete both a BS and MS in Media Arts and Science (MAS) in five years. The shortened timeframe is achieved by substituting 12 credit hours of undergraduate electives in the senior year with graduate courses required for the MS. The BS and MS are both existing degrees.

The department also proposes three new 12-credit-hour graduate specializations within the MS for students who have completed corresponding 15-credit-hour undergraduate specializations: 3D Graphics and Animation, Game Design and Development, User Experience Design, Video Production and Sound Design, and Web Design and Development.

The MS in Media Arts and Science is a professional graduate program that combines research, theory, and practice in the design and production of multichannel digital media. With the guidance of HCC faculty, supplemented by interactions with working professionals and domain experts, students develop cutting-edge industry knowledge and in-demand skills in our state-of-the-art technology labs. Students gain a broad understanding of the range of current and emerging digital media ecosystems and applications and are guided to develop knowledge in areas including gamification and media design strategies for a variety of high-impact domains, including health and well-being, business and marketing, education, military applications and simulations; social media and media-rich communications strategies for customer engagement; and advanced applications of media design, including 3D printing technology.

Institutional Rationale

The department is proposing the BS/MS and new specializations for the following reasons:

1. The BS/MS in MAS is the dual degree combination most frequently requested by undergraduate students in the school. (Roughly half the undergraduate students in the school and two-thirds of those in the department are in the MAS program.)
2. Although the BS/MS in MAS and Human-Computer Interaction serves undergraduates in the Web Design and Development specialization, MAS students in the other four undergraduate specializations also seek—but currently lack—opportunities to deepen their knowledge and skills at the graduate level. The new MS specializations create these paths.
3. MAS jobs in Indianapolis often require specialized knowledge and skills at a graduate level, including the ability to perform research in an MAS specialization and to collaborate with researchers in other fields (e.g., working with doctors to create 3D models for prosthetics, to develop serious games that increase adherence to a prescribed exercise plan, or to produce videos that enhance health literacy).

4. Top employers in MAS (e.g., Pixar, Blizzard) expect job applicants to have an impressive professional portfolio exhibiting their work. The skills required to create such a portfolio may require an extended period of mentorship, through projects and independent studies, made possible by the BS/MS program.
5. In central Indiana, MAS fields suffer from a dearth of master's degree holders, although the degree is generally the minimum requirement to instruct undergraduate students. Increasing the pool of talent with this degree will enable local universities to meet Indiana's demand for training high-tech professionals.
6. BS in MAS students with interest in the MS in MAS are typically discouraged from applying because of its length, cost, and lack of specializations. This proposal rectifies these three impediments.

Graduates of the BS/MS program will be prepared for a range of careers, including [Brand Manager](#), [Graphic Designer](#), [Product Manager](#), and [Social Media Strategist](#). For those specializing in 3D Graphics and Animation, career options include [2D/3D Design Artist](#), [3D Animator](#), [Creative Director](#), [Medical Animator](#), and [Motion Graphics Artist](#); for Game Design and Development, [Creative Director](#), [Lead Game Designer](#), [Lecturer in Application Development](#), [Unity 3D Game Developer](#); for User Experience Design, [Human Factors Specialist](#), [Interactive Media Designer](#), [Product Analyst](#), [Usability Engineer](#), [Usability Tester](#), User Experience (UX) Consultant, [UX Designer](#), and UX Researcher; for Video Production and Sound Design, [Audio Visual Manager](#), [Broadcast Engineer](#), [Director](#), [Media Arts Instructor](#), [Producer](#), [Video Editor](#), and [Videographer](#); and for Web Design and Development, and [Web Administrator](#), [Web Designer](#), and [Web Developer](#).

This proposal aligns with the department's [HCC Strategic Plan 2014–2019](#) and its vision to “build new programs in human-centered computing with high market demand and research potential” to “educate tomorrow’s intellectual and industrial leaders in understanding, designing, and creating next-generation human-centered computing systems.” It also aligns with its goals of improving the “quality and quantity of graduate students,” increasing their “research productivity,” and embedding “industrial partners and career pipelines in the graduate programs.” The proposal also supports the school’s mission “to excel in education, research, and civic engagement in the field of informatics, an integrative discipline which advances knowledge in computing, information, and media technologies; the implications those technologies have for individuals and society; and their application to any field of study adapting to the challenges of the Information Age” ([Mission Statement](#)).

The MS also aligns well with [IUPUI's Strategic Plan](#) “Increase Capacity for Graduate Education” and, specifically, to “aggressively develop professional master’s degrees.” This degree combination is a key strategy for developing and retaining IT talent in the State and is expected to enhance recruitment and retention for the school and campus.

The new specializations also leverage on the campus's disciplinary strengths laid out in the [IUPUI's Strategic Plan for Advances in Health and Life Sciences](#). For example, NEWM N548 3D Prototyping for Medical and Dental Applications achieves the objective to “engage students and faculty from the various health and life sciences schools in collaborating in classroom and clinical settings to deliver higher quality, comprehensive patient care” and to “implement, integrate, and evaluate interprofessional health education programs and exemplary practices sites and translate outcomes into collaborative practice models in order to improve patient outcomes, quality, and cost effectiveness.” For example, an MAS faculty and student researcher from the IU School of Dentistry created a prosthetic mandible for a patient using 3D scanning, sculpture, and printing technology ([The Observer, June 29, 2016](#)).

Institutional strengths and synergies: The MS in MAS, established in 2002, targets students with an interest in the research, design, and development of digital media experiences for a variety of organizational and industry settings. The program's emphasis on digital media for healthcare builds on IUPUI's strengths in the health and life sciences. Likewise, its emphasis on the business of digital media builds on Indianapolis' growth as a center for technology entrepreneurs and large digital marketing companies.

Students in the program seek in-depth knowledge and skills in the holistic development of professional digital media projects. Historically, our students have come from diverse areas, such as healthcare, art, journalism, telecommunications, communication studies, the social sciences, design, history, information and library science, computer science, philanthropy, and education, among others. The program also serves those planning to conduct research in digital media and then pursuing a Ph.D. in a related field.

Target audience: This BS/MS program is intended to serve BS in MAS students with high academic promise who seek to deepen their knowledge and skills at the graduate level, expand their professional portfolio, improve their career prospects, and engage with MAS faculty and faculty in other schools in research collaborations.

State Rationale

The proposed BS/MS addresses state priorities outlined in the Indiana Commission on Higher Education's “[Reaching Higher, Achieving More](#).” The BS/MS is student centered, mission driven, and “workforce-aligned, recognizing the increasing knowledge, skills and degree attainment needed for lifetime employment and ensuring Indiana's economic competitiveness.”

By creating a “smarter pathway” to completing the learning outcomes required by employers in less time, the program scores high on ICHE's on-time completion, cost per degree, and student debt productivity metrics. By replacing free electives with required graduate courses, the MS can be completed with 12 fewer credit hours, thus shaving more than a semester off of the length of the degree. This not only saves the cost of tuition, fees, accommodation, and meals (e.g., \$10,506.02 in state, \$16,074.23 out of state, per nine credit hour semester, [IUPUI 2015–2016 Tuition & Fee Estimator](#)) but the opportunity cost of delayed employment (which could add

another \$30,000 or more). These benefits of the program increase the likelihood of degree completion. Thus, the BS/MS is a program demonstrating “continuous efficiency,” further enhanced by operational efficiency from interdisciplinary coordination.

Regarding quality, the MS has clearly defined and empirically measurable student learning outcomes and rigorous learning assessment procedures.

Labor Market Need

In Central Indiana, the increase in job growth in computer-related occupations is outpacing all areas 7.3% to 2%. A 2014 TechPoint Foundation report found “85 percent of [companies surveyed] experienced a high level of competition for talent in Indiana and 65 percent perceived a skills gap between available talent and the jobs that the companies are looking to fill.” The Accenture 2013 Skills and Employment Trends Survey of 400 executives at large US companies reported that, among those who have or expect to face a skills shortage, the biggest demand is for IT skills (44%). A major reason for a continued skills shortage is a lack of qualified candidates (38%).

The TECNA 2013 National Survey of Technology, Policy, and Strategic Issues surveyed over 1700 IT and business executives from US industries including IT, finance, healthcare, media, education, life sciences, and telecommunications and reported similar shortages of workers with the IT skills to meet their needs. These organizations report they were expecting year over year shortages of workers to fill their open positions ranging from 25% to 44%.

The BS/MS also meets the “high demand academic programs that are critical to Indiana’s economy” by providing paths to well remunerated careers in growing fields ([Reaching Higher, Achieving More](#)). For example, careers listed by O*Net as having a bright outlook include [15-1132.00 Software Developers, Applications](#) (\$98,260 median US salary in 2015, 14%+ projected growth from 2014–2024), [15-1199.10 Search Marketing Strategists](#) (\$85,240), [15-1199.11 Video Game Designers](#) (\$85,240), [15-1199.03 Web Administrators](#) (\$85,240), [15-1134.00 Web Developers](#) (\$64,970, 14%+), [27-4032.00 Film and Video Editors](#) (\$61,750, 14%+ projected growth from 2014–2024), and [17-2112.01 Human Factors Engineers and Ergonomists](#) (\$83,470).

Indiana Department of Workforce Development’s [Occupational Demand Report \(SEA 301\)](#) shows very high projected 2014–2024 growth rates for MAS fields, such as Web Developers (39%), Software Developers, Applications (28%), Film and Video Editors (23%), Producers and Directors (16%), and Audio and Video Equipment Technicians (16%) as well as for the fields of interdisciplinary collaborators of the program, such as Biomedical Engineers (40%), Orthotists and Prosthetists (30%), Health Technologists (27%), and Market Research Analysts and Marketing Specialists (26%).

The BS/MS in MAS can also be preparatory to a doctoral degree, such as a Ph.D. in [Media Arts and Technology](#) or [Human-Computer Interaction](#).

Over the last decade, the MS in MAS program has graduated 224 students, who went on to work in important positions in the digital media industry. These students work in design agencies, digital media companies, digital media production companies, healthcare systems, higher education, the Hollywood movie industry, and news agencies.

Examples of their current employers include Angie’s List, Ball State University, Blackbaud, Butler University, the Children’s Museum of Indianapolis, Department of Veteran’s Affairs, Eli Lilly and Company, Exaromed, Gaither Music Company, Gannett, Girl’s Inc., Herff Jones, IBM, Indianapolis Public Schools, IU Health, LIDS Sports Group, McGraw-Hill Higher Education, Oregon State University, Pixar, Purdue School of Engineering and Technology (IUPUI), Quest Information Systems, Roche Diagnostics, Thomson Consumer Electronics, and XM Satellite Radio. Examples of job positions secured by our MS in MAS graduates include Application Developer, Business Analyst, Consultant, Creative Analyst, eCommerce Programmer, Medical Multimedia Specialist, Software Engineer, User Interface Designer, and Visiting Lecturer.

The academic advisors sent out a survey to students in the BS in MAS program whose GPA is 3.0 or higher. Twenty-one students responded.

	Yes	No	Maybe
Do you have interest in graduate school?	12	7	2
If there were an accelerated bachelor’s to master’s degree for MAS, would you be more inclined to pursue your master’s?	19	0	2
If so, what area of specialization would you want to pursue? ¹	N		
<i>Video Production and Sound Design</i>	13		
<i>3D Graphics and Animation</i>	4		
<i>Web Design and Development</i>	4		
<i>Game Design and Development</i>	2		

Program Cost and Support

Because the BS/MS relies on existing programs and MS enrollment is not at capacity, the program is not expected to require additional faculty and staff.

The program is not expected to require additional facilities, though continued growth could place demands on laboratory space.

The program is not expected to incur significant capital costs, though it may require the purchase of additional computer and video and audio equipment. These costs would be offset by tuition.

The program is not expected to require the reallocation of resources from existing programs.

¹ User Experience Design was not included in this survey.

There will be no additional fees associated with the program. On the contrary, BS/MS students will be able to take 12 credit hours of graduate courses (\$4,068.12 in state, \$12,016.10 out of state) at the undergraduate rate (\$3,203.40 in state, \$11,490.96 out of state). The application fee for the MS is waived.

Similar and Related Programs

Similar Programs at Other Institutions: Not required for BS/MS combining existing degrees

Articulation of Associate/Baccalaureate Programs: The BS/MS is open to transfer students under articulation agreements who meet the admission requirements.

Collaboration with Similar or Related Programs on Other Campuses: None

Admission requirements

Students will be admitted to the IU School of Informatics and Computing under the guidelines that currently exist for admitting traditional BS students. The sequence of courses that they will take for the first two years will be identical to the courses taken by MAS majors. The students will be made aware of the option to pursue the integrated degree program during their first year, and counseled appropriately if they wish to pursue it. Only MAS students whose track record shows promise of success at graduate level would be counseled to enter the accelerated degree program. Students interested in applying for the integrated degree program will do so during the fourth semester into their BS program.

To be conditionally admitted to the program, students will be required to complete the first 60 credit hours of coursework (normally the first four semesters) in the plan of study with a minimum GPA of 3.25. The requirements for final admission to the MS program are a) completion of all BS in MAS degree requirements, b) a minimum cumulative undergraduate GPA of 3.25, c) a grade of B– or higher in each graduate course undertaken as part of the BS plan of study, and d) a minimum graduate GPA of 3.0 for those courses.

Degree Requirements

The proposed curriculum includes all core undergraduate courses required for the BS in MAS and all graduate course required for the MS in MAS. A total of 138 credit hours are required for the BS/MS. In the normal progression, the BS is completed in 120 credit hours and the MS in 30 credit hours. The total number of credit hours is reduced from 150 to 138 by substituting 12 of the 16 credit hours of general electives of the BS with graduate courses required for the MS. The substitutions generally occur in the senior year, but might also occur in the junior year, depending on the specialization and plan of study.

Successful completion of the graduate program requires a cumulative GPA of 3.0. No course with a grade of less than a B– may count toward the fulfillment of MS degree requirements.

Scope and Size

During the initial years, it is expected that the program will attract at least five students per year for a period of four years. This will increase to ten students per year during the following years.

Administrative Structure

There will be two plans of study for students in this program: 1) a BS plan of study that includes the 12 credit hours of graduate courses to be taken in place of the undergraduate general electives, and 2) an MS plan of study for the last 18 credit hours (normally, the final year of the five-year program). The two plans of study are in the appendix.

After conditional BS/MS admission, the Graduate Coordinator will review each student’s performance at the end of each semester to ensure final admissions requirements are met.

Students will receive the BS upon completion of BS degree requirements (120 credit hours). A student who becomes ineligible for final admission to the MS or decides to leave the BS/MS program will still be eligible to receive a BS degree once all the BS degree requirements have been completed.

This degree program will be offered only on the IUPUI campus.

Program Learning Outcomes

Upon completion of the MS in MAS program, students will	RBT ²	PGPL ³	Course: Assessments
1. Create and evaluate media applications by researching and applying multimedia design and development techniques using text, graphics, web and mobile technologies, 2D and 3D modeling and animation, sound, and video; concept development, prototyping, storyboarding, HCI design methods, proof of concepts, multimedia production pipelines, testing, and evaluation	5, 6	1, 2	N500: Midterm and Final Project Report N501, N507: Assignments and Course Project N534: Formal Game Design Report H541: Midterm and Final Project Report
2. Develop digital games for a variety of domains, including entertainment, health and well-being, medical sciences, education, and business, applying media design principles and cognitive theories	6	1	N534: Assignments, Formal Game Design Report N537: Multiplayer Project, Persistent World, Device Project
3. Research and develop multichannel, interactive media strategies, including digital content and social media architectures, to enhance organizational communication	5, 6	1, 2	N512: Final Project Report H550: Business Plan
4. Design and use novel forms and applications of media technologies, such as those enabled by advanced digital video production techniques and 3D printing	6	1, 2	N501, N507: Assignments and Course Project N548, 549: Final Prototype
5. Apply principles and theories of quantitative	3	1	H541: Midterm and Final

² RBT: Revised Bloom’s taxonomy

³ PGPL: Principles of Graduate and Professional Learning (1. Knowledge and Skills Mastery; 2. Critical Thinking and Good Judgment; 3. Effective Communication; 4. Ethical Behavior)

analysis, qualitative analysis, research design, information visualization, and visual analytics			Project Report N507: Assignments and Course Project N534: Usability Evaluation Report N506: Project or Thesis
6. Design effective, usable, and human-centered media-rich applications using prototypes and proof of concepts	6	2	N534: Formal Game Design Report H541: Midterm and Final Project Report N506: Project or Thesis
7. Effectively communicate in digital, oral, and written form the processes, ideas, outcomes, and implications of MAS projects	2, 5	3	N500, H541: Midterm and Final Project Report N506: Project or Thesis
8. Articulate digital media design and production decisions and their rationale	2, 5	3	N500, H541: Midterm and Final Presentation N501: Course Project N537: Quizzes, Exercises, Analysis Paper H550: Business Plan
9. Exhibit sound judgment, ethical behavior, and professionalism in applying media arts concepts and principles to serve stakeholders and society, especially in ethically challenging situations	2–6	4	H541: Midterm and Final Project Report N507: Assignments and Course Project H550: Business Plan
10. Collaborate in teams fairly, effectively, and creatively, applying group decision-making and negotiation skills	2–6	4	N500, N512, H541: Final Project Report N501: Course Project

Assessments

The HCC Department employs the following assessment methods:

1. *Course and Instructor Evaluation.* Students are required to complete a course and instructor evaluation survey for each course taken in the School of Informatics and Computing. The survey includes quantitative and open-ended items. The survey is conducted by school staff in the last five weeks of the semester and is reviewed by the HCC Department's Chair and Curriculum Committee in February and September. The Chair uses the results for both faculty and curricular development.
2. *Curriculum Survey.* Students participate in an annual curriculum survey. The survey provides comprehensive, detailed, qualitative feedback on course quality and availability. The survey is conducted by student members of the HCC department's Curriculum Committee in May, and their report is reviewed by the HCC Department's Chair and Curriculum Committee in September. Specific courses are developed or revised each year based on their report.
3. *Student Satisfaction Survey.* Graduates participate in an exit survey. The survey provides feedback on the program, department, school, and campus. The survey is conducted by the

Communications Manager in May and December and is reviewed by the deans, chairs, and department curriculum committees in September and February.

4. *Alumni Surveys.* Alumni complete a career survey 90 days after graduation and two years and 90 days after graduation. Questions on curricular development are appended to this survey, which include the identification of the most and least helpful courses. The survey is prepared by the school's Academic Affairs Committee, administered by its Director of Career Services in March and August, and reviewed by the chairs and department curriculum committees in September. The Chair uses the results for both faculty and curricular development.
5. *HCC Advisory Board.* The board is composed of directors at major employers. The HCC Chair consults with them semiannually on the department's mission and program goals. Findings related to the curriculum are reported to the HCC Curriculum Committee in September and February.
6. *Pretesting and Posttesting.* Two courses per year will be selected for pretesting and posttesting based on rubrics developed by certification bodies (e.g., INFORMS for analytics, PMI for project management). Based on students' results on the tests, the instructor, chair, and HCC Curriculum Committee engage in a dialog on how to improve the course in September and February.
7. *Student Assessments.* Students will be assessed for mastery of program competencies by different methods in different classes. The methods include assignments, exams, laboratories, reports, and individual and team-based projects. The assessments will be used to evaluate the success of the courses on student learning outcomes and the Principles of Graduate and Professional Learning (PGPLs).

Licensure and Certification

The BS/MS does not prepare graduates for a state, national, or industry license or certification.

Plan of Study

Core (9 cr.)

- [NEWM N500 Principles of Multimedia Technology](#)
- [NEWM N512 Trends in Media, Informatics, and Communications](#)
- [INFO H541 Interaction Design Practice](#)

General (i.e., no specialization, 15 cr.)

Select five courses from the following list: (Up to 6 cr. may be substituted with other graduate courses with the academic advisor's approval)

- [NEWM N501 Foundations of Digital Production](#)
- [NEWM N502 Digital Media Motion and Simulation Methods](#)
- [NEWM N504 Advanced Interactive Design Applications](#) (prereq.: [N502](#))
- [NEWM N507 Digital Media for Healthcare](#)

- [NEWM N534 Serious Games and Simulations](#)
- [NEWM N537 Virtual Worlds Design and Development](#)
- [NEWM N548 3D Prototyping for Medical and Dental Applications](#) (prereq.: N549)
- [NEWM N549 3D Prototyping and Articulation](#)
- [NEWM N553 Independent Study](#) (in 3D Graphics and Animation, Digital Storytelling, Game Design and Development, Video Production and Sound Design, User Experience Design, and Web Design and Development)
- [NEWM N585 Seminars in Media Arts and Science. Architecting Digital Media Ecosystems: Strategy and Design*](#)
- [NEWM N595 Internship in Media Arts and Technology](#)
- [INFO H550 Media and Technology Entrepreneurship](#)
- [INFO H590 Topics in Informatics: Expert Feedback Studio on Novel Media Applications](#) (with city entrepreneurs)
- [INFO I575 Informatics Research Design](#) (required for Thesis option)

3D Graphics and Animation Specialization (15 cr.)

Select five courses from the following list:

- [NEWM N502 Digital Media Motion and Simulation Methods](#)
- [NEWM N504 Advanced Interactive Design Applications](#) (prereq.: N502)
- NEWM N541 3D Production* (prereq.: either [N342](#) and [N343](#) or [N502](#))
- [NEWM N542 Advanced 3D Character Animation](#) (prereq.: either [N342](#) or [N504](#))
- NEWM N545 3D Character Development* (prereq.: either [N343](#) and [N345](#) or [N504](#))
- NEWM N546 Adv. 3D Topics: Dynamics* (prereq.: N550)
- NEWM N550 3D Compositing and Visual Effects* (prereq.: either [N243](#) or [N502](#))
- [NEWM N548 3D Prototyping for Medical and Dental Applications](#) (prereq.: [N549](#))
- [NEWM N549 3D Prototyping and Articulation](#)
- [NEWM N595 Internship in Media Arts and Technology](#)
- [INFO H550 Media and Technology Entrepreneurship](#)
- [INFO I575 Informatics Research Design](#) (required for Thesis option)

Game Design and Development Specialization (15 cr.)

Select five courses from the following list:

- NEWM N530 Advanced Game Design and Development/Powers*
- NEWM N533 Advanced Creature and Character Design/Powers*
- [NEWM N534 Serious Games and Simulations](#)
- NEWM N536 Game Production: Design/Powers Technology/Shelton*
- [NEWM N537 Virtual Worlds Design and Development](#)
- [NEWM N595 Internship in Media Arts and Technology](#)
- [INFO H550 Media and Technology Entrepreneurship](#)
- [INFO I575 Informatics Research Design](#) (required for Thesis option)

User Experience Design Specialization (15 cr.) (with the option to be awarded the HCI Graduate Certificate upon departmental approval of the application)

- [INFO H543 Interaction Design Methods](#)
- [INFO H561 Meaning and Form in HCI](#)
- [INFO H563 Psychology of Human–Computer Interaction](#)

Select two course from the following:

- [INFO H564 Prototyping for Interactive Systems](#)
- [INFO H566 Experience Design for Ubiquitous Computing](#)
- [INFO H565 Collaborative and Social Computing](#)
- INFO I590 Interactive Visual Analytics
- [NEWM N595 Internship in Media Arts and Technology](#)
- [INFO H550 Media and Technology Entrepreneurship](#)
- [INFO I575 Informatics Research Design](#) (required for Thesis option)

Video Production and Sound Design Specialization (15 cr.)

Select five courses from the following list:

- [NEWM N516 Online Video Presentation](#)
- NEWM N553 Advanced Digital Video** [Independent Study changed to N590]
- NEWM N554 Directorial Analysis, Production, and RAW Workflow*
- NEWM N555 Advanced Digital Sound Design*
- NEWM N560 Advanced Scriptwriting for New Media*
- NEWM N556 Digital Cinema*
- NEWM N557 Digital Effects*
- NEWM N468 Video for Social Change*
- [NEWM N595 Internship in Media Arts and Technology](#)
- [INFO H550 Media and Technology Entrepreneurship](#)
- [INFO I575 Informatics Research Design](#) (required for Thesis option)

Web Design and Development (15 cr.)

Select five courses from the following list:

- [LIS S517 Web Programming](#)
- [NEWM N510 Web Database Concepts](#)
- NEWM N515 Advanced Multi-Device Web Development* (prereq.: N215 or LIS S517)
- [NEWM N516 Online Video Presentation](#)
- NEWM N522 Dynamic Data Applications* (prereq.: N320 or N510)
- NEWM N523 Database Development for Mobile Applications* (prereq.: N320 or N510)
- [LIS S532 Information Architecture for the Web](#) (prereq.: N215 or LIS S517)
- NEWM N613 Advanced Web Application Development* (prereq.: N515)
- [INFO I501 Introduction to Informatics](#)

- [INFO H516 Applied Cloud Computing for Data Intensive Sciences](#) (prereq.: N215 or LIS S517)
- INFO I590 Interactive Visual Analytics
- [NEWM N595 Internship in Media Arts and Technology](#)
- [INFO H550 Media and Technology Entrepreneurship](#)
- [INFO I575 Informatics Research Design](#) (required for Thesis option)

Final Project or Thesis (6 cr.)

- [NEWM N506 Media Arts Project or Thesis](#) (1–3 cr. variable credits, also over 3–4 semesters)