

INDIANA UNIVERSITY SCHOOL OF INFORMATICS IUPUI NEW MEDIA PROGRAM



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The School of Informatics

Moore's Law says that computing power doubles every 18 months. Regardless of whether that law is literally correct, it illustrates the rapid changes in information technology that will continue throughout the foreseeable future. The School of Informatics prepares students to meet the increasing demand for information technology professionals. The curriculum combines knowledge of a specific subject area (or cognate area) with the concepts in informatics that will help students adapt to technological changes throughout their careers. The proverb says that if you give people fish, you've fed them for a day, but if you teach them how to fish, you've fed them for a lifetime. Like the proverb, informatics teaches students how to adapt to technological changes while preparing them for lifelong learning in their careers and in their lives.

The undergraduate curriculum looks at information technology from a liberal arts perspective. It goes well beyond a "trade school" approach to educate students in the underlying science of information and information technology and to explore their human implications. The School of Informatics educates students in the technical, psychological, and social aspects of information technology and, at the same time, educates them in the application of information technology to another discipline or "cognate area."

The curriculum is designed in two axes. One axis is the technical dimension, running from the logical and mathematical foundations of information technology to the issues of distributed information and knowledge systems. The other axis represents the human dimension, from the individual working with a computer and the area of human-computer interaction to groups interacting via computers with each other and the areas of social and organizational informatics. Where these two axes cross, we have the intersection of the human and the technical, of art and science. Also at that intersection we have "new media"—the use of computers and the Internet as multimodal communication devices that allow the expression of the human spirit through the visual arts, music, voice, and text. The curriculum includes: mathematical foundations, distributed information, human-computer interaction, social/organizational informatics, and new media.

The curriculum gives students a solid foundation while encouraging them to specialize their training through informatics electives and by applying their informatics skills in a cognate area. Bridging the specialization and cognate area is a year-long senior capstone project in which they will not only further specialize but learn practical skills, including teamwork. Central to the idea of the informatics major is that students learn how information technology relates to a traditional discipline in the liberal arts or the professions. Therefore, students take 15-18 credit hours in a cognate area that both grounds students in the discipline and emphasizes some combination of applications, implications, and foundations of information technology.

In addition to acquiring knowledge of core informatics and of informatics in the context of a traditional discipline, students also must take a set of general education courses to ensure that they can communicate clearly in both written and spoken English, read effectively, and reason quantitatively. They must be able to raise and rationally debate ethical concerns suggested by information technologies and their interactions with other people. Students also must have some knowledge of the world and its peoples, and their cultural, artistic, and scientific achievements. To this end, the general education requirement exposes students to the arts and humanities, social and historical studies, and natural and computer sciences.

The school offers a Bachelor of Science degree in informatics, media arts, and health information administration; five specialized professional master's degrees, and a variety of undergraduate and graduate programs in new media. Degrees in informatics not only combine existing course offerings, but also create innovative courses and curricula in new and emerging aspects of information technology. Informatics research is conducted at the Informatics Research Institute, which provides expanded educational opportunities for both undergraduate and graduate students.

The Development of the School of Informatics

The School of Informatics has grown out of years of planning and discussion, both at IUB and IUPUI. In the fall of 1997, a Taskforce on Informatics, chaired by Richard Shiffrin (Director of the Cognitive Science Program, IU Bloomington), was formed to study ways in which the university could capitalize on its strengths in information technology and to make a recommendation for further development. The membership of that taskforce came from both the IUB and IUPUI campuses and represented a wide range of disciplines involved in information technology. This taskforce report recommended that IU establish the School of Informatics.

In the summer of 1998, then-President Myles Brand created an Informatics Planning Committee chaired by Dennis Gannon (Chair of Computer Science, IUB). The committee was charged with developing a detailed implementation plan for this metaschool. The committee document outlined how an undergraduate degree in informatics could fruitfully require a substantial number of courses in an area outside of the core informatics courses. It also called for the creation of a research institute and for a small core faculty. The Informatics Planning Committee gave the following motivation for the new school:

The movement of society into the information age involves developments in information science and technology, distributed information processing, computer and cognitive science, social aspects of dealing with distributed information, knowledge retrieval, distributed teaching and learning, information dissemination, and many related themes. All academic and research programs at IU are (or shortly will be) affected by these

developments. This taskforce recommends that a new school, tentatively titled "School of Informatics," be formed to promote teaching, training, and research in these areas, and thereby play a catalyzing role in this ongoing evolutionary process.

On January 1, 1999, Brand appointed an interim dean, J. Michael Dunn (Computer Science and Philosophy, IUB) and an interim associate dean, Darrell Bailey (Music and New Media, IUPUI). With the guidance of a multidisciplinary faculty advisory committee of more than 50 members, the school began to take shape. The Indiana Commission for Higher Education formally approved the school in November, authorizing IU to admit its first informatics majors in the fall of 2000.

One School, Two Campuses

The School of Informatics spans the IU Bloomington (IUB) and Indiana University Purdue University Indianapolis (IUPUI) campuses. By combining the strengths of these two campuses, the School of Informatics is able to create a unique environment that enables students to earn degrees with strong information technology components in arts, humanities, science, and the professions. The expert faculty and excellent technological resources foster a synthesis of academic disciplines and cultures. Faculty from varied departments share developments in the fast-moving information technology areas through the School of Informatics and its degree programs. The school is actively forging cooperative arrangements with employers in the state and region and creating internships, cooperative education programs, and opportunities for learning through service.

Informatics Research Institute

Research and theory in informatics move rapidly to application and development. The faculty teaching in the School of Informatics participate in research activities and new applications of technology. As a result, faculty can transmit state-of-the-art knowledge to their students. Indiana University is capitalizing on this great research strength in informatics with the formation of an Informatics Research Institute (IRI). IRI will conduct research in areas of emphases shared with the School of Informatics, including: fundamental research in human-computer interaction; fundamental research in capturing, managing, analyzing, and explaining information and making it available for its myriad uses; and expanding research into policy and socioeconomic issues arising from information technology.

Undergraduate Programs

The School of Informatics offers a Bachelor of Science degree in Informatics, a Bachelor of Science degree in Media Arts and Science, a Bachelor of Science degree in Health Information Administration, and an Associate of Science degree in Media Arts and Technology.

The very nature of these degrees, with the changing technologies and applications, requires that the content of each degree be continuously assessed and revised. Therefore, the faculty of the School of Informatics will periodically review and revise the curricula to ensure that students are prepared to

meet contemporary workplace and intellectual demands. Please contact the School of Informatics office, or refer to our Web site at www.informatics.iupui.edu, to confirm current program requirements.

Probationary Admission to New Media

Individuals who do not qualify for a direct admission or whose college grade point average is lower than 2.0 on a 4.0 scale (C) may petition the New Media Program for probationary admission. Special consideration is given to adult learners and students returning after five or more years. Petitions are available from the Informatics Student Services Office, phone (317) 278-7666.

Deadline to enroll for the fall semester: July 15

Deadline to enroll for spring semester: November 15

Deadline to enroll for summer session: April 15

At the discretion of the dean, the New Media Program may admit on a probationary basis those students who do not meet the minimum requirements for direct admission. To be considered for probationary admission, students must be in the upper two-thirds of their high school graduating class and have combined SAT I math and verbal (critical reading) scores of at least 650. Such students are counseled through the Informatics Student Services Office and remain on probation until they have successfully raised their cumulative grade point average to 2.0 (C) and satisfied any other limitations set. Students admitted on probationary status become eligible for dismissal if they fail to achieve a minimum GPA of 2.3 during each semester until they have reached a minimum cumulative GPA of 2.0 (C). Students who do not achieve a cumulative grade point average of 2.0 (C) after two semesters, or 24 credit hours, will be dismissed.

Academic Regulations

Absences

From Final Examinations Students are required to adhere to the policies regarding final examinations as published in the *Schedule of Classes*.

From Scheduled Classes Illness is the only acceptable excuse for absence from class. Other absences must be explained to the satisfaction of the instructor, who will decide whether omitted work may be made up.

Credit for Correspondence Courses

With prior approval, the School of Informatics will accept a maximum of two courses (6 credit hours total) by correspondence study to count toward the degree requirements. Only general elective courses may be taken by correspondence. Distance learning courses and courses conducted online are not considered correspondence courses and, therefore, do not have a credit hour limit associated with them.

Degree Application

Candidates for graduation must file an application with the school by March 1 for December graduation and October 1 for May, June, or August graduation.

Credits for all course work, except that of the current semester, must be recorded on the candidate's Indiana University transcript at least one month prior to the date of graduation.

Statute of Limitations

Candidates for the bachelor's degree in informatics have the right to complete the degree requirements specified by the bulletin in effect at the time they entered Indiana University, provided that the required courses are available and that no more than eight calendar years have elapsed since the date of entry.

Grading Policies

The School of Informatics follows the official grading system of Indiana University described in the front of this Bulletin.

Pass/Fail Option

Students in the School of Informatics may elect to take a maximum of 12 credit hours total under the Pass/Fail option. The procedure for declaring this option may be found in the *Schedule of Classes*. Special regulations affecting the Pass/Fail option for School of Informatics students are as follows:

1. Only one course per semester or one course per summer session may be taken under the Pass/Fail option.
2. School of Informatics students may not take any informatics course Pass/Fail. In addition, the Pass/Fail option may not be used for any course that satisfies an admission or general education electives requirement or for any course in the student's cognate area. Only university elective courses may be taken on a Pass/Fail basis.
3. A grade of P is not counted in the grade point average; a grade of F is included. Grades of P cannot be changed to any other letter grade.
4. Pass/Fail forms are available in the school of informatics office.

FX Option

FX denotes an undergraduate level course originally failed and subsequently retaken. The School of Informatics will calculate FX grades as grades of F for internal purposes and degree requirements. This calculation will apply to all categories of academic standing (good standing, probation, and dismissal), class rank, and all grade point average requirements in the degree, including cumulative, semester, and major concentrations.

A student may use the FX option for purposes of the university transcript. An undergraduate student who has repeated a course previously failed may request to have only the second grade in that course counted in the student's grade point average as entered on the student's transcript. A student may exercise this FX option for no more than three courses, totaling no more than 10 credit hours. A student may use the FX option on the transcript only once for a given course. Requests for approval of FX courses should be made in consultation with the student's advisor.

Withdrawals

A grade of W (Withdrawn) is given automatically to the student who withdraws from courses during the automatic withdrawal period as specified in the

Schedule of Classes. After the automatic withdrawal period a student may withdraw only with the permission of the dean. This approval is given only for urgent reasons related to extended illness or equivalent distress. The desire to avoid a low grade is not an acceptable reason for withdrawal from a course.

Upon notification from the IUPUI registrar's office that a student has accumulated eight (8) or more Ws, the School of Informatics will send a letter of concern to the student, requesting an explanation. This notification will likewise remind students that their record of withdrawals from courses may jeopardize financial aid. Students with 10 Ws may be regarded as not making the "reasonable academic progress" required to maintain eligibility for financial aid, and lack of such progress constitutes grounds for denying further financial aid.

Academic Standing

A student is in good academic standing for an Indiana University bachelor's degree when his or her semester grade point average is a minimum of 2.0 (C) for the last semester's course work and when his or her cumulative grade point average is at least 2.0 (C). Students must be in good academic standing to graduate.

Academic Probation

Students will be placed on academic probation if their cumulative or semester grade point average (semester grade index) is below 2.0. After one semester on probation, students who fail to return to good academic standing will be placed on critical probation. At the discretion of the dean, these students can be dismissed. If a student is given the opportunity to enroll under critical probation, the School of Informatics will establish strict conditions that must be met before that student will be allowed to register for future classes.

Dismissal

Students can be dismissed if they fail to return to good academic standing after one semester on critical probation. Students may also be dismissed if, in the opinion of the dean, they are not making satisfactory progress toward their degree.

Students eligible for dismissal will be notified in writing that they have been dismissed and will be withdrawn from classes for which they have registered.

Readmission

Dismissed students must petition the dean of the School of Informatics for readmission. A Petition for Readmission form must be filed by July 15 for fall, November 15 for spring, and April 15 for summer readmission. A student who has been dismissed for the second time is eligible to return to school only after being out of school for one regular semester and having petitioned successfully. A third dismissal is final. Dismissed students whose petitions are denied will not be allowed to register.

Informatics Degree Programs

Prior to each semester's enrollment, a faculty member or an academic advisor provides academic counseling for each student in the School of Informatics. Although academic counseling is intended to provide effective guidance, students are responsible for planning their own programs and for meeting the following degree requirements for graduation. Students are advised to read bulletin descriptions of all courses selected, paying careful attention to conditions concerning awarding of credit.

Bachelor of Science in Informatics

General Requirements

Students must successfully complete a minimum of 122 credit hours for the Bachelor of Science degree. The campus at which a student is admitted will award the degree. Students may transfer no more than 60 credit hours toward a Bachelor of Science degree. Students must complete the specific degree requirements of the School of Informatics as listed below.

1. Students must complete a minimum of 30 credit hours in courses at the 300-400 (junior-senior) level.
2. Students must have a minimum cumulative grade point average of 2.0 (C). Any course taken to satisfy the requirements of the major must be completed with a minimum grade of C- unless otherwise specified.
3. Students are expected to complete the requirements for their undergraduate degree within eight years of admission to the School of Informatics. Students are allowed to continue beyond this time period only at the discretion of the dean. If a student has not taken classes for three years or more, that student must satisfy program requirements of the School of Informatics in effect at the time of reactivation. Requests for deviation from requirements listed in the bulletin must be approved in writing by the dean, whose decision is final.
4. Courses that fulfill the requirements for a cognate area also may meet the general education distribution requirements.
5. Cognate area courses cannot count as informatics core courses or informatics elective courses.
6. If cognate area courses are equivalent to informatics core courses, students should substitute additional informatics elective courses in place of informatics core courses to meet the 34 credit hour requirement.
7. Courses that fulfill the requirements for a bachelor's degree in informatics also may apply to a minor outside of the School of Informatics.
8. Students must file a degree application with the School of Informatics office by March 1 for December graduation and October 1 for May, June, or August graduation. Failure to file by the deadline may delay the official date of graduation.

Course Requirements

The course work required for the B.S. in Informatics consists of five parts:

- Informatics Core Courses
- Informatics Electives
- Cognate Area Courses
- General Education Requirements
- General Electives

Required Informatics Core Courses (34 cr.)

INFO I101 Introduction to Informatics (4 cr.)
 INFO I201 Mathematical Foundations of Informatics (4 cr.)
 INFO I202 Social Informatics (3 cr.)
 INFO I210 Information Infrastructure I (4 cr.)
 INFO I211 Information Infrastructure II (4 cr.)
 INFO I308 Information Representation (3 cr.)

Select two of the following four courses:

INFO I300 Human-Computer Interaction (3 cr.)
 INFO I303 Organizational Informatics (3 cr.)
 INFO I310 Multimedia Arts and Technology (3 cr.)
 INFO I320 Distributed Systems and Collaborative Computing (3 cr.)

Select one of the following capstone options:

INFO I450/I451 Design and Development of an Information System (3/3 cr.)
 (senior standing; capstone project), two semester course
 INFO I460/I461 Thesis (3/3 cr.)
 (senior standing; capstone experience)

Recommended Courses The following course is recommended for students who lack a strong computing background. This course is considered a general elective course.

INFO I112 Basic Tools of Informatics—Programming and Database Concepts (3 cr.)

Informatics Electives (6 cr.)

Any course in the department of computer and information science, computer programming technology, informatics, new media, or journalism at the 300 level or above may count as an elective.

Note: The above courses are subject to the successful completion of prerequisites or approval of the instructor. Students also may count other courses with informatics content as informatics electives upon approval of the dean.

Cognate Area Courses (15-18 cr.)

Departments offering informatics cognate courses are listed on the informatics Web site (www.informatics.iupui.edu). Students should, in consultation with their academic advisors, choose cognate areas before their sophomore year. Students must receive a grade of C- or higher in each course, and a cumulative GPA of 2.0 or higher.

General Education Requirements (38-41 cr.)

ENG W131 Elementary Composition I
 ENG W231 Professional Writing Skills
 JOUR J200 Reporting, Writing and Editing

Students must check the listings for courses in the *Schedule of Classes* each semester to make certain

the course section they have chosen fulfills the requirement.

Oral Communication (3 cr.)

COMM R110 Fundamentals of Speech Communication

Quantitative and Analytical Skills (9 cr.)

Six (6) hours from any of the following MATH courses:
 M118; 153; 154; 163; 164

Three (3) hours from any of the following STAT courses:
 350; 416; 417

Web-Based Programming (9 cr.)

Nine (9) hours from any of the following CSCI courses:

N307; N351; N331; N355; N341; N305; N311; N335

Students must check the listings for courses in the *Schedule of Classes* each semester to make certain the course section they have chosen fulfills the requirement.

Arts, Humanities, and Social Sciences (12 cr.)

Informatics students must have basic training in the arts, humanities, and social sciences, which will assist them in their lives and give them a broader perspective from which to approach the applications of information technology. The requirements for each campus are as follows:

One arts and humanities course (3 cr.) selected from the following:

AFRO A150 Survey of the Culture of Black Americans (3 cr.)
 AMST A103 Topics in American Studies (3 cr.)
 CLAS C205 Classical Mythology (3 cr.)
 CMLT C190 Introduction to Film (3 cr.)
 COMM T130 Introduction to Theatre (3 cr.)
 ENG L105 Appreciation of Literature (3 cr.)
 ENG L115 Literature for Today (3 cr.)
 FLAC F200 World Cultures Through Literature (3 cr.)
 FOLK F101 Introduction to Folklore (3 cr.)
 HER H100 Art Appreciation (3 cr.)
 HER H101 History of Art I (3 cr.)
 HER H102 History of Art II (3 cr.)
 HIST H105 American History I (3 cr.)
 HIST H106 American History II (3 cr.)
 HIST H108 Perspectives on the World to 1800 (3 cr.)
 HIST H113 History of Western Civilization I (3 cr.)
 HIST H217 The Nature of History (3 cr.)
 PHIL P110 Introduction to Philosophy (3 cr.)
 PHIL P120 Ethics (3 cr.)
 REL R133 Introduction to Religion (3 cr.)
 REL R173 American Religion (3 cr.)
 REL R180 Introduction to Christianity (3 cr.)
 REL R212 Comparative Religions (3 cr.)
 MUS M174 Music for the Listener (3 cr.)
 WOST W105 Introduction to Women's Studies (3 cr.)

One social science course (3 cr.) selected from the following:

AFRO A150 Survey of the Culture of Black Americans (3 cr.)
 ANTH A104 Culture and Society (3 cr.)
 COMM C180 Interpersonal Communication (3 cr.)

ECON E101 Survey of Current Economic Issues and Problems (3 cr.)
 ECON E201 Introduction to Microeconomics (3 cr.)
 ECON E202 Introduction to Macroeconomics (3 cr.)
 ENG G104 Language Awareness (3 cr.)
 FOLK F101 Introduction to Folklore (3 cr.)
 GEOG G110 Introduction to Human Geography (3 cr.)
 GEOG G130 World Geography (3 cr.)
 HIST H117 Introduction to Historical Analysis (3 cr.)
 POLS Y101 Principles of Political Science (3 cr.)
 POLS Y103 Introduction to American Politics (3 cr.)
 POLS Y213 Introduction to Public Policy (3 cr.)
 POLS Y219 International Relations (3 cr.)
 PSY B104 Psychology as a Social Science (3 cr.)
 PSY B310 Life Span Development (3 cr.)
 SOC R100 Introduction to Sociology (3 cr.)
 SOC R121 Social Problems (3 cr.)
 WOST W105 Introduction to Women's Studies (3 cr.)

One comparative world cultures course (3 cr.) selected from the following:

ANTH A104 Culture and Society (3 cr.)
 CLAS C205 Classical Mythology (3 cr.)
 FLAC F200 World Cultures through Literature (3 cr.)
 GEOG G110 Introduction to Human Geography (3 cr.)
 HIST H108 Perspectives on the World to 1800 (3 cr.)
 POLS Y217 Introduction to Comparative Politics (3 cr.)

REL R133 Introduction to Religion (3 cr.)
 REL R212 Comparative Religions (3 cr.)

One of these must be a course in ethics:
 CPT 410 Information Technology, Ethics, and Leadership (3 cr.)

REL R283 Religion, Ethics, and Values (3 cr.)
 REL R293 Ethics and World Religions (3 cr.)
 REL R393 Comparative Religious Ethics (3 cr.)
 PHIL P120 Ethics (3 cr.)
 PHIL P326 Ethical Theory (3 cr.)
 PHIL P493 Biomedical Ethics (3 cr.)

General Electives (24-30 cr.)

Courses for the remaining credits will be decided by the individual student, in consultation with an advisor, to fulfill additional career and/or personal interests. Students may take a maximum of 4 credit hours of HPER elective physical education courses numbered EXXX.

Dual Baccalaureate Degree

In certain circumstances students may be permitted to pursue a B.S. in Informatics and complete an undergraduate degree in another degree-granting school of the university. Check with an academic advisor for more details.

Second Baccalaureate Degree

In certain cases the dean may admit bachelor's degree holders to candidacy for a second bachelor's degree. When such admission is granted, the candidate must earn at least 60 additional credit hours and meet the requirements of the School of Informatics. Students seeking second degree

candidacy should review the guidelines available from the informatics office. Students with a bachelor's degree who wish to further their education should also consider becoming qualified for admission to a graduate program.

Minor and Certificate in Informatics

The undergraduate minor or certificate allows a student majoring in another subject to get appropriate training in informatics and obtain certification as someone who knows how to apply informatics tools to that subject area.

Certificate in Informatics

1. Minimum grade of 2.0 (C) in all courses taken for the certificate.
2. Students are required to complete 27 credit hours from the following list:
 INFO I101 Introduction to Informatics (4 cr.)
 INFO I202 Social Informatics (3 cr.)
 INFO I210 Information Infrastructure I (4 cr.)
 INFO I211 Information Infrastructure II (4 cr.)
 INFO I300 Human-Computer Interaction—Design and Programming (3 cr.)
 INFO I303 Organizational Informatics (3 cr.)
 INFO I308 Information Representation (3 cr.)

In addition, students must take an additional course (3 credit hours) from the informatics curriculum. These additional courses can be chosen from the listed electives for informatics and can therefore be taken in another department, if the other department is not the student's major department.

Minor in Informatics

1. Minimum grade of 2.0 (C) in all courses taken for the minor.
2. Students are required to take three courses from the following list:
 INFO I101 Introduction to Informatics (4 cr.)
 INFO I202 Social Informatics (3 cr.)
 INFO I210 Information Infrastructure I (4 cr.)
 INFO I211 Information Infrastructure II (4 cr.)
 INFO I308 Information Representation (3 cr.)
3. Students are required to take two courses from the following list of upper level courses:
 INFO I300 Human-Computer Interaction—Design and Programming (3 cr.)
 INFO I303 Organizational Informatics (3 cr.)

One course from the list of approved informatics elective courses. The course cannot be in the student's major department.

Minor in Business

IUPUI students pursuing a bachelor's degree in the School of Informatics may obtain a minor in business by successfully fulfilling the following requirements:

BUS A100 Basic Accounting Skills (1 cr.)
 BUS A201 Introduction to Financial Accounting (3 cr.)
 BUS A202 Introduction to Managerial Accounting (3 cr.)

ECON E201 Introduction to Microeconomics (3 cr.)
 ECON E202 Introduction to Macroeconomics (3 cr.)
 ECON E270 Introduction to Statistical Theory in Economics (3 cr.)
 MATH M118 Finite Mathematics (3 cr.)
 MATH M119 Brief Survey of Calculus I (3 cr.)

In addition, BUS K201 The Computer in Business, or its equivalent, must be completed with a minimum grade of C prior to starting the integrative core. Students are required to take the integrative core, which is 9 credit hours taken together as a single educational unit (BUS F301 Financial Management, M301 Introduction to Marketing Management, and P301 Operations Management).

In addition to the 12 required courses listed above, BUS X204 Business Communications, BUS L302 Commercial Law I, and BUS Z302 Managing and Behavior in Organizations are recommended.

New Media Degree Programs

The New Media Program offers an Associate of Science in Media Arts and Technology, a Bachelor of Science in Media Arts and Science, and a Certificate in Internet Application Development; all provide an integrated approach to the study of new media. Focused on applied research and application, these degrees are oriented toward professional practice. Together, they encompass the design, development, management, integration, application, assessment, and deployment of new and digital media to communication.

Associate of Science in Media Arts and Technology

Course Requirements

The course work required for the A.S. in New Media consists of three parts:

New Media Core Courses
 General Education Requirements
 General Electives

Required New Media Core Courses (18 cr.)

NEWM N100 Introduction to Digital Media Principles (3 cr.)
 NEWM N101 Topics in Interactive Multimedia (3 cr.)
 ENG W131 English Composition I (3 cr.) or JOUR J100 Computer Methods for Journalists (3 cr.)
 CPT 115 Computer Information Systems Fundamentals (3 cr.)
 CPT 140 Programming Constructs Lab (3 cr.)
 CSCI N241 Introduction to Web Design (3 cr.)

General-Education Requirements (6 cr.)

COMM R110 Fundamentals of Speech (3 cr.)
 JOUR J200 Reporting, Writing, and Editing I (3 cr.) or ENG W132 English Composition II (3 cr.)

Foreign Language (6 cr.)

Students must complete 6 credit hours in a foreign language. Japanese or Chinese is recommended.

Analytical Skills (6 cr.)

MATH M118 Finite Mathematics (3 cr.)

MATH M153 Algebra and Trigonometry I (3 cr.)

PHIL P162 Practical Logic (3 cr.)

PHIL P265 Elementary Symbolic Logic (3 cr.)

Arts and Humanities (6 cr.)

CMLT C190 Introduction to Film (3 cr.)

COMM T130 Theatre Appreciation (3 cr.)

HER H100 Art Appreciation (3 cr.)

MUS M174 Music for the Listener (3 cr.)

PHIL P120 Personal and Social Ethics (3 cr.)

Sciences (6 cr.)

Astronomy

Biology

Chemistry

Computer

Geography

Physics

Psychology (PSY B105 Introduction to Psychology only)

General Electives (12 cr.) selected from the following schools or departments:

New Media, Art, Journalism, Music, Computer Science, Computer Technology, and/or Library and Information Science.

Bachelor of Science in Media Arts and Science

All students must meet the requirements as established by the faculty of the New Media Program and applied to all IUPUI New Media students. The New Media Program, Office of Student Services, (317) 278-7666, can answer questions about general education courses and distribution requirements.

General Requirements

1. All IUPUI students must fulfill the following undergraduate requirements:
 - 6 credit hours of Communication (written and oral)
 - 10 credit hours of Foreign Language
 - 6 credit hours of Analytical Skills
 - 3 credit hours of Arts and Humanities
 - 3 credit hours of Social Sciences
2. A minimum of 122 credit hours is required for a new media degree.
3. A minimum cumulative grade point average of 2.0 (C) is required for graduation.
4. A minimum of 51 credit hours must be at the 300-400 level. Courses taken at other institutions at the freshman and sophomore levels, regardless of title or description, will not be accepted in satisfaction of this requirement.
5. At least 12 credit hours of 300-400 level courses must be taken outside the major program as electives.
6. A maximum of 12 credit hours may be taken using the Pass/Fail option and applied to university electives only.

7. A minimum of 24 credit hours must be taken in the concentration/specialization area. For requirements in the concentration/specialization area, refer to the plan of study, available from your advisor.
8. Any course in which a student receives a grade below C (2.0) may not be used to fulfill any requirement (a C- does not count).
9. A minimum of 26 credit hours of the work of the senior year must be completed at IUPUI except in the case of students transferring within the campuses of Indiana University. (See academic advisor for specific residency requirements.)
10. Credit to the degree will not be accepted for remedial courses.
11. Once a course has been applied toward one requirement, it cannot be used to satisfy a second requirement, except where explicitly stated otherwise. No course will be counted more than once toward graduation with the exception of variable titled courses, seminars, independent study, internships, and other special courses.

Course Requirements

The course work required for the B.S. in Media Arts and Science consists of six parts:

Required New Media Core Courses
Web-Based Computer Programming
Concentration/Specialization Courses
New Media Electives
General Education Requirements
University Electives

The New Media Program recommends that students complete English W131 or Honors W140 during the first semester or as soon afterward as placement test scores and course availability allow. Students whose placement test scores indicate a need to take English W001 should enroll in that course their first semester. Students must earn a minimum grade of C in English W001 to advance to English W131. It also is recommended that English W132, W150, or JOUR J200 be taken the semester following successful completion of English W131.

Speech Communication R110 (3 cr.) Students with previously acquired competency in public speaking may be eligible for special credit and exemption from the requirement; contact the chairperson of the Department of Communication Studies, Cavanaugh Hall 309, or call (317) 274-0566.

Foreign Language Requirement Placement Test

Students with previous experience in a foreign language should take the Foreign Language Placement Test at the Testing Center to assess their level of language preparation. Students who complete the course into which they were placed with a minimum grade of C are eligible for special credit at a reduced fee for the appropriate lower-division course(s) that precede the course taken. Foreign language special credit counts toward graduation and toward the foreign language requirement.

Courses numbered 117 are reserved for students who have never studied the language before. Students who have had two or more years of formal study in a language may take a 117-level course in that language as a refresher course before enrolling in a more

advanced course. Their work will be graded on a Satisfactory/Fail (S/F) basis.

Nonnative Speakers Students for whom English is not a first language may be exempted from the foreign language requirement, without credit, by completion of English W131 and W132 with a minimum grade of C or higher.

Native speakers of English who have achieved elementary or intermediate proficiency in a foreign language by studying or living in a country where the language is spoken should confer with the world languages and cultures department for placement in the correct level of that foreign language.

Advanced Courses In addition to advanced courses in one's major, the new media student should conduct in-depth study in other areas. Courses at the 300 level or above must be completed in five areas: Required Core (6), Web-Based Programming (9), Concentration or Specialization (12), New Media Electives (12), and University Electives (12).

Required New Media Core Courses (18 cr.)

NEWM N100 Introduction to Digital Media Principles (3 cr.)
 NEWM N110 Visualizing Information (3 cr.)
 NEWM N101 Topics in Interactive Media (3 cr.)
 NEWM N201 Design Issues (3 cr.)
 NEWM N199 Directed Study I (1 cr.)
 NEWM N299 Directed Study II (1 cr.)
 NEWM N399 Directed Study III (1 cr.)
 NEWM N499 Capstone Experience (3 cr.)

Web-Based Computer Programming (15 cr.)

CSCI N241 Introduction to Web Design (3 cr.)
 CSCI N301 Fundamental Computer Science Concepts (3 cr.)
 Nine (9) hours from the following:
 CSCI N305 C Language Programming (3 cr.)
 CSCI N307 Java
 CSCI N331 Visual Basic Programming (3 cr.)
 CSCI N341 Web Programming (3 cr.)
 CSCI N345 Advanced Programming, Java (3 cr.)
 CSCI N351 Introduction to Multimedia Programming (3 cr.)
 CSCI N355 VRML (3 cr.)
 CSCI N399 variable title (3 cr.)
 CSCI N499 variable title (3 cr.)

Concentration/Specialization Courses (24 cr.)

To be selected from one of the following areas (of which 12 credits must be at the 300 level or above).

- Area 1:** Computer Science
 Computer Technology
 Library Information and Science
 New Media/Informatics
- Area 2:** Art
 Journalism
 Music
 New Media/Informatics

New Media Electives (12 cr.)

Students must complete 12 credit hours of Media Arts and Science electives at the 300 level or above.

General Education Requirements

COMM R110 Fundamentals of Speech Communication (3 cr.)

ENG W131 English Composition I

JOUR J200 Reporting, Writing, and Editing I (3 cr.)

or ENG W132 English Composition II (3 cr.), or

TCM 220 Technical Report Writing (3 cr.)

Foreign Language (10 cr.)

Students must complete 10 credit hours in a foreign language. Asian languages are recommended.

Analytical Skills (6 cr.)

MATH M118 Finite Mathematics (3 cr.)

MATH 153 Algebra and Trigonometry I (3 cr.)

PHIL P162 Logic (3 cr.)

PHIL P265 Introduction to Symbolic Logic (3 cr.)

STAT 301 Elementary Statistical Methods (3 cr.) P:

MATH 111

STAT 350 Data Analysis (3 cr.)

Arts and Humanities (3 cr.)

CMLT C190 Introduction to Film (3 cr.)

COMM T130 Introduction to Theatre (3 cr.)

HER H100 Art Appreciation (3 cr.)

MUS M174 Music for the Listener (3 cr.)

PHIL P120 Personal and Social Ethics (3 cr.)

Social Sciences (3 cr.)

AFRO A150 Afro-American Studies (3 cr.)

ANTH A104 Culture and Society (3 cr.)

ECON E101 Survey of Current Economic Issues and Problems (3 cr.)

ECON E201 Introduction to Microeconomics (3 cr.)

ECON E202 Introduction to Macroeconomics (3 cr.)

GEOG G110 Introduction to Human Geography (3 cr.)

POLS Y101 Principles of Political Science (3 cr.)

PSY B104 Psychology as a Social Science (3 cr.)

SOC R100 Introduction to Sociology (3 cr.)

University Electives (25 cr.) of which 12 hours must be completed at the 300 level or above

Suggested electives:

COMM C228 Discussion and Group Methods (3 cr.)

COMM M373 Film and Video Documentary (3 cr.)

COMM C380 Organizational Communication (3 cr.)

HER E101 Beginning Drawing (3 cr.)

HER E105 Beginning Painting (3 cr.)

HER E201 Basic Photography (3 cr.)

JOUR J210 Visual Communication (3 cr.)

JOUR J300 Communication Law (3 cr.)

PSY B366 Concepts and Applications in

Organizational Psychology (3 cr.) or

any course from the schools or departments of

New Media, Art, Journalism, Music, Computer

Science, Computer Technology, and/or Library

and Information Science.

Health Information Administration

Description of the Profession Health information administrators collect, interpret, and protect health data and determine how data are used. They are managers and information specialists who frequently interact with other members of the medical, financial, and administrative staffs. It is their responsibility to ensure that the information system is protected and driven by accurate, up-to-the-minute information. Some examples of the responsibilities of department managers follow:

- Supervise and train clerical and technical personnel.
- Determine health information policies.
- Design health information collection, storage, and report systems.
- Select computer systems for processing and storing clinical data.
- Serve on standards, improvement, and utilization review committees.
- Act as liaison to other departments.
- Determine departmental budget and resource needs.
- Assure that the medical documentation requirements of various accrediting and governmental agencies are met.

Graduates of the Program While many health information administrators are employed in hospitals, others work for insurance companies, long-term care and psychiatric facilities, computer companies, physician group practices, drug companies, and government agencies. They also coordinate quality management programs for health care facilities, teach in colleges and universities, and perform consulting activities.

The program graduate is eligible to seek registration as a Registered Health Information Administrator (RHIA) by successfully passing a national qualifying examination offered by the American Health Information Management Association. RHIA registration is an important credential when seeking employment as a health information administrator.

Credential Required to Practice RHIA Registered Health Information Administrator.

Licensure Requirements to Practice State licensure does not apply.

Bachelor of Science in Health Information Administration

Educational Program

Length of the Program Four years; 74 semester hours of prerequisite course work plus two years (56 credit hours) of professional course work. The professional component of the program is offered in the junior and senior years of a Bachelor of Science undergraduate degree. The program begins in the fall semester and includes a final clinical course in health information administration, which is taken in the Summer I session of the senior year.

Structure of the Program The prerequisites and the professional program may be taken on a part-time or full-time basis.

Design of the Professional Curriculum The professional courses focus on the management of health information systems and utilization of computerized clinical data. The professional component of the curriculum integrates lecture and laboratory courses with technical and professional practice experiences in hospitals and other health care facilities and related settings. A four-week professional practice experience is arranged for each senior student in Summer Session I.

Additional Cost In addition to regular university tuition and fees, students should expect to pay program-related expenses. Contact the program for a current cost sheet.

Program Facilities The Health Information Administration Program is offered in the School of Informatics. Professional practice is provided by health care facilities and agencies in Indiana and surrounding states.

Accreditation The Health Information Administration Program is accredited by the Commission on Accreditation of Allied Health Education Programs.

Admission

General Information

Students accepted into the program must complete the school's and the following program admission requirements. Admission to the professional program is competitive; therefore, completion of the prerequisites does not guarantee admission to the program.

Criteria used for Selection of Class

Completion of prerequisite courses, grade point average, interview.

Class Size

20 students each fall semester.

Specific Requirements

In addition to the School of Informatics admission policies and procedures found at the beginning of this section of the bulletin, the following admission policies apply to the Health Information Administration Program.

Application Deadline

November 15 of the year preceding the planned date of entry.

Total Number of Prerequisite Credit Hours

74.

Distribution of Credit Hours in Specific Areas

See section on prerequisites.

Limitations of Course Work

Remedial course work will not count toward the 74 required prerequisite credit hours.

Minimum Cumulative Grade Point Average

2.5 on a 4.0 scale. This requirement is applied at the time of program application and must be maintained. Grades for remedial courses are included in the cumulative grade point average.

Minimum Grade Requirement in a Stated Prerequisite Course

C (2.0 on a 4.0 scale) in anatomy, physiology, computer science, analytic skills/quantitative methods, business administration, and organization/management.

Interview

All qualified applicants will be interviewed prior to admission.

Indiana Residents Preference Policy

See School of Informatics policy.

Volunteer Experience

While volunteer experience is not required, it is very helpful in making a career choice.

Curriculum

Prerequisites

Prior to entering the program, students must complete at least 68 credit hours of the following minimum prerequisites. Students should consult with their academic advisors for appropriate courses and semester sequence in order to complete prerequisites. Prerequisites may be taken at any accredited college or university.

The code "G" indicates a course that meets the school's general-education requirements.

* indicates courses which must be completed prior to entering the Professional Program.

Oral Communications (G) *	3 cr.
Written Communications (G) *	6 cr.
Human Anatomy (G) *	4-5 cr.
Human Physiology (G) *	4-5 cr.
Microbiology *	3-4 cr.
Medical Terminology	2 cr.
Information Technology *	13 cr.
Social/Behavioral Sciences (G) *	3 cr.
Business *	6 cr.
Analytical Skills/Quantitative Methods (G) *	6 cr.
Professional Ethics *	3 cr.
Humanities (G)	3 cr.
Accounting *	4 cr.
Organization/Management * (3 hours must be completed)	6 cr.
Electives * (2-5 hours must be completed)	5-8 cr.

Suggested Electives

The following suggestions for electives are made to aid the student in the prerequisite courses and in the professional course work: management information systems, supervisory management, methods of employee training, computer sciences, research methods, interpersonal communications, medical terms from Greek and Latin, and foreign languages.

A Suggested Plan of Study

The following is a suggested two-year plan of prerequisites. Variations on this schedule can be made. Students should check with their advisors to make sure all requirements are met.

Freshman

Fall

Oral Communications	3 cr.
Introduction to Informatics	4 cr.
Introduction to Business Administration	3 cr.
Mathematics (Algebra or Finite)	3 cr.
Basic Accounting Skills	1 cr.
Total	14 cr.

Spring

English Composition I	3 cr.
Anatomy	4-5 cr.
Basic Tools of Informatics	3 cr.
Social/Behavioral Science Elective	3 cr.
Humanities Elective	3 cr.
Total	16-17 cr.

Sophomore

Fall

Written Communications Elective	3 cr.
Physiology	4-5 cr.
Information Technology Elective	3 cr.
Foundations of Accounting	3 cr.
Organization/Management Elective	3 cr.
Total	16-17 cr.

Spring

Information Technology Elective	3 cr.
Business Legal Aspects Elective	3 cr.
Statistics Elective	3 cr.
Professional Ethics Elective	3 cr.
Microbiology Elective	3-4 cr.
Total	15-16 cr.

Additional required prerequisite courses, including organization/management, medical terminology and general electives, may be taken during summer sessions or (to a limited extent) concurrent with the professional program courses in the junior year.

Professional Program

Courses in the professional program are sequential and, therefore, must be taken in the order specified by the program faculty. A minimum grade of C (2.0) is required in each professional course.

Junior

Fall

Quantitative Methods and Research	2 cr.
Hospital Organization/Management	3 cr.
Health Care Information Requirements/Standards	3 cr.
Medical Science I	3 cr.
Organization/Management Elective (choose from prerequisite list)	3 cr.
Total	14 cr.

Spring

ICD-9-CM Coding	3 cr.
Health Information Storage and Retrieval	2 cr.
Medicine and the Law	2 cr.
Medical Science II	3 cr.
Directed Study	1 cr.
Total	11 cr.

Senior

Fall

Seminar in Health Information Administration	1 cr.
Health Planning/Information Systems	3 cr.
CPT Coding	3 cr.
Long-Term Care	1 cr.
Release of Information	1 cr.
Health Care Quality Improvement	1 cr.
Professional Practice Experience I	6 cr.
Total	16 cr.

Spring

Seminar in Health Information Administration	1 cr.
Reimbursement Systems	3 cr.
Directed Study	1 cr.
Capstone Experience	3 cr.
Professional Practice Experience II	6 cr.
Total	14 cr.

Summer Session I

Clinical in Medical Record Administration	4 cr.
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Scholarships

Two Van Ausdall and Farrar Scholarships are awarded to full-time senior students in the Health Information Administration Program. Awards are predicated on demonstrated financial need and ability to successfully complete the program. Preference is given to students who plan employment in Indiana.

Two Gertrude L. Gunn Memorial Fund Scholarships, established in memory of the founder of the program, are awarded to senior health information administration students. They are based on scholarship and demonstrated financial need.

The Mary L. McKenzie Scholarship is awarded to a senior health information administration student. It is based on scholarship and demonstrated financial need.

The Elton T. Ridley Minority Scholarship is awarded to senior health information administration students. The scholarship is awarded to a student who is a member of a class of individuals who are traditionally underrepresented in the program.

The Foundation on Education and Research (FORE) Scholarship is available through the American Health Information Management Association (AHIMA). This scholarship is awarded through application directly to AHIMA. Information will be provided to students after acceptance to the Professional Program.

Other scholarships may be available.

Awards

Based on superior performance and in accordance with Indiana University-Purdue University Indianapolis policies, the program faculty will recommend that qualified students be awarded degrees with distinction.

Graduation Requirements

Satisfactory completion of 130 credit hours, including 74 credit hours of prerequisite and general-education courses and 56 credit hours of professional courses. All course work must be completed in compliance with the program's and school's academic and professional policies.

Graduate Program

The Master of Science Degrees

Given the rapid and apparently unlimited growth of this new field at all levels of competence, each of the master's degree programs serves students who need education in the use of information technologies to enhance their job performance or employment prospects.

The School of Informatics offers five master's degrees:

Master of Science in Bioinformatics

Master of Science in Chemical Informatics

Master of Science in Health Informatics

Master of Science in Human-Computer Interaction

Master of Science in Media Arts and Science (see the "Media Arts and Science" section in this bulletin for policies, regulations, and requirements)

Bioinformatics, Chemical Informatics, Health Informatics, and Human-Computer Interaction require 36 credits, including the completion of two common graduate core courses. Media Arts and Science requires 30 credits, including the completion of 18 credit hours of core courses.

Application Procedures

Students holding a bachelor's degree from an accredited four-year collegiate institution are eligible to apply for admission. Admission is selective. The admission committee evaluates applicants' abilities to succeed academically and their potential to contribute to the program.

The master's degree is designed for students who seek additional professional education in informatics to complement knowledge in such diverse disciplines as computer science and technology, graphics, visualization, electronic networking and media communication, library and information science, telecommunications, psychology, cognitive science, journalism, medicine, health and nursing, biology, and chemistry. Most graduates of the School of Informatics will emerge as highly sought-after employees in a burgeoning information industry.

The master's degrees are focused on developing specialized skills and knowledge in information and information technology, with particular application to a specific field of study or practice. Each degree is an interdisciplinary endeavor that combines course work and field experiences from a traditional subject area or discipline with intensive study of information and technology. Because these specialized skills are developed and applied differently in these different fields, specific requirements are established for each degree, and have a content-specific rationale.

Application Procedures for U.S. Citizens

Requests for domestic applications should be directed to the School of Informatics.

Completed applications should be sent to:

Graduate Admissions Committee
School of Informatics
IUPUI
719 Indiana Avenue Suite 316
Indianapolis, IN 46202

E-mail: info@informatics.iupui.edu

Web: www.informatics.iupui.edu

Application Procedures for International Students

Requests for international applications should be directed to:

Office of International Affairs
IUPUI

620 N. Union Drive, 207

Indianapolis, IN 46202-5167

Phone: (317) 274-7294

E-mail: oia@iupui.edu

Web: www.iupui.edu/~oia/admissions

Application Deadlines

Applications will not be acted upon until all required documents have been received (including transcripts, letters of recommendation, application fee, GRE scores, and TOEFL scores for all nonnative English speakers). In order to allow time for processing and making financial aid decisions, applicants must meet the following deadlines:

	<i>Fall</i>	<i>Spring</i>
Admission	March 15	November 15

Admission to the Master's Programs

Successful applicants for admission to the master's programs must demonstrate skills and knowledge in an academic field relevant to the particular master's program (e.g., biology for bioinformatics). Promising applicants who have deficiencies may, with faculty help, select courses that will provide instruction to overcome deficiencies and meet admissions requirements. However, the courses will not count toward the total number of credits required for the advanced degree.

- Degree requirement: bachelor's degree with demonstrated technical skills from an accredited college or university.
- Minimum overall grade point average of 3.0 on a 4.0 point scale.
- Three letters of recommendation from individuals in positions to evaluate the applicant's professional promise. Indiana University reserves the right to validate the source of the letters received.
- Scores from the general Graduate Record Examination (GRE), taken within the last five years. Subject tests are recommended if appropriate to the degree.
- Personal statement or sample of creative work.

Each application for admission is carefully evaluated by the admissions committee for the appropriate degree. Applicants to all degree programs must do the following:

1. Submit an application to the School of Informatics, or, if necessary, to the Office of International Affairs.
2. Pay a nonrefundable graduate application fee to Indiana University.
3. Submit three Application Reference Forms completed by individuals familiar with the

applicant's activities and potential to succeed in graduate work. These forms are included in the application packet.

4. Arrange for official transcripts to be sent from all colleges and universities attended by the applicant. Transcripts indicating "issued to student" are not considered official. An official transcript bears the original signature of the registrar and/or original seal of the issuing institution. Transcripts should be mailed directly by a registrar, or given to the applicant by the registrar in a sealed and signed envelope. International applicants should refer to the guidelines outlined in the International Graduate Application for Admission form. If the student has not completed all undergraduate course work at the time of application, the admission decision will be based on information available at the time of application. However, a final transcript showing graduation must be submitted before enrollment. Students who have taken course work on any Indiana University campus do not need to submit an Indiana University transcript.
5. Submit scores from the Graduate Record Examination (GRE). Only the General Exam is required; however, an appropriate subject exam (e.g., chemistry for chemical informatics) may be helpful in determining the applicant's potential.
6. The school does not specify minimum scores, preferring instead to use the full information available in the applicant's dossier. The Media Arts and Science program does not require GRE scores. Information concerning these examinations may be obtained from Graduate Record Examinations, Educational Testing Service, CN 6000, Princeton, NJ 08541-6000 (www.gre.org).
7. Students whose native language is not English must submit results of the Test of English as a Foreign Language (TOEFL). The TOEFL is required of all nonnative English speakers. The TOEFL may be waived if a B.S. or M.S. degree has been earned in the United States. A minimum TOEFL score of 600 is required. Registration information can be requested from TOEFL/TSE Publications, P.O. Box 6154, Princeton, NJ 08541-6154 (www.toefl.org).
8. Submit a personal statement (300-500 words) describing educational background and reasons for pursuing graduate study. In addition, some programs may require a sample of creative work or professional accomplishment, which may include written work, a computer program, multimedia presentation, portfolio, etc. Submitted materials should support the applicant's career intentions and plans. Contact the Office of Student Services for further information.

Financial Assistance

Graduate Assistantships

Students may compete for a limited number of graduate assistantship appointments. Assistantships are awarded solely on the basis of merit. These appointments constitute the most common type of financial assistance offered through the School of Informatics. Graduate assistantships include a stipend

and a fee scholarship. Students will be assigned to work in areas supporting the mission of the School of Informatics.

Students applying for admission to the program should complete the financial aid form if they wish to be considered for a graduate assistantship.

Fellowships and Scholarships

Although the majority of financial aid is in the form of assistantships, a limited number of fellowships and scholarships are also available. Those receiving fellowships and scholarships are not required to perform any duties in return for the stipend. These awards are also made solely on a merit basis.

Students applying for admission to the program are considered for fellowships and scholarships; there is no additional application to complete. Awards are normally granted for an academic year. The school is developing new sources of funding, and students are encouraged to review the informatics Web site or call the School of Informatics for up-to-date information.

Grants

The GradGrants Center (GGC) is a free service available to all enrolled graduate students on all campuses of Indiana University. The GGC provides information and training to assist graduate students in their search for funding to further graduate study at Indiana University. The IUPUI center is located in the Union Building, room 518; (317) 274-4023.

Loans

Domestic students who need financial assistance not provided by any of the awards already mentioned are eligible to apply for need-based financial aid. For graduate students, most need-based aid is in the form of student loans. For further information, contact the Office of Student Financial Assistance, IUPUI, Cavanaugh Hall 103, 425 University Boulevard., Indianapolis, IN 46202; (317) 274-4162.

Academic Regulations

Applicability of Degree Requirements

Students may choose to complete either the specific degree requirements published in the appropriate bulletin at the time of entry into the university or those in the bulletin current at the time of graduation.

Residency Requirements

The campus at which a student is admitted will certify and award the degree.

Intercampus Transfer

Students enrolled in the School of Informatics at any campus of Indiana University may transfer to the School of Informatics on another campus, provided they are in good standing. However, international students may need to pay a processing fee.

Transfer of Credit

A maximum of 8 credit hours of graduate course work with grades of B (3.0) or higher may be transferred from other accredited colleges and universities and applied to the School of Informatics

degree programs. The transfer must be approved by the dean, and is not an automatic occurrence. (See "Revalidation" section below.)

Revalidation

Normally, a course may not be counted toward degree requirements if it has been completed more than five years prior to the awarding of the degree for master's students. The advisor may recommend to the dean that course work taken prior to the deadline be revalidated if it can be demonstrated that the knowledge contained in the course(s) remains current. Currency of knowledge may be demonstrated by: (a) passing an examination specifically on the material covered by the course; (b) passing a more advanced course in the same subject area; (c) passing a comprehensive examination in which the student demonstrates substantial knowledge of the content of the course; or (d) publishing scholarly research demonstrating knowledge of the content of the course.

Courses taken while an undergraduate and counted toward the requirements of a baccalaureate degree may not also be counted toward a graduate degree.

Grading System

The official grading system is as follows:

A	= 4.0	D+	= 1.3
A-	= 3.7	D	= 1.0
B+	= 3.3	D-	= 0.7
B	= 3.0	F	= Failed
B-	= 2.7	I	= Incomplete
C+	= 2.3	W	= Withdrawn
C	= 2.0	R	= Deferred
C-	= 1.7	NR	= No grade reported

A minimum of a B (3.0) average in graduate work is required for continuance in graduate study. Courses completed with grades below C (2.0) are not counted toward degree requirements, but such grades will be counted in calculating a student's grade point average. Note that no work may be transferred from another institution unless the grade is B (3.0) or higher.

Incomplete

A grade of Incomplete may be given only if the completed portion of a student's work is of passing quality. It is the responsibility of the student to satisfy the requirements of that course within one calendar year from the date on which the Incomplete is recorded. The student is expected to finish all necessary work in time for the instructor to assign a regular grade before the expiration of this time period. If the student is unable to do so, it is the student's responsibility to notify the instructor of the course and the graduate advisor within the year to request an extension of time. Every overdue Incomplete will be changed to a grade of F after one calendar year.

Withdrawals

Because deadlines for withdrawal from courses may vary by campus and/or school, students should check with the current campus *Schedule of Classes* to verify deadlines and procedures.

Course Waivers

Requests for waivers of specific courses or requirements on the basis of previous course work are to be submitted in writing to the dean.

Credit Earned in Nondegree Status

Not more than 9 hours of graduate credit completed as a nondegree student may be credited toward a School of Informatics graduate degree. Deficiency courses do not apply to the 9 credit hours.

Graduate Credit

Generally, graduate credit may not be awarded for graduate courses taught by graduate students.

Academic Standing

Students are considered to be in good standing during any semester in which their academic grade point average is at least 3.0 (B) for both their last semester's course work and for the cumulative average of all course work completed. Only courses with grades of C (2.0) or above may be counted toward degree requirements. However, grades below C are used in computing the cumulative grade point average, even if a course is repeated and a higher grade is earned.

Academic Probation

Students are placed on probation following a semester in which their graduate cumulative or semester grade point average falls below 3.0. Students on probation are required to attain an average of at least 3.0 for all graduate course work completed by the end of the next semester of full-time enrollment or its equivalent (9 credit hours). Failure to do so is cause for dismissal.

Academic Integrity

Academic integrity requires that students take credit only for their own ideas and efforts. Misconduct, including cheating, fabrication, plagiarism, interference, or facilitating academic dishonesty, is prohibited because it undermines the bonds of trust and cooperation among members of this community and between us and those who may depend on our knowledge and integrity. Complete details are contained in the Indiana University *Code of Student Rights, Responsibilities, and Conduct*.

Thesis

Depending on particular degree requirements, students will complete either a capstone project or a thesis under the guidance of an advisor. More details are given in the appropriate section for each program.

Degree Conferral

For all students seeking a master's degree, an application for the degree must be filed with the School of Informatics at least 60 days before the date anticipated for degree conferral. All degree requirements must be completed at least 30 days prior to the date of expected degree conferral, including submission of the bound copies of the master's thesis (if required for degree).

Time Requirements

All requirements for M.S. degrees must be met within five consecutive calendar years from the date of completion of the first credited (i.e., nondeficiency) course.

Master of Science in Bioinformatics (36 cr.)

Bioinformatics is a pure and applied science dealing with the collection, management, analysis and dissemination of biological data and knowledge, especially with respect to genetics and molecular biology. A Master of Science in Bioinformatics addresses needs for education in this rapidly growing field. This is an interdisciplinary program involving faculty from the departments of biology, computer science, chemistry, library and information science, and others.

The end of the twentieth century saw an explosion of data discovered from living organisms, especially in areas of molecular biology and genetics. The goal of bioinformatics is to deal with this flood of data, organize it as comprehensible information, and turn it into useful knowledge. For example, the flow of information from the Human Genome Project will revolutionize medical practice and biological research in this century and enable an understanding of most inherited diseases. Study of the genomic code, coupled with new understanding of its organization, regulation and function in cells, and in development of organisms, is forming the basis for designing new treatments for many diseases and for understanding and modulating health problems associated with aging. Genome information is quickly becoming the basis for designing new drugs. It is also central to the improvement of genomes of economically important crops and animals.

Experienced bioinformaticians are limited in number, while the need for them in industry, academe, and government has grown rapidly. Full understanding and application of this new data requires a large body of intelligent, creative, and experienced scientists with a firm understanding of both computation and biology. There is a current and projected shortage of such people and a pressing need for educational institutions to teach bioinformatics. In the mid-1990s, biosciences industries discovered the importance of bioinformatics to their goals and quickly stripped academic centers of many experts who would normally serve to educate a new generation of students. New directions following the unraveling of the genomic code also point to greatly increased information flow and an increasing scale in the application of computing methods to biosciences.

The School of Informatics collaborates closely with the Center for Computational Biology and Bioinformatics and the Department of Biochemistry in the School of Medicine, the Department of Computer and Information Science in the School of Science, and the Department of Electrical and Computer Engineering in the School of Engineering and Technology. Research and learning opportunities for students abound.

Degree Requirements

The bioinformatics curriculum includes a set of core and elective courses covering concepts and training in bioinformatics, biosciences and informatics, and computer sciences. A primary goal of this curriculum is to provide scientists with a strong foundation in the areas of computation/informatics and biology, though their primary focus may be in one or the other area. The integration of knowledge from biology, computing, mathematics, and related areas will receive particular emphasis. Students with different levels of background in biology, computing, and informatics sciences are encouraged to apply. Students with academic deficiencies will address these through individually planned programs of suggested course work. Students will gain experience in the applications of computing methods to biology information by completing course work and nonclassroom original research projects. Informatics and biosciences faculty will supervise these projects jointly.

Prerequisites

Prospective students for graduate study in bioinformatics will be expected to have introductory background in both informatics and biology. Students need approximately 6 undergraduate credit hours of course work in biology, covering areas of molecular biology, genetics, and evolution. Students need approximately 6 undergraduate credit hours of computer science or informatics course work, covering areas of programming, discrete structures, and data structures. Students not having completed these prerequisites may need to take appropriate undergraduate courses to ensure regular progress through the program.

To receive the master's degree, the applicant must be admitted as a graduate student and complete 36 credits in bioinformatics-related courses accepted for graduate credit, including 9 hours of core courses, 21 hours of electives, and 6 hours of project or thesis credit. The following courses may be used:

Core Courses (9 cr.)

CSCI 548 Topics: Introduction to Bioinformatics (3 cr.)
INFO I501 Introduction to Informatics (3 cr.)
INFO I502 Information Management (3 cr.)

Electives (21 cr.)

Electives are to be chosen, with prior approval of a graduate advisor, from a list of departments specific to each degree program. The following courses have been approved. Additional courses may be added to the student's program with advisor's consent. Note that elective courses may require prerequisites.

BIOL 484 Cellular Biochemistry (3 cr.)
BIOL 507 Molecular Biology (3 cr.)
BIOL 540 Topics in Biotechnology (3 cr.)
BIOL 548 Techniques in Biotechnology (3 cr.)
BIOL 641 Microbial Genetics (2 cr.)
CSCI 503 Operating Systems (3 cr.)
CSCI 504 Concepts in Computer Organization (3 cr.)
CSCI 506 Management of the Software Development Process (3 cr.)
CSCI 507 Object-Oriented Design and Programming (3 cr.)
CSCI 520 Computational Methods in Analysis (3 cr.)
CSCI 536 Computer Networks (3 cr.)

CSCI 541 Database Systems (3 cr.)
CSCI 542 Distributed Database Systems (3 cr.)
CSCI 565 Programming Languages (3 cr.)
CSCI 580 Analysis of Algorithms (3 cr.)
CSCI 590 Artificial Intelligence (3 cr.)
CSCI 590 Data Mining (3 cr.)
GRAD G865 Fundamental Molecular Biology (2-5 cr.)
MGEN Q580 Basic Human Genetics (3 cr.)
MGEN Q630 Genetics of Populations (3 cr.)
MGEN Q730 Methods in Human Genetics (3 cr.)
STAT 511 Statistical Methods I (3 cr.)
STAT 514 Designs of Experiments (3 cr.)

Project/Thesis (6 cr.)

Students must perform an independent research project and produce a report or thesis for public defense. The project might consist of a research paper, a designed artifact, or other appropriate deliverable format.

INFO I692 Thesis/Project in Bioinformatics (1-6 cr.)

Master of Science in Chemical Informatics (36 cr.)

The size of the information problem in chemistry is staggering. It can be judged from the fact that Chemical Abstracts Service adds over 700,000 new compounds to its database annually. Massive amounts of physical and chemical property data are generated each year for new and existing chemical substances. The avalanche of data can bury a chemical research project unless chemists find ways to cope with it. Fortunately, those trained in chemical informatics provide the tools to acquire, organize, and evaluate data, yielding new insights for further chemical research. Chemical informatics companies combine molecular simulation and data analysis techniques with high-quality graphical visualization to obtain stunning results. Chemical informatics thus helps chemists investigate new problems and organize and analyze scientific data to develop novel compounds, materials, and processes through the application of information technology.

The curriculum for a Master of Science in Chemical Informatics in the School of Informatics educates students in the following major aspects of chemical informatics:

- **Information Acquisition:** Methods used for generating and collecting data empirically (experimentation) or from theory (molecular simulation)
- **Information Management:** Storage and retrieval of information
- **Information Use:** Data analysis, correlation, and application to problems in the chemical and biochemical sciences

Degree Requirements

Prerequisites

Prospective students for graduate study in chemical informatics will be expected to have training in both informatics and chemistry. If sufficient background has not been completed, some additional course work may be necessary to ensure progress through the program.

Students with a Bachelor's Degree in Computer Science, Informatics, or Other Information Fields

Students with a B.S. in any information-based field will need approximately 22 undergraduate credit hours of course work in chemistry to provide sufficient background for course work required to study for the M.S. in Chemical Informatics. This includes:

General chemistry with laboratory (two semesters)
Organic chemistry (two semesters)
Biological chemistry or biochemistry (one semester)
Physical chemistry (one semester)

Students with a Bachelor's Degree in Chemistry (B.A. or B.S.)

Students with undergraduate degrees in chemistry (typically 25 or more credits in chemistry or biochemistry courses) will need some preparative work in informatics. Four or more credits in formal informatics course work, computer science courses relevant to informatics, or bioinformatics or chemical informatics course work will provide the necessary background for graduate study. Students not having completed this study may need to take appropriate undergraduate courses to ensure regular progress through the program.

Core Courses (12 cr.)

INFO I501 Introduction to Informatics (3 cr.)
INFO I502 Information Management (3 cr.)
CHEM 696 Special Topics in Chemistry (3 cr.) Course content changes each semester. Students register for 3 credit hours for two semesters.

Electives (18 cr., at least 6 of which must be in chemistry or biochemistry)

Electives are to be chosen, with prior approval of a graduate advisor, from a list of departments specific to each degree program. The following courses have been approved. Additional courses may be added to the student's program with advisor's consent.

Biochemistry

BIOC B807 Enzyme Chemistry (3 cr.)
BIOC G865 Fundamentals of Molecular Biology (3 cr.)
BIOL K484 Cellular Biochemistry (3 cr.)
BIOL 507 Molecular Biology (3 cr.)
CHEM 533 Introduction to Biochemistry (3 cr.)
CHEM 636 Biochemistry (3 cr.)
CSCI 548 Introduction to Bioinformatics (3 cr.)

Analytical Chemistry

CHEM 621 Advanced Analytical Chemistry (3 cr.)
CHEM 629 Chromatography (3 cr.)
CHEM 696 Chemometrics (3 cr.)

Organic Chemistry

CHEM 651 Advanced Organic Chemistry (3 cr.)
CHEM 652 Synthetic Organic Chemistry (3 cr.)

Physical Chemistry

CHEM 575 Intermediate Physical Chemistry (3 cr.)
CHEM 672 Quantum Chemistry (3 cr.)
CHEM 675 Chemical Kinetics (3 cr.)
CHEM 696 Introduction to Computational Chemistry (3 cr.)

Computer Science

CSCI 542 Distributed Database Systems (3 cr.)
CSCI 590 Artificial Intelligence (3 cr.)
CSCI 590 Data Mining (3 cr.)

New Media

NEWM N502 Digital Media Motion and Simulation Methods (3 cr.)
NEWM N504 Advanced Interactive Design Application (3 cr.)

Project/Thesis or Internship (6 cr. taken in the second year)

As a capstone experience, students will complete 6 credits of research, a project, or an internship under the guidance of a chemistry faculty member.

INFO I693 Informatics Thesis/Project in Chemical Informatics (1-6 cr.)

Laboratory Informatics (A specialization within the M.S. in Chemical Informatics)

Laboratory informatics is the specialized application of information technology to maximize laboratory operations. Laboratory informatics encompasses data acquisition, data processing, laboratory information management systems (LIMS), laboratory automation, scientific data management (including data analysis and long-term archiving), and electronic laboratory notebooks. Focus is on the application of this technology in analytical, production, and R&D laboratories. This specialization is embedded within the chemical informatics degree.

This professional, industry-oriented graduate program is designed for students with undergraduate degrees in the physical or life sciences who seek advanced training in laboratory informatics to pursue careers in the agricultural, biomedical, chemical, food, petroleum, and pharmaceutical industries. Graduates will work primarily in commercial and municipal laboratories as operations specialists, LIMS analysts, and lab managers. A significant job market also exists with laboratory software and instrumentation companies in sales, service, and training positions.

The curriculum leading to the M.S. in Chemical Informatics with a specialization in Laboratory Informatics includes a common informatics core, a specialized core for the major, electives from other schools to build on the core foundation, and internships in real-world settings. Classes and labs will be taught in a state-of-the-art research facility.

Prerequisites

Students must possess a bachelor's degree in an academic field that could be relevant to laboratories that utilize laboratory informatics. For example, a degree in plant biology could be relevant to a biotechnology laboratory, and a degree in chemistry could be relevant to an analytical laboratory.

Core Courses (6 cr.)

INFO I501 Introduction to Informatics (3 cr.)
INFO I502 Information Management (3 cr.)

Laboratory Informatics Specialization Courses (12 cr.)

INFO I510 Laboratory Instrumentation and Data Acquisition (3 cr.)
INFO I511 Laboratory Information Management Systems (LIMS) (3 cr.)
INFO I512 Scientific Data Management and Analysis (3 cr.)
CHEM C571 Chemical Information Technology (3 cr.)

Electives (12 cr.)

Electives are to be chosen, with prior approval of a graduate advisor, from a list of departments specific to each degree program. The following courses are typical examples:

INFO I533 Seminar in Chemical Informatics (3 cr.)
INFO I590 Topics: Scientific Computing for Informatics (3 cr.)
INFO I590 Topics: Informatics Project Management (3 cr.)
STAT 511 Statistical Methods I (3 cr.)

Thesis/Project (6 cr.)

Students will complete 6 credits of research, a project, or an internship under the guidance of a chemistry faculty member.

INFO I693 Thesis/Project in Chemical Informatics (6 cr.)

Master of Science in Health Informatics (36 cr.)

The School of Informatics offers a Master of Science in Health Informatics to address needs arising from the rapidly changing health care environment. Research and educational programs in medical, nursing, and health informatics are growing at a rapid rate nationally. This can be attributed in large part to the increasing complexity and importance of health care reimbursement, which has created a need for improved classification, storage, and analysis of medical information to establish best clinical practice and cost efficiency. Users of health informatics include clinicians, researchers, health care educators, health organization administrators, health policy analysts, health information administrators, quality improvement directors, and chief information officers. Those who are professionally involved in health informatics work in a variety of settings, including acute care hospitals, managed care organizations, consulting firms, claims and reimbursement organizations, accounting firms, home health care agencies, long-term care facilities, corrections facilities, pharmaceutical companies, behavioral health organizations, insurance companies, state and federal health care agencies, and health computing industries.

The IUPUI campus is uniquely suited to conduct graduate education in health informatics through its health schools, research centers, and affiliated academic units. The School of Medicine has a long history of fellowship training and research in medical informatics. The School of Nursing, which is the largest in the country, is in the forefront in the development of nursing informatics, with a particular emphasis on consumer health informatics. The School of Library and Information Science offers master's and doctoral degrees in information science,

which are distinguished by their sociotechnical orientation. The school also has a broad research thrust exploring the interconnection of social, behavioral, and technological issues associated with the use of information and communication technologies. The Department of Computer and Information Science offers a master's degree in Computer Science with a specialization in databases and data mining. The department supports the computer science requirements of the M.S. in Health Informatics. Faculty in the department is externally funded to conduct research in medical informatics and bioinformatics. Other academic programs at Indianapolis and Bloomington in public health, applied health sciences, and hospital administration offer important supporting course work.

Degree Requirements

To receive the Master of Science in Health Informatics, students must complete 36 credit hours of prescribed courses. In addition to core courses, students choose, in consultation with advisors, a set of concentration electives. Examples of concentration areas include 1) knowledge-based health care information, 2) health services informatics, and 3) clinical databases.

Knowledge-based health care information focuses on the storage, organization, evaluation, and dissemination of health and medical knowledge (e.g., textbooks, journals, other media, and information) to support evidence-based practice and patient education. End-users of knowledge-based health care information include clinicians, patients, health educators, and health planners.

Health services informatics focuses on information management in health care systems and addresses such diverse needs as patient flow, resource allocation, billing, and compiling and reporting of data. This involves developing information systems for processing and storing clinical data, complying with medical documentation requirements of accrediting and governmental agencies, and setting health information policies.

Clinical databases focuses on the storage of medical data and linkage of electronic systems. Study in this concentration is based on an electronic medical record system, which includes existing standards and coding, links between health-related databases, and data extraction for clinical care and management. Research is oriented to using such databases to learn more about disease and health maintenance (e.g., clinical epidemiology, pharmacoepidemiology, public health informatics, and nursing informatics).

Prerequisites (11 cr.)

All students applying for the M.S. in Health Informatics should have prerequisite courses or equivalencies in the following areas:

Anatomy, biology, or physiology (200 level or higher)	3 cr.
Computer Science CSCI N301	3 cr.
Medical Terminology	2 cr.
Statistics	3 cr.

To receive a master's degree, the applicant must be admitted as a graduate student and complete 36 credits in health informatics-related courses

numbered 500 or above as listed below. The following courses are offered at IUPUI; courses may also be taken at IUB with approval of the advisor.

Core Courses (15 cr.)

All of the following are required:

- INFO I501 Introduction to Informatics (3 cr.)
- INFO I502 Information Management (3 cr.)
- INFO I503 Social Impact of Information Technologies (3 cr.)
- INFO I530 Seminar in Health Informatics Applications (3 cr.)

Choose one of the following:

- NURS R505 Measurement and Data Analysis (3 cr.)
- PBHL G651 Biostatistics for Public Health (3 cr.)
- SPEA H518 Public Health Statistics (3 cr.)

Electives (15 cr.)

Electives may be selected from existing graduate courses in numerous schools and other academic units, depending on student need. Of these 15 credit hours, 9 credit hours must be selected from the list of informatics and computer science courses. (This list is neither exhaustive nor exclusive.) In consultation with their advisors, students will have wide latitude in choosing appropriate courses.

Informatics and Computer Science

- CSCI 503 Operating Systems (3 cr.)
- CSCI 504 Concepts in Computer Organization (3 cr.)
- CSCI 536 Computer Networks (3 cr.)
- CSCI 541 Database Systems (3 cr.)
- CSCI 542 Distributed Database Systems (3 cr.)
- CSCI 565 Programming Languages (3 cr.)
- CSCI 590 Topics: Artificial Intelligence (3 cr.)
- INFO I531 Seminar in Health Informatics (1-3 cr.)
- INFO I551 Independent Study in Health Informatics (1-3 cr.)
- NURS T619 Computer Technologies (3 cr.)
- SLIS L542 Introduction to Human-Computer Interaction (3 cr.)
- SLIS L570 Online Information Retrieval (3 cr.)
- SLIS L571 Information Networking (3 cr.)
- SLIS L574 Communication in Electronic Environments (3 cr.)
- SPEA H628 Health Care Information Systems (3 cr.)
- SPEA V516 Public Management Information Systems (3 cr.)
- SPEA V519 Database Management Systems (3 cr.)
- SPEA V611 Design of Information Systems (3 cr.)
- SPEA V613 Implementation of Information Systems (3 cr.)

Design, Measurement, and Evaluation

- AHLT W520 Research Methodology for Allied Health (3 cr.)
- AHLT W570 Research Communication in Allied Health (3 cr.)
- ECON E528 Economic Analysis of Health Care (3 cr.)
- NURS L650 Data Analysis for Clinical and Administrative Decision Making (3 cr.)
- NURS R720 Metanalysis of Health/Illness or Disease/Illness (3 cr.)
- NURS T617 Evaluation in Nursing (3 cr.)
- PBHL G652 Biostatistics II (3 cr.)
- SPEA H517 Managerial Epidemiology (3 cr.)

- SPEA H521 Management Sciences for Health Services Administration (3 cr.)
- SPEA H615 Strategic Management, Decision Making, and Evaluation II (3 cr.)
- SPEA V541 Benefit-Cost Analysis of Public and Environmental Policies (3 cr.)

Health Sciences

- AHLT W510 Trends and Issues in Allied Health (3 cr.)
- AHLT W560 Topics: Patient-Centered Outcomes Research (3 cr.)
- HPER C501 Program Planning in Public Health Education (3 cr.)
- HPER C515 Health Education in Clinical Settings (3 cr.)
- NURS M560 Teaching Strategies to Promote Client Functioning (3 cr.)
- PBHL P503 Public Health Community Project (3 cr.)
- SOC R515 Sociology of Health and Illness (3 cr.)
- SPEA H501 U.S. Health Care Systems, Policies, and Ethical Challenges (3 cr.)
- SPEA H503 Health Systems Organization and Management (3 cr.)

Project/Thesis (6 cr.)

As a capstone experience, students will complete either a project, planned in conjunction with their advisor, or a researched-based thesis, supervised by a research advisor and a thesis committee. Core and support faculty from the participating schools will have a wide range of research interests that will provide graduate students with choices relevant to their concentration areas.

- INFO I691 Thesis/Project in Health Informatics (1-6 cr.)

Master of Science in Human-Computer Interaction (36 cr.)

Human-Computer Interaction (HCI) is the branch of informatics that studies and supports the design, development, and implementation of humanly usable and socially acceptable information technologies. The goal of the field is to shape new media and tools that will support human use, augment human learning, enhance communication, and lead to more acceptable technological developments at the individual and the social levels.

Research in HCI draws extensively on mainstream informatics concerns with cognition, communication, representation, and computation. HCI professionals seek to identify the nature and parameters of human information processing at the interface, design forms of representation that support human interpretation and use of information, reliably and validly test new technologies for usability and acceptability, and determine how information technologies change working practices and social activities.

Regular job postings for HCI personnel express a desire for professionals with suitable scientific training in design and evaluation, and increasingly, applied social scientists with technological skills are finding employment in the software industry as HCI professionals. At Indiana University, the HCI program draws from faculty campuswide to provide the appropriate blend of multidisciplinary expertise required to study this new discipline.

Prerequisites

Students may be asked to complete prerequisite course work by a graduate advisor to ensure progress through the program.

Degree Requirements

To receive the master of science degree, the applicant must be admitted as a graduate student and complete 36 credits of graduate study in HCI according to the following schedule:

Core Courses (15 cr.)

INFO I501 Introduction to Informatics (3 cr.)
INFO I502 Information Management (3 cr.)

Six (6) credit hours of course work in Human-Computer Interaction

Three credit hours of Intermediate Statistics

Electives (15 cr.)

Electives are to be chosen, with prior approval of a graduate advisor, from a list of departments specific to each degree program. The following courses have been approved. Additional courses may be added to the student's program with advisor's consent.

Students must take courses from at least two departments. Note that some elective courses may require prerequisites.

BUS S601 MIS Research Topics in Applications Systems Design (3 cr.)
BUS S602 MIS Research Topics in Administration and Technology (3 cr.)
CSCI A504 Introductory C++ Programming (2 cr.)
CSCI A506 Object-Oriented Programming in C++ (2 cr.)
CSCI A546 User-Interface Programming (2 cr.)
CSCI A547 Network Technologies and Administration (2 cr.)
CSCI A548 Mastering the World Wide Web (2 cr.)
CSCI A591 Introduction to Computer Science (3 cr.)
CSCI A592 Introduction to Software Systems (3 cr.)
CSCI A594 Data Structures (3 cr.)
CSCI A596 Programming Languages (3 cr.)
CSCI A597 Introduction to Programming I (3 cr.)
CSCI A598 Introduction to Programming II (3 cr.)
CSCI B503 Algorithms Design and Analysis (3 cr.)
CSCI B521 Programming Language Principles (3 cr.)
CSCI B538 Networks and Distributed Computing (3 cr.)
CSCI B551 Elements of Artificial Intelligence (3 cr.)
CSCI B561 Advanced Database Concepts (3 cr.)
CSCI B581 Advanced Computer Graphics (3 cr.)
CSCI B582 Image Synthesis (3 cr.)
CSCI B665 Software Engineering Management (3 cr.)
CSCI B666 Software Management Implementation (1-3 cr.)
CSCI B669 Topics in Database and Information Systems (1-6 cr.)
CSCI B689 Topics in Graphics and Human-Computer Interaction (1-6 cr.)
CSCI P536 Advanced Operating Systems (3 cr.)
CSCI P565/P566 Software Engineering I-II (3/3 cr.)
CSCI P573 Scientific Computing (3 cr.)
EDUC R541 Instructional Development and Production I (3 cr.)
EDUC P544 Applied Cognition and Learning Strategies (3 cr.)

EDUC P600 Topical Seminar in Learning Cognition and Instruction (3 cr.)
EDUC R641 Instructional Development and Production II (3 cr.)
EDUC R685 Human-Computer Interaction Design (1-3 cr.)
INFO I534 Seminar in Human-Computer Interaction (1-3 cr.)
INFO I554 Independent Study in Human-Computer Interaction (1-3 cr.)
JOUR J530 Issues in New Communication Technologies (3 cr.)
PSY P450 Human Factors (graduate credit available) (3 cr.)
SLIS L542 Introduction to Human-Computer Interaction (3 cr.)
SLIS L576 Digital Libraries (3 cr.)
SLIS L578 User Interface Design for Information Systems (3 cr.)
SLIS L642 Information Usage and the Cognitive Artifact (Human-Computer Interaction II) (3 cr.)
SLIS L697 Advanced Topics in Information Systems (1-4 cr.)
SPHS S522 Digital Signal Processing (3 cr.)
TEL T541 Processes and Effects: Individual Level Theory and Research (3 cr.)
TEL T571 Applied Emotional and Cognitive Psychology Theory (3 cr.)

Project/Thesis (6 cr.)

Students will perform an independent research project, and produce a report or thesis, a designed artifact, or other appropriate deliverable format for public defense.

INFO I694 Thesis/Project in Human-Computer Interaction (1-6 cr.)

Master of Science in Media Arts and Science (30 cr.)

The Master of Science degree develops specialized skills and knowledge in new media with the purpose of preparing students to manage and conduct research on Internet and Web environments and multimedia production techniques. Like all new media programs, the master's degree is focused on applied research and application. The course of study is oriented toward professional practice and relies on a theory base drawn from fundamental disciplines which study communication as sight, sound, and motion.

Skills and knowledge embedded in this degree program include: Web page and multimedia research design, computer programming and database programming, multimedia authoring language skills and data collection, software, multimedia development of audio and video impact on users, digital graphics assessment techniques, and writing and editing of materials for multimedia evaluation and assessment.

The Master of Science in Media Arts and Science includes required courses in new media with specific emphasis on philosophy and principles of the field as well as techniques using technology in communication and cybernetic/human interaction theory. Graduates will be prepared to conduct research in the development and effects of using

communication technology in academic, social, and vocational settings. Opportunity will exist within the field for students to conduct applied research in media-related disciplines.

Career options include 2D/3D artist, animator, creative technologist, multimedia producer, director of software development, electronic publisher, hypermedia specialist, Internet developer, graphic artist, interactive trainer, music producer, multimedia developer, composer, techno-artist, video/audio editor, Webmaster, and Web site designer.

Admission Requirements

Students must hold a bachelor's degree with demonstrated media arts skills. Students must have an overall grade point average of 3.0 on a 4.0 scale.

- Students will be required to attend an interview to assess the applicant's computer literacy, personal skills, and professional experience.
- Students must present a portfolio. See section on graduate portfolio submission guidelines.
- Students also must submit three letters of recommendation to support the application for admission.
- Arrange for official transcripts to be sent from all colleges and universities attended by the applicant. Transcripts indicating, "issued to student" are not considered official. An official transcript bears the original signature of the registrar and/or original seal of the issuing institution. Transcripts should be mailed directly by a registrar, or given to the applicant by the registrar in a sealed and signed envelope. International applicants should refer to the guidelines outlined in the International Graduate Application for Admission form. If the student has not completed all undergraduate course work at the time of application, the admission decision will be based on information available at the time of application. However, a final transcript showing graduation must be submitted before enrollment. Students who have taken course work on any Indiana University campus do not need to submit an Indiana University transcript.

Graduate Portfolio Submission Guidelines

The candidate's portfolio should demonstrate a sufficient mastery of the knowledge and skills of design, interactive media, and/or three-dimensional digital graphics. This includes the ability to technically and creatively integrate the cumulative proficiencies of the candidate's previous discipline into a representation that professionally demonstrates his or her experience, achievements, and creative problem-solving skills in digital technologies. Portfolios should include a collection of 15-20 works (maximum) that represent the candidate's graphics, digital arts, and/or other proficiencies in three of the four areas below. Fifty percent of the works submitted must be from categories 1-3; i.e., areas pertaining to the visual arts.

1. **2D:** Visual communication, design, and/or art
2. **Interactive:** Multimedia and/or hypermedia/Web design*

3. **3D:** 3-dimensional graphics, simulation, gaming, and/or animation*
4. **Other:** Other forms of media or other disciplines
 - **Media:** Film, video, etc.*

*One or more of these areas should include audio, video, or simulation

 - **Music:** Recordings, scores, etc.
 - **Journalism:** Examples of creative written works, published works, etc.
 - **Other disciplines:** Published papers or research in the arts and sciences

All portfolios must be delivered in a digital format such as DVD, CD-ROM, or Web site. Floppy disks, videotapes, film, and audiotape will not be accepted. Portfolios should auto-run or a clear indication of a starting point must be identified. The committee will not open individual folders to review multiple works. The accumulated works must be in a predesigned presentation format (e.g. PowerPoint, Flash, Director, etc.). If the candidate submits copies of written works such as published papers or musical scores, they must be GBC or Coil bound into one document. Do not send three-ring binders or other forms of folders or binders.

The portfolio should include a Microsoft Word document or PDF that contains a detailed description of the submitted works with the following information:

1. Name
2. Title
3. Description of work
4. Date of completion
5. Resources used: applications (software or program), platform, etc.
6. Additional comments

Degree Requirements

The Master of Science degree is a 30 credit hour program that includes a core of 18 hours and a specialization area of 12 hours. Electives will be available which allow students to specialize in "major field" areas within the new media graduate curriculum. Students must receive a B+ or higher in the required core courses, and a B or higher in the specialization core courses to remain in good standing.

Required Core Courses (18 cr.)

- N500 Principles of Media Arts Production (3 cr.)
- N501 TPCS: Foundations of Multimedia Technology (3 cr.)
- N502 Digital Media Motion and Simulation Methods (3 cr.)
- N503 Multimedia Design Applications (3 cr.)
- N504 Advanced Interactive Design Applications (3 cr.)
- N505 Internship in Media Arts and Technology (3 cr.)
- N506 Media Arts and Technology Major Project (3 cr.)
- N510 Web Database Concepts (3 cr.)

Specialization Core Courses (12 cr.)

Specialization courses must be selected from the 400- and 500-level courses offered in the schools of: Informatics, Art, Journalism, Music, Library and Information Science, or the departments of Computer Science and Computer Technology.

Area 1:

Computer Science
Computer Technology
Library Information and Science
New Media

Area 2:

Art
Journalism
Music
New Media

The New Media academic advisor and the head of graduate studies MUST approve the specialization core PRIOR to enrollment in the courses.

Undergraduate Course Descriptions

Health Information Administration (HIA)

"P" refers to a course prerequisite and "C" to a course that must be taken concurrently.

M315 Quantitative Methods and Research (2 cr.)

This course will outline the procedures associated with vital statistics in health care (birth/death certificates). The student will learn about the statistics associated with health care. The research portion will focus on data search and access techniques, national research policy making, biomedical and health research investigation, and research protocol data management.

M322 Hospital Organization and Management (3 cr.)

Orientation to hospital departments hospital organization; inter- and intra-relationships of hospital and community agencies.

M325 Health Care Information Requirements and Standards (3 cr.)

This course will outline accreditation standards and regulatory requirements for all aspects of health care including the hospital setting, psychiatric records, and other alternate forms of delivery. It will focus on the content of the health record and documentation requirements, including an orientation to the health information management profession.

M330 Medical Terminology (2 cr.)

Understanding and use of the language of medicine, including building, analyzing, defining, pronouncing, and spelling diagnostic terms that relate to the structure of the body systems.

M350 Medical Science for Health Information I (3 cr.)

This course will cover pathophysiology and pharmacology associated with the body systems.

M355 ICD-9-CM Coding (3 cr.) This course will focus on International Classification of Diseases (ICD) and coding. Students will learn how to code, index, and sequence diagnoses and procedures. Ethical coding guidelines will be taught.

M380 Seminar in Health Information

Administration (1 cr.) Allows the student to refine their skills in planning health care seminars for the profession, hospitals, and within the classroom setting. Written summaries and oral presentations required. Fall semester only.

M400 Health Information Storage and

Retrieval (2 cr.) This course will focus on the creation of forms design, including the retrieval, filing, and storage of health care information according to the guidelines established by federal and state regulations. Registries will be discussed with specific focus on the cancer registry and master patient index (MPI).

M420 Health Care Planning and Information

Systems (3 cr.) Students will understand the design of systems, research various vendors, and present information so that a selection of information systems can be recommended. This course will also address systems planning; systems selection process; clinical and business applications of computing in health care; and resolving organization information issues.

M441 Professional Practice Experience I

(6 cr.) Supervised laboratory practice with onsite observations of medical, technical, and administrative systems. Study in the function of health information management procedures in the clinical setting.

M442 Professional Practice Experience II

(6 cr.) P: M441 This course is a continuation of M441. Supervised laboratory practice with onsite observations of medical, technical, and administrative systems. Study in the function of health information management procedures in the clinical setting.

M445 Medicine and the Law (2 cr.)

Presentation of concepts of law in medical and/or health areas as applied to the physician, hospital, health institutions, health information, and individual health workers.

M450 Medical Science for Health Information

II (3 cr.) P: M350. This course is a continuation of M350. Course will cover pathophysiology and pharmacology associated with the body systems.

M455 CPT Coding (3 cr.)

P: M355. Focus on Current Procedural Terminology coding. Sequence of procedures as they relate to correct coding guidelines. Study of Health care Common Procedure Coding System (HCPCS) will also be included.

M459 Clinical in Health Information

Administration (4 cr.) Professionally supervised internship in an approved clinical site for management experiences in health information services.

M460 Long-Term Care (1 cr.)

Discuss the scope of work and the role of long term care. Understand the purpose of the Resident Assessment Instrument (RAI), Minimum Data Set (MDS), and Resident Assessment Protocols (RAPS). Long-term care reimbursement issues addressed.

M461 Release of Health Care Information (1 cr.) This course will outline the requirements associated with confidentiality and privacy of health information. This course will focus on Health Insurance Portability and Accountability Act (HIPAA) code sets and transactions privacy.

M462 Health Care Quality Improvement (1 cr.) This course will identify quality/performance improvement methods and techniques for health care professionals. Interpretation of data appropriate to user needs and presentation of information will also be covered.

M470 Health Care Reimbursement Systems (3 cr.) P: M355 and M455. This course will present data elements that apply to prospective payment systems. It will allow the student to gain the knowledge of correct reimbursement systems and to identify issues and patient types in meeting medical necessity guidelines.

M480 Seminar in Health Information Administration (1 cr.) Allows the student to refine their skills in planning health care seminars for the profession, hospitals, and within the classroom setting. Written executive summaries and oral presentations required. Spring semester only.

M485 Health Information Administration Enrichment (1 cr.) Current trends, problems, best practices, and developments are discussed that affect the health care profession. Students pursue special interest and share information and experiences with the group. This course is an in-depth exploration of topics and issues in the forefront of health care. Format includes research papers, class discussions, and presentations.

M490 Directed Study (1 cr.) This course will reinforce the concepts taught throughout the semester in an independent study approach in order to review for the certification examination.

M499 Capstone Experience (3 cr.) This final project will allow the student to synthesize all of the information learned throughout the professional program. Written research projects and oral presentations will test the student's integrated knowledge and abilities across the field.

Informatics (INFO)

I101 Introduction to Informatics (4 cr.) P: computer literacy. Emphasis on topics in human-computer interaction and human factors, collaborative technologies, group problem solving, ethics, privacy, and ownership of information and information sources, information representation and the information life cycle, the transformation of data to information, and futuristic thinking.

I112 Basic Tools of Informatics—Programming and Database Concepts (3 cr.) Introduction to programming and database design concepts. Emphasis on problem-solving and information-gathering techniques. The lecture will discuss general concepts and syntax. The lab will focus on the use of software, including a programming language, modifying and accessing data using visual tools, and building database

applications using forms and development tools. Lecture and laboratory.

I201 Mathematical Foundations of Informatics (4 cr.) P: INFO I101 and MATH M118. An introduction to the suite of mathematical and logical tools used in information sciences, including finite mathematics, automata and computability theory, elementary probability and statistics, and basics of classical information theory.

I202 Social Informatics (3 cr.) P: INFO I101. Introduces the social and behavioral foundations of informatics. Theoretical approaches to how technology is used from psychological and sociotechnical perspectives. Examples of how current and emerging technologies such as games, e-mail, and electronic commerce are affecting daily lives, social relations, work, and leisure time.

I210 Information Infrastructure I (4 cr.) Recommended P or C: INFO I101. The software architecture of information systems. Basic concepts of systems and applications programming.

I211 Information Infrastructure II (4 cr.) P: INFO I210. The systems architecture of distributed applications. Advanced programming, including an introduction to the programming of graphical systems.

I300 Human-Computer Interaction—Design and Programming (3 cr.) P: INFO I211. The analysis of human factors and the design of computer application interfaces. A survey of current HCI designs with an eye toward what future technologies will allow. The course will emphasize learning HCI based on implementation and testing interfaces.

I303 Organizational Informatics (3 cr.) P: INFO I101. Examines the various needs, uses, and consequences of information in organizational contexts. Topics include organizational types and characteristics, functional areas and business processes, information-based products and services, the use of and redefined role of information technology, the changing character of work life and organizational practices, sociotechnical structures, and the rise and transformation of information-based industries.

I308 Information Representation (3 cr.) P: INFO I201 and INFO I210. The basic structure of information representation in social and scientific applications. Representational structures and approaches from many disciplines are introduced: philosophical theories of classification and categorization; information access and representation on the World Wide Web; object-oriented design and relational databases; AI knowledge representation and discovery.

I310 Multimedia Arts and Technology (3 cr.) P: INFO I308. The study of the evolution of media arts and underlying principles of communication. Application development paradigms in current practice.

I320 Distributed Systems and Collaborative Computing (3 cr.) P: INFO I211. An introductory treatment of distributed systems and programming. Topics range from the distributed and object models

of computation to advanced concepts, such as remote method invocations, object brokers, object services, open systems, and future trends for distributed information systems.

I400 Topics in Informatics (1-3 cr.) P: at least junior standing, or permission of instructor. Variable topic. Emphasis is on new developments and research in informatics. Can be repeated twice for credit when topics vary, subject to approval of the dean.

I420 Internship in Informatics Professional Practice (3-6 cr.) P: approval of dean and completion of 100- and 200-level requirements in informatics. Students gain professional work experience in an industry or research organization setting, using skills and knowledge acquired in informatics course work.

I450/451 Design and Development of an Information System (3/3 cr.) P: senior standing and approval of the dean. System design and development present both technical and managerial problems with which students will be familiar from their undergraduate course work. This course puts these lessons into practice as students work in teams to develop an information system. Examples of course projects include design and development of a database for a business or academic application, preparation and presentation of an interactive media performance or exhibit, or design and implementation of a simulated environment (virtual reality).

I460/461 Senior Thesis (3/3 cr.) P: senior standing and approval of the dean. The senior student prepares and presents a thesis: a substantial, typically multi-chapter, paper based on a well-planned research or scholarly project, as determined by the student and a sponsoring faculty member.

I499 Readings and Research in Informatics (1-3 cr.) P: consent of instructor and completion of 100- and 200-level requirements in informatics. Independent readings and research related to a topic of special interest to the student. Written report required. Can be repeated for a maximum of 6 credit hours.

New Media (NEWM)

A450 Digital Matte (3 cr.) P: completion of any track. The combination of digital painting, perspective, and light used to create a 2D backdrop. By bringing together existing footage, textures, and painting techniques, students will design environments and create atmosphere. Other topics covered include traditional painting techniques, advanced digital painting techniques, video effects, and green screen.

A451 Advanced Video (3 cr.) P: completion of the P track. Advanced course focusing on the creation and direction of a short narrative. This course will demonstrate mastery of editing and narrative skills culminating in a final project. Other topics covered include research/planning, marketing, preproduction, production, and postproduction (Adobe AfterEffects, Premiere, Final Cut Pro).

A455 Advanced Web (3 cr.) P: completion of the M track. Advanced course focusing on the creation of media-rich Web experiences. This course will demonstrate mastery of design, interactivity, and animation for the Web, culminating in a final project. Other topics covered include research/planning, marketing, preproduction, production, and postproduction (Flash, Anark).

A460 Advanced Interactive (3 cr.) P: completion of the M track. Advanced course focusing on the creation of interactive experience. This course will demonstrate mastery of design and interactivity culminating in a final project. Other topics covered include research/planning, marketing, preproduction, production, and postproduction (Director, Flash, Anark).

A465 Advanced Sequential Narrative (3 cr.) P: Completion of specialization/concentration area. Advanced course focusing on the creation of a sequential narrative using 2-D animation. This course will demonstrate mastery of graphic and audio synchronization in a final project. This course will expand on the ideas of pacing, tempo, and sequence. Other topics covered include research/planning, marketing, preproduction, production, and postproduction. [Macromedia Flash, Freehand, and Sound Forge].

A470 Advanced 2D Animation (3 cr.) P: completion of the S track. Traditional and digital animations converge to produce advanced broadcast quality projects. Students will further develop their understanding of preproduction and postproduction in service to the animated stories and characters created. Other topics include character and environment design, soundtrack, syncing, backgrounds and animation, and motion principles (animation program: Flash).

A475 Advanced Animation for Integrated Media (3 cr.) P: Completion of specialization/concentration area. Advanced course in the development of animated sequences. Using graphics and sound, students will develop title sequences for video and sound productions. Other topics will include scientific visualization, animation, video editing, and sound implementation.

A480 Advanced 3D Animation (3 cr.) P: completion of the S track. Advanced course focusing on the creation of high-end, broadcast-quality animations. This course will demonstrate mastery of narrative and animation skills culminating in a final project. Other topics covered include research/planning, marketing, preproduction, production, and postproduction (Maya).

A481 Advanced 3D Simulation (3 cr.) P: completion of the P track. Advanced course focusing on the creation of high, broadcast-quality simulations. This course will demonstrate mastery of video and animation skills culminating in a final project. Other topics covered include research/planning, marketing, preproduction, production, and postproduction (Maya).

A485 Advanced Video Game Design (3 cr.) P: completion of the S track. Advanced course focusing on the creation of an interactive simulation.

This course will demonstrate mastery of modeling and conceptual skills culminating in a final project. Other topics covered include research/planning, marketing, preproduction, production, and postproduction (Maya).

A490 Advanced Sound Design (3 cr.) P: completion of the P track. Advanced course focusing on the creation of sound effects and soundtracks. This course will demonstrate mastery of composition and editing skills culminating in a final project. Other topics covered include research/planning, marketing, preproduction, production, and postproduction.

A495 Advanced Editing (3 cr.) P: completion of the P track. Advanced course focusing on the editing of sound and video effects. This course will demonstrate mastery of composition and editing skills culminating in a final project. Other topics covered include research/planning, marketing, preproduction, production, and postproduction.

M355 Web Design (3 cr.) P: N265 and N280. Creation, production, and management of online publications. By utilizing strategic thinking, information architecture, and principles of design, students will successfully launch a media-rich Web site. Other topics covered include file management, developing a target audience, interface design, and design deconstruction (2D Web-based and or 3D Web-based program: Go-Live or Dreamweaver, Anark).

M360 Interactive Design (3 cr.) P: M350. Synthesize static media, streaming media, and information organization to create an interactive project. By maximizing elements from various media including audio, video, and static sources, students will test and produce an interactive experience for a target-specific audience. Other topics covered include strategic thinking, audio development, developing assets, project management, and usability testing (interactive program: Director or Flash).

M365 Simulation for Integrated Media (3 cr.) P: M355. Principles of new media, usability and design are combined to create a spatial environment and develop its content. Students will utilize their knowledge of interactivity to develop and exhibit a concept of their creation. Other topics covered include traffic flow management, spatial design, kiosk design, and exhibition design and graphics (design programs: Illustrator, Photoshop, Flash or Director, Maya or 3D Studio Max).

M370 Animation for Integrated Media (3 cr.) P: Completion of two 200-level classes. Images and animation converge to develop an animated sequence. Using text, graphics, and sound, students will create animation and visualizations. Other topics include video editing and sound design.

N100 Introduction to Digital Media Principles (3 cr.) Introduces skills and knowledge critical to making a successful new media product in today's competitive market. Students are exposed to new and emerging technologies and applications, and will be able to define and understand new media markets. These competencies will be developed through

lectures, demonstrations, class discussion, guest lecturers, and examples of new media.

N101 Topics in Interactive Multimedia (3 cr.) P or C: N100. Interactive multimedia is a rapidly evolving field that is significantly influenced by changes in theory, storage media, computing hardware, design and editing principles from animation and video production, authoring/presentation software, and communication capabilities in disciplines such as music, art, and journalism. Students will be exposed to recent trends by hands-on development of interactive media projects. These will include development of interactive multimedia for use on multiple platforms, developing multimedia that can be accessed via the Internet, real-time/real-audio interaction between users and the development of interactive CD-ROM-based multimedia.

N110 Visualizing Information (3 cr.) An introductory course for new media students using traditional and digital media and print best practices. Students develop an understanding of basic design principles and applications. Design history and the elements of composition and typography are applied through exercises and projects. The focus is on foundations of visual thinking, sketching, exploring the relationship between type and image, and developing multiple solutions to a given problem in the context of simple and complex visual information. Computer images will be constructed using the basics of Illustrator.

N175 Digital Media I: Vector Imaging (3 cr.) P: N101. Vector graphics are produced using traditional visualization (sketches) and computer methods. Color theory, geometric construction, perspective, and rendering techniques are utilized in vector-based graphic creation for use in new media applications (Illustrator).

N180 Digital Media II: Raster Imaging (3 cr.) P: N101. Raster graphics are produced using traditional visualization (sketches) and computer methods. Topics will include image composition, realistic representation, digital imaging for new media, color mode and pallet usage, material, and value representation (PhotoShop).

N190 Topics in Interactive Media (3 cr.) P: N110 and N150. Applying existing core competencies to dissect and produce new media projects. Students will create new media projects in a real-world context as a team and as individuals. These competencies will be developed through strategic thinking, public speaking, team building, analysis, and community outreach (graphics and time-based programs: Photoshop and Director).

N199 Directed Study I (1 cr.) P: N190. C: First flex-core class. This course introduces the New Media student to the current job market as they begin their journey to understand this new and ever-expanding field. Students will explore various new media careers in business, education, entertainment, science, and other related fields. Students will research different career paths to see what is needed to be a success in the field of new media.

N200 Desktop Tools for Digital Media (3 cr.) P: N101. An introduction to the principles of

multimedia creation and digital effects. Authoring, video and sound editing computer applications, as well as cyberspace protocols and language are engaged. The class will focus on a number of different software programs.

N201 Design Issues in Digital Media (3 cr.)

P: N101. Introductory course that will equip students with strategies in assembling visuals applicable to any medium. It will explore composition strategies, visual literacy and awareness, and principles of the visual display of quantitative information. The course will begin with traditional visual (print) media and move into digital forms to give the student an awareness and ability to work in any medium. Projects, lectures, discussion, and writing assignments serve as a survey of best practice.

N204 Introduction to Interactive Media (3 cr.)

P: N101. The creation of interactive multimedia products for multi-platform delivery. Topics include the multimedia production process, audience analysis, hardware and software requirements, authoring tools, scripting, content development, interface design, distribution, and development strategies. Concentration will be on real-world applications for interactive multimedia (Director I).

N210 Introduction to Digital Sound (3 cr.) P:

N101. An introduction to digital sound creation and editing. Topics will focus on analog sound techniques and equipment, analog-to-digital conversion, basic editing, formats and conversions, digital-to-analog conversion, and basic sound effect techniques for new media (Soundforge, N-Track, and Protools).

N215 Online Document Development (3 cr.)

P: N101. An introductory course for the creation, publication, and management of documents and images for online distribution on the Internet. Topics include an introduction to hypermedia development, portable document formats, Web publishing, document conversion, file exchanges, and image preparation (Dreamweaver).

N230 Introduction to Game Design and

Development (3 cr.) P: N101, N175, N180. An introductory course to "video" game design and development for entertainment. Topics covered will be game theory, design and development of computer-based games, current game delivery systems and software, the commercial development cycle, case studies of current games, ethical issues including the current game rating system, emerging technical developments in game development, and current game trends. Production will be geared towards developing new levels of existing games.

N235 Introduction to Computer Simulation/Animation (3 cr.) P: N101.

An introductory course covering applied three-dimensional computer graphic animation for students interested in the use of design, time and motion study, surface texture mapping, lighting, color, and the technology required to produce computer animations for commercial applications in manufacturing design, marketing, training, gaming, Web creation, and entertainment (3D Studio Max I).

N240 Introduction to Digital Video (3 cr.)

P: N101. An introductory course covering video

production techniques for digital media. The technology (hardware and software) along with techniques will be taught through lecture and projects. All phases of video production will be addressed, from pre-production through production to post-production with a focus on the digital media aspects (Adobe Premiere).

N250 Team Building in Technology (3 cr.)

P: N101. A methods course designed to help students improve their effectiveness in solving problems and expand critical thinking when working in groups of three or more people. This course is practical in orientation, including the interpersonal process, decision-making styles, problem-solving concepts and procedures, the creative effort, conflict resolution, leadership, and assessment. Projects will be developed with objectives, requirements, and constraints; client requests, implementation of the design solution, executing the design plan, and evaluating the final project.

N260 Scriptwriting (3 cr.) P: N190 or C: N199.

An introduction to writing for new media. Concentrating on developing ideas, concepts, plans and stories, students will generate scripts and analysis for numerous new media projects. Other topics covered include writing for scripts, grants, storyboards, and advertising and marketing plans (word processing, Internet).

N265 Sound Composition (3 cr.) P: N190 or C:

N199. An introduction to digital sound creation and editing. Concentrating on sound effects, voiceover, and composition, students will generate sound for various new media projects. Other topics covered include recording, formatting, effects, editing, and conversion (sound editing program: Sound Forge, Peak, Gold).

N275 Visual Practices (3 cr.) P: N190 or C: N199.

An introduction to drawing and idea generation for new media projects. Students will develop control over spatial relationships and defining ideas through drawing and other visualization techniques. Other topics covered include perspective, life drawing, rendering, developing roughs, and advanced storyboards.

N280 Design Principles (3 cr.) P: N190 or C:

N199. An introductory course that will equip students with strategies in assembling visuals applicable to all new media. Students will explore composition strategies in raster- and vector-based problems. Other topics include typography, color theory, grids and layouts, and style (vector, raster, and interactive programs: Illustrator, Photoshop, Director or Flash).

N290 Creative Concept Development (3 cr.)

Creativity, ideation, and concept development are the focus of this new media course. Students learn the processes of creative problem solving and idea generation and development through specific theories, methodologies, and projects as they apply to new media design in two dimensions, three dimensions, and sound. Processes include brainstorming, group think-tanking, sketching, storyboarding, and other image making for image, motion, and sound.

N295 Career Enrichment Cooperative (3 cr.)

P: N175 and N180; sophomore standing and approval of the dean. A semester of external career experiences designed to enrich the student's preparedness for entering the workforce. Periodic meetings with faculty advisors and a comprehensive written report on the experience detailing the intern's activities and reactions are required.

N299 Directed Study II (1 cr.) P: completion of

flex-core. This course applies design and visualization information towards the development of a comprehensive portfolio and resume. The development of the portfolio and resume will provide students with a framework for display of personal growth and achievement. Students will develop a portfolio and resume to be used for future career opportunities.

N300 Digital Media Production (3 cr.) P: N101.

This is an advanced course demanding innovational design and technical skills to meet systematic studio work on complex computational undertakings resulting in multimedia projects that are conceived, observed, and analyzed. Digital skills and tools are taught in lecture and hands-on experimentation format, including creative process and evaluation. Combines the production of journalism, music composition, and animation/simulation with computer transmission of imaging, sound, and video.

N302 Media Simulation Methods (3 cr.)

P: N101. A study of the fundamentals and methods of building and using computer-based simulation models, including the utility of simulation as a decision support tool; representing queuing systems in a computer model; simulated sampling from distributions of input variables; point and interval estimates of expected values of output variables, and the design of simulation sampling experiments (3D Studio Max II).

N304 Interactive Media Applications (3 cr.)

P: N204. Digital design methodology and techniques, control and timing, machine organization, instruction sequencing, and data flow control; control unit implementation by means of hardware and micro-programming; synchronization of input/output operations with interface design (Director II).

N311 The Digital Paradigm Shift: Effects in International Cultures and Society (3 cr.)

This course teaches how the paradigm shift to a digital world will effect international cultures and societies. A study of the major paradigm shifts in reference to culture and society as well as the effect for the future for humanity as a culture. Based on readings, lectures, class discussions, and papers with supported citations.

N315 Online Document Development II (3 cr.)

P: N215. Advanced creation, publication, and management of interactive publications for online distribution with the inclusion of emerging technologies for a media-rich experience. Topics include interactive Web site development, animations for the Web, online interactive design, document conversion, file exchanges, and digital media development for online usage (Dreamweaver, Flash, Fireworks).

N330 Game Design, Development, and Production (3 cr.) P: N230. Advanced game development by producing interactive computer-based games. The process learned in N230 will be put into practice by developing a story, characters, programming, and interactive game based on current trends in game development. Use of actual game development systems for current console gaming systems.

N335 Computer-Based Character Simulation/Animation II (3 cr.) P: N235. A class that will take the basics of computer animation to the next level by including character animation. Students will learn the craft of biped motion using traditional and advanced methods. The class will instruct on the physics-based topics of gravity, balance, drag, and overshoot in developing character movements. Students will also learn skills in modeling the character and in the creation of synched facial animation. Project-based and two character animations will be completed from storyboard to digital movie format.

N340 Digital Video Production (3 cr.) P: completion of two 200-level classes. Video production techniques for digital media. Preproduction, production, and postproduction of digital video will be addressed and utilized for the completion of a short video project. Other topics covered include directing, editing, media optimization, and assembling assets (video capture and editing programs: Premiere, Final Cut Pro).

N399 Directed Study III (1 cr.) P: completion of track. This course will cover specific information relating to career development and provide instruction on the development of job promotional material. Students will create self-promotional documentation that will enable image branding and other assets needed for future careers in the field of new media.

N400 Imaging and Digital Media Seminar (3 cr.) Variable titled course designed to bring guest speakers from industry as well as other disciplines on campus to expose students to the wide realm of new media and how it can be utilized in each discipline. Class discussions, assigned readings, and research papers.

N410 History and Theory of Digital Media (3 cr.) Examines the history of computer-based media, technologies, and the digital information age. Topics include studying the historical components and developments, as well as present digital media and research speculation towards the future of digital media and technologies.

N420 Multimedia Project Development (3 cr.) This course will focus on total project design and development of interactive multimedia applications. Topics to be covered include system design and development, selection of appropriate hardware and software platforms, use of productivity tools, project management, dynamics of team-based project development, cost analysis, prototyping, pilot testing, and other evaluation/usability techniques to insure product quality. Students will work in teams to develop large-scale projects.

N435 Computer Simulation/Animation III Production (3 cr.) P: N335. Advanced animation course focusing on the creation of high-end simulation productions. This course will focus in more depth on greater story development and on a commercially finished animation. Topics to be covered in lecture format include rigid body dynamics, soft bodies, track animation, nurbs modeling, and particle dynamics. Concept theories will discuss physics and gravity, incorporation of digital sound and music, quality story and character development, and outputting techniques for broadcast application (Maya).

N440 DV and CGI Digital Effects (3 cr.) P: N340 and N335. An advanced course covering the integration of CGI (computer-generated imagery) and digital effect techniques for video production, as used in industry. Students learn the techniques for creating digital effects, shooting video for effects, and the use of effects to aid in the telling of a story. Topics include integration of text, graphics, sound, video, and 2D/3D animation into video productions. Advanced editing and composite techniques will be explored through projects (Adobe AfterEffects, DVD authoring software, Alias Wavefront Maya).

N450 Usability Principles for New Media Interfaces (3 cr.) This course introduces the principles of human-computer interaction (HCI) and user experience modeling through a focused study of the theory and application of user-centered design, usability, and usability testing in the context of new media (hypermedia and multimedia) product development. Relationships are drawn between aesthetics, human factors, and cognitive psychology in the development of graphic user interfaces (GUI), information architecture, navigation, and interactivity. Methods to validate new media design solutions are applied through controlled usability inspections, testing, and the statistical assessment of data through an interface prototype project.

N475 Research in Design Methods (3 cr.) This course is designed to give students an understanding of the advanced concepts of theoretical topics, simulation modeling, and analysis concepts. Investigate applications of simulation in systems characterized by probabilistic behavior.

N485 Seminar in New Media (3 cr.) Current trends, problems, best practices and developments in new media. Students pursue a special interest and share information and experience with the group. This course is an in-depth exploration of topics and issues at the forefront of new media. Seminar format with research papers and class discussion/presentations.

N490 Independent Study (1-6 cr.) Research and practical experience in various areas of new media as selected by the student prior to registration, outlined in consultation with the instructor and approved by the program advisor. Total credit of internship/independent study shall not exceed nine hours.

N495 Enrichment Internship (3 cr.) P: junior standing and program advisor approval. Industry, corporate, or similar experience in new media-oriented employment. Projects jointly arranged, coordinated, and evaluated by faculty and industrial supervisors. Apply during the semester prior to

desired internship. Total credit of internship/independent study shall not exceed nine hours. Completion of 9 credit hours of new media electives at the 300-400 level is required.

N499 Capstone Experience (3 cr.) To be taken during the students' senior year. The capstone experience is the culmination of the student's major in both knowledge and abilities of a particular area of interest in new media. The successful execution, individually or as a team, integrates student's learning across the field.

P350 Video (3 cr.) P: N260 and N270. Video production techniques for digital media. Preproduction, production, and postproduction of digital video will be addressed and utilized for the completion of a short video project. Other topics covered include directing, editing, media optimization, and assembling assets (video capture and editing programs: Premiere, Final Cut Pro).

P355 Intermediate Sound (3 cr.) P: N260 and N265. Sound design course developing soundtracks and sound effects. Applying sound construction. Engineering students will produce aural solutions to promote storytelling and atmosphere. Other topics covered include advance sound effects, pacing issues, style, and soundtrack (sound editing program: Sound Forge, Peak, Gold).

P360 Lighting and Field Production (3 cr.) P: P350. Theoretical and practical application of lighting, filming, and audio recording. Students will work in a variety of locations to encompass as many different environments as possible. Other topics covered include daytime shooting, nighttime shooting, studio shooting, and storytelling (video capture and editing programs: Premiere, Final Cut Pro).

P365 Simulation and Visualization Production (3 cr.) P: P355. Building and using computer-based simulation models skills will be applied to simulate a concept, event, or story. Other topics covered include editing, sound, narration, and effects (animation and video editing program: Maya or 3D Studio Max, Final Cut Pro or After Effects) to clarify concepts. Animation, design and visual composition.

P370 Digital Effects (3 cr.) P: completion of three 300-level classes from track. Covering the integration of CGI and digital effects technique for video production. Students learn the techniques for creating digital effects, shooting video for effects, and the use of effects to aid in storytelling. Other topics covered include programming/scripting, shooting raw footage, effects, and integrating all new media (video editing, special effects, animation programs: Final Cut Pro, After Effects, Maya).

S350 Sequential Narrative (3 cr.) P: Completion of two 200-level classes. Digital techniques and traditional storytelling concepts produce a sequential narrative. Students investigate panel-to-panel and frame-to-frame sequential storytelling as foundational elements of animation. Other topics covered include pre-visualization, storyboards, and character design.

S355 2D Interactive (3 cr.) P: N270 and N275. Concept, production, and development of video games. By developing motivational goals, programming events, and implementing story,

students will successfully create a video game experience. Other topics covered include world development, sound design, programming, basic animation, and playability testing (vector and game design program: Illustrator or Freehand, Flash).

S360 2D Animation (3 cr.) P: S350. Intermediate course focusing on the creation of a narrative through 2D principles. This course will demonstrate mastery of design and illustration skills culminating in a final project. Other topics covered include research/planning, marketing, preproduction, production, and postproduction (Photoshop, Quark Xpress, Flash, After Effects).

S365 3D Interactive (3 cr.) P: S355. Intermediate character, concepts, and level design will produce a mod-based game. Students will develop assets within an existing game engine to produce an original game concept. Other topics covered include advanced conceptual design, character modeling, digital painting, and level design (modeling program: 3D Studio Max or Maya)

S370 3D Animation (3 cr.) P: Completion of three 300-level classes from the S track. Intermediate animation course developing high-end simulation productions. Applying construction/rendering techniques and applying physics and dynamics, students will produce a 3D animated narrative. Other topics include advanced character modeling, camera movement, backgrounds, textures, and lighting (animation program: Maya).

Graduate Course Descriptions

Informatics (INFO)

The abbreviation "P" refers to the course prerequisite or prerequisites. The number of hours of credit given a course is indicated in parentheses following the course title.

I501 Introduction to Informatics (3 cr.) Basic information representation and processing; searching and organization; evaluation and analysis of information. Internet-based information access tools; ethics and economics of information sharing.

I502 Information Management (3 cr.) Survey of information organization in medical, health, chemical, and biology-related areas; basic techniques of the physical database structures and models, data access strategies, management, and indexing of massively large files; analysis and representation of structured and semi-structured medical/clinical/chemical/biological data sets.

I503 Social Impact of Information Technologies (3 cr.) An overview of important social, legal, and ethical issues raised by information technology.

I510 Data Acquisition and Laboratory Automation (3 cr.) This course covers the entire process by which signals from laboratory instruments are turned into useful data: (1) fundamentals of signal conditioning and sampling; (2) interfacing, communications, and data transfer; (3) markup languages and capability systems datasets; (4) general lab automation; (5) robotics. A significant portion of this course is devoted to practical learning using LabVIEW.

I511 Laboratory Information Management Systems (3 cr.) A comprehensive study of LIMS: history, the LIMS paradigm, LIMS functions. General operations of the analytical laboratory. Laboratory information flow. Principles of quality assurance and quality control, laboratory audits, and validation. Laboratory needs assessment and selection of LIMS. Implementation of LIMS; impact of LIMS in the laboratory.

I512 Scientific Data Management and Analysis (3 cr.) General principles of knowledge discovery and databases (KDD); data and metadata; applications of scientific data management systems (SDMS) in laboratories; data warehousing; electronic laboratory notebooks (ELN); data mining and visualization.

I530 Seminar in Health Informatics Applications (3 cr.) Presents an overview of the various professional applications and research directions taken in health informatics. Requires directed laboratory experience.

I531 Seminar in Health Informatics (1-3 cr.) Total credit for seminars and independent study courses may not exceed nine hours.

I532 Seminar in Bioinformatics (1-3 cr.) Presentation and discussion of new topics in bioinformatics as seminar by students. Concentration on a particular area each semester to be announced before registration. Total credit for seminars and independent study courses may not exceed nine hours.

I533 Seminar in Chemical Informatics (1-3 cr.) Presentation and discussion of new topics in chemical informatics. Concentration on a particular area each semester to be announced before registration. Total credit for seminars and independent study courses may not exceed nine hours.

I534 Seminar in Human-Computer Interaction (1-3 cr.) Topics vary yearly and include the following: information visualization, immersive technologies, designing hypermedia for educational applications, user-centered design techniques and tools, formal methods and cognitive modeling in HCI. Total credit for seminars and independent study courses may not exceed nine hours.

I550 Legal and Business Issues in Informatics (3 cr.) Provides students with a solid foundation on legal and business matters that impact informatics and new media, including intellectual property, privacy, confidentiality and security, corporate structure, project planning, tax implications, marketing, obtaining capital, drafting business plans and working with professionals such as attorneys, accountants, and insurance agents.

I551 Independent Study in Health Informatics (1-3 cr.) Independent study under the direction of a faculty member, culminating in a written report. May be repeated for credit. Total credit for seminars and independent study courses may not exceed nine hours.

I552 Independent Study in Bioinformatics (1-3 cr.) Independent study under the direction of a faculty member, culminating in a written report. May be repeated for credit. Total credit for seminars and independent study courses may not exceed nine hours.

I553 Independent Study in Chemical Informatics (1-3 cr.) Independent study under the direction of a faculty member, culminating in a written report. May be repeated for credit. Total credit for seminars and independent study courses may not exceed nine hours.

I554 Independent Study in Human-Computer Interaction (1-3 cr.) Independent study under the direction of a faculty member, culminating in a written report. May be repeated for credit. Total credit for seminars and independent study courses may not exceed nine hours.

I575 Informatics Research Design (3 cr.)

I590 Topics in Informatics (1-3 cr.)

I691 Thesis/Project in Health Informatics (1-6 cr.)

I692 Thesis/Project in Bioinformatics (1-6 cr.)

I693 Thesis/Project in Chemical Informatics (1-6 cr.)

I694 Thesis/Project in Human-Computer Interaction (1-6 cr.)

New Media (NEWM)

N500 Foundations of Digital Arts Production (3 cr.) This course examines a range of issues and fundamental principles of digital media communication in the context of e-commerce and the information industry, especially its impact on the cultural, economic, social, and ethical dimensions of local and world communities. Through assignments, lectures, and discussions, class presentations will center on the knowledge necessary to understand a diversity of user markets for new media products. Topics include digital and print publishing media, user-centered design, multimedia, hypermedia, sound, video, networking, computer graphics, and other emerging technologies, as well as the legal and ethical aspects regarding the protection of intellectual property, copyright, and name-branding.

N501 TPCS: Principles of Multimedia Technology (3 cr.) This course examines the production process and management of developing multimedia. It offers opportunities for students to investigate and produce digital multimedia projects by researching foundations in the use of digital video technology with special emphasis on the production process of storytelling. Skills learned will include: collaborative learning, teamwork, project management, and multimedia production process. This class examines the development, design, and process of new media as a vehicle for visualizing information. Students will develop oral presentation skills through research papers and project presentations. This class will lay the foundation for the development of digital media through hands-on research and developmental projects. Lectures will cover the foundation of concept design, production, and tools used in the production of digital multimedia.

N502 Digital Media Motion and Simulation Methods (3 cr.) Applications in animation/simulation design and creation using computer desktop tools. Examines the fundamentals of three-dimensional animation through storyboards and planning, modeling, texturing, lighting, rendering, and composite techniques. Topics will include nurbs design development, texture mapping for realism and stylistic output, keyframe and path animation, and cinematography lighting techniques. Skills will be developed through design and modeling of individual or team multidisciplinary projects.

N503 Digital Media Application Design Processes (3 cr.) Presents the principles and fundamentals of design techniques using authoring tools on PC, Macintosh, and emerging computer platforms. Included are storyboarding, planning and organization of scripts, use of current technology, computers, video and digital arts equipment; computer-assisted design and project planner software tools and management of design team concepts.

N504 Advanced Interactive Design Applications (3 cr.) Incorporates extensive analysis and use of computer and multimedia authoring tools intended for character simulation design. The course will study

the concepts of physics-based bipedal movement in relation to gravity, balance, anticipation, potential energy, personality constructs, and locomotion. Assessment modeling for character depiction and animation will be planned and storyboarded. Other topics include more advanced facets of computer animation including paint tube modeling, layered texture mapping, and track and block animation for cyclical actions.

N505 Internship in Media Arts and Technology (3 cr.) An internship program for students to work with and learn from experts in media (digital arts) technology fields who are developing and using new applications in commercial and educational settings. Requirements for interns include the development of a technology project proposal; interview, resume, and project presentation; on-site intern residency; project report; oral and media presentation of project outcomes.

N506 Media Arts and Technology Project (3 cr.) Students create and orally present a multimedia teaching/training project combining elements of digital media technology including CD-ROM, videodisc, digital audio and video, MIDI, and Internet applications. Requirements include technology project proposal development; oral presentation of proposal, research and development of project, project final report, and the presentation of project. Final project to be submitted in digital form for permanent archive.

N510 Web-Database Concepts (3 cr.) Addresses diverse issues arising when designing World Wide Web interface. Basic database concepts will be presented but the course will focus on discussion of interface issues specific to Web databases, technologies for linking databases to Web servers for delivery, discussion of various Web-database applications, case studies, and industry trends.

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