IU School of Informatics and Computing

Welcome to the IU School of Informatics and Computing!

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 for the foreseeable future. The School of Informatics and Computing prepares students to meet the continuing demand for information technology professionals who know how to grow and adapt to this environment of rapid technological change.

Informatics is focused on the best applications of technologies and emphasizes the social and psychological aspects of information technology. Some have called informatics "technology with a human face." Informatics prepares professionals to use information technology to solve problems in a variety of settings. The degrees emphasize the development of new uses for technologies, always keeping in mind the needs of people and the best and most appropriate uses for technology.

Informatics and Computing students have:

- a technical understanding of how computing systems and programs operate
- an ability to adapt/assess and apply new trends in information technology (IT)
- well-developed problem-solving skills
- experience working on a team, such as those formed for the senior capstone experience
- well-developed communications skills to clearly convey solutions and observations to others
- an understanding of social and ethical principles as they relate to IT issues
- the ability to create 3-D animations to help explain surgery to patients
- accelerated drug discovery through information technology
- developed computer applications to manage disaster relief
- explored human interactions with computers, mobile devices, and robots

Informatics is all of this - and so much more. Harnessing the power and possibility of technology, Informatics turns data and information into knowledge that people can use every day. In the world of information and technology, it's the bridge to all things useful. Informatics is the future.

Degrees from the School of Informatics and Computing are unique because they involve students in learning how information technology relates to a traditional discipline in the sciences, liberal arts, or professions. Students of Informatics learn to solve real problems that directly impact our lives and the lives of those around us. They use their technology and problem solving skills to make a difference in the world. For students interested in a career with infinite potential, Informatics stands out as a strong, flexible and dynamic field of study.

The undergraduate curriculum looks at information technology from a balanced perspective. It includes a technical core in the areas of mathematical foundations, distributed information, human-computer interaction, social/organization informatics, and media arts and science. In addition to knowledge of core informatics and of informatics in the context of a traditional discipline, students 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 the natural sciences.

Graduate program curricula apply information technology to a specific domain. Graduate students in the School of Informatics and Computing study under faculty who are leaders in the areas of bioinformatics, health informatics, human-computer interaction, library science and media arts and science. Students in the School of Informatics and Computing's graduate programs also learn from a community of fellow student visionaries, with classmates who come from all over the world and across disciplines to advance informatics research and build life-long careers.

The School of Informatics and Computing offers a variety of educational programs to meet a variety of needs in the evolving world of information technology:

- Bachelor of Science in Health Information Management
- Bachelor of Science in Informatics
- Bachelor of Science degree in Media Arts and Science
- Minors and Certificates
    - 3D Graphics and Animation Minor
    - Digital Humanities Minor
    - Game Design and Development Minor
    - Informatics Minor
    - Studio Art and Technology Minor
    - Human-Computer Interaction Certificate
    - Legal Informatics Certificate
    - Medical Coding Certificate
- Master of Library Science - with options for dual degrees in History (M.A.), Philanthropic Studies (M.A.), Health Informatics (M.A.), Law (J.D.), Public Management (certificate), Nonprofit Management Certificate and Library Management Certificate.
- Master of Science degrees in Bioinformatics, Health Informatics, Human-Computer Interaction, Informatics and Media Arts and Science
- Graduate certificates in Human-Computer Interaction, Clinical Informatics, Informatics for Public Health Professionals, Health Information Management and Exchange, Health Information Security and Health Information Systems Architecture.

The School of Informatics and Computing also offers the following innovative, accelerated 5-year B.S./M.S. degree programs in the following areas:

- B.S. Health Information Management + M.S. Health Informatics
- B.S. Informatics + M.S. Bioinformatics
- B.S. Informatics + M.S. Health Informatics
- B.S. Informatics + M.S. Human-Computer Interaction
- B.S. Informatics + Master of Jurisprudence
- B.S. Media Arts & Science + M.S. Human-Computer Interaction
- B.S. Media Arts & Science + M.S. Media Arts & Science
- B.S. Biology + M.S. Bioinformatics
- B.S. Health Sciences + M.S. Health Informatics
- B.S. Nursing + M.S. Health Informatics
- B.S. Sports Management + M.S. Sports Analytics

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Contact Information

Contact Information

School of Informatics and Computing 535 W. Michigan Street, IT 475
Indianapolis, IN 46202 Phone: 317-278-4636
Fax: 317-278-7669
soicindy@iupui.edu

Undergraduate Advising Phone: 317-278-4636
soicindy@iupui.edu

Department of BioHealth Informatics Phone: 317-278-7602 soicindy@iupui.edu

Department of Human-Centered Computing Phone: 317-278-7606 soicindy@iupui.edu
Department of Library and Information Science
Phone: 317-278-4636
soicindy@iupui.edu

Overview

Mission Statement
The mission of the Indiana University School of Informatics and Computing is to excel in education, research, and civic engagement in the field of informatics, an integrative discipline which advances knowledge in

1. computing, information, and media technologies;
2. the implications those technologies have for individuals and society; and
3. their application to any field of study adapting to the challenges of the Information Age.

The School of Informatics and Computing fosters a broad and interdisciplinary view of informatics and uses this view to explore and expand knowledge in informatics education and research. Along with the many schools and departments located on the Indiana University Purdue University urban Indianapolis campus, The School of Informatics and Computing is firmly committed to a welcoming environment, a diverse faculty and student body, and to efforts which support Indiana's economic development.

Together with The School of Informatics and Computing of Informatics and Computing at IU Bloomington, The School of Informatics and Computing of Informatics and Computing at Indianapolis (IUPUI) aims to lead the nation in creating a new, broad and interdisciplinary view of informatics and uses this viewpoint as the foundation for three foci:

Education and Research
The School of Informatics and Computing's primary emphasis is in education and research, offering a broad array of B.S., M.S., and Ph.D., programs and a research agenda that emphasizes the breadth of informatics as an interdisciplinary field of study. The School of Informatics and Computing is at the forefront of innovation in education and provides an informatics curriculum which focuses on computing and information technology, while giving equal attention to the complex interactions of technology, individuals, and society. Students of Informatics learn skills which allow them to use computing to solve real human problems in areas such as healthcare, education, poverty, security, and the environment.

Equally important is the fact that Informatics maintains a strong focus on the human use of computing. For example, informatics students build new computing tools and applications while studying how people interact with those technologies and how those technologies shape our relationships, our organizations, and our community. Informatics is a professional school which goes beyond the study of technology in and of itself, to identify, define, and address information problems in a range of disciplines with a variety of technologies and methodologies.

The School of Informatics and Computing also conducts research in a wide range of computing and informatics foundations, applications, and their implications. The School of Informatics and Computing brings a unique perspective that combines information science with a deep understanding of domain-specific areas of research, such as the biological, health, and life sciences, medical and biomedical sciences, cognitive and social sciences, media arts and science, the law and legal domains, business, and human-computer interaction design and usability engineering.

Economic Development and Entrepreneurship
The School of Informatics and Computing is also deeply engaged in the area of economic development and entrepreneurship. In addition to its primary mission in education and research, The School of Informatics and Computing trains well-equipped graduates for a wide range of computing and information technology occupations by placing a special emphasis on:

1. partnering with information technology businesses to address their professional needs in the state of Indiana, and
2. supporting a culture of entrepreneurship for its students, faculty and alumni.

Diversity
The School of Informatics and Computing also fosters an inclusive educational and research culture and environment by:

1. attracting women and under-represented minorities who have a wide range of intellectual interests, talents, and professional goals, and

2. achieving national recognition as an exemplar for diversity.

Bioinformatics

Bioinformatics

Successful applicants to our **Master of Science program in Bioinformatics** must have a strong background in computing, information technology, and biology. You should be able to demonstrate the skills and knowledge required of the undergraduate Informatics degree.

Promising applicants lacking competencies necessary for admission may be allowed to take courses that will satisfy those requirements, as determined by School of Informatics and Computing faculty. Those courses, however, would not count towards degree or certificate completion.

Prerequisites

- Minimum of a Bachelor's degree *(with demonstrated technical skills)*
- Minimum Overall GPA: 3.0 *(4.0 point scale)*
- Graduate Record Exam (GRE) scores from within the past five years if you are seeking direct financial assistance (such as an assistantship or fellowship) from the School of Informatics and Computing. A GRE score is not required to submit your FAFSA or to seek other federal or private financial assistance opportunities.

Students holding a bachelor's degree in computer science or a related field from an accredited four-year collegiate institution must have completed all or part of the prerequisite courses listed below:

- K322 Genetics and Molecular Biology and K324 Cell Biology or BIOL 507 Molecular Biology

Students holding a bachelor's degree in life sciences or a related field from an accredited four-year collegiate institution must have completed all or part of the prerequisite courses listed below:

- Programming in C, C++, or Java (3 credits)
- Programming/Database (3 credits) (e.g. N510 Web-Database Concepts)
- Statistics (3 credits) (e.g. SPEA K300 or PSY B305)

How to Apply

The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated.

Submit a resume, transcripts, a personal statement, and letters of recommendation to:

Graduate Admissions Committee
School of Informatics and Computing 535 W. Michigan Street, IT 475
Indianapolis, IN 46202

1. Complete and submit the IUPUI Graduate Online Application form. Paper applications are not accepted. Choose "M.S. Informatics" and Bioinformatics in the "Academic Interest" section.
2. Submit a resume listing your education, work, research, honors/awards and computer programming experience. This may be attached to your online application or sent separately.
3. Submit a personal statement (visit the IU Writing Center for instructions on how to write such a statement). This may be attached to your online application or sent separately. Your personal statement should indicate the following:
   - Why you're applying to the program
   - Your post-graduation career plans
4. Submit all official transcripts from previous colleges and universities. *NOTE: we do not require transcripts from Indiana University campuses.*
5. Submit three references from academic instructors and/or employers. To submit references, you will input contact information for each person on your electronic application. The reference will receive a form via email to fill out and submit electronically.
6. Complete the Graduate Record Examination (GRE) and ensure that IUPUI receives your score report from the GRE exam board (when applying for financial support). The Informatics and Computing school code for the GRE is 1325 – enter this code on the exam's answer sheets.
7. Submit English language proficiency exam score (International and non-native English speaking students only – see instructions below).
8. Pay your $65 application fee.

Special Instructions for International Students and Non-native English Speakers

If your native language is not English, submit with your application one of the following official test scores from within the past two years:

- Test of English as a Foreign Language (TOEFL): Minimum required scores: 250 for the computer-based test, 600 for the paper test and 79 for the Internet-based test.
- International English Language Testing System (IELTS): Minimum required score of 6.5 or higher

Use IUPUI School Code 1325 to ensure correct routing of your score to IUPUI.

- The TOEFL may be waived if a B.S. or M.S. degree has been earned in the United States
- If you are in the Indianapolis area, placement into G013 or higher on the IUPUI ESL Placement Test may replace the TOEFL requirement for admission. Test registration is arranged by calling 317-274-4240. You must have submitted your application and received a University ID to be eligible to register for this test.
- If you need additional English language study, you may enroll at the ELS Language Centers intensive English program at IUPUI and successfully complete Level 112. We accept successful completion of ELS 112 in place of a TOEFL report.

Last updated: 04/24/2017

Human-Computer Interaction

Human-Computer Interaction

Successful applicants to our **Master of Science program in Human-Computer Interaction** must have a strong background in computing and information technology. You

should be able to demonstrate the skills and knowledge required of the undergraduate Informatics degree.

Promising applicants lacking competencies necessary for admission may be allowed to take courses that will satisfy those requirements, as determined by School of Informatics and Computing faculty. Those courses, however, would not count towards degree or certificate completion.

Prerequisites

- Minimum of a Bachelor's degree *(with demonstrated technical skills)*
- Minimum Overall GPA: 3.0 *(4.0 point scale)*
- Graduate Record Exam (GRE) scores from within the past five years if you are seeking direct financial assistance (such as an assistantship or fellowship) from the School of Informatics and Computing. A GRE score is not required to submit your FAFSA or to seek other federal or private financial assistance opportunities.

Successful applicants will have a foundation of core knowledge and skills (from either past education or work experience) in one or more of the following proficiency areas:

- *Programming*- Proficiency in programming/scripting, including:
  - One or more languages (e.g., HTML, JAVA, C++ and Visual Basic)
  - A basic understanding of programming methodologies, such as system design and architecture, problem and algorithm analysis
  - Other systems knowledge such as artificial intelligence and database analysis/database technology
- *Design*- Proficiency with the principles and processes of visual communication, industrial design, new media or other disciplines that deal with design theory and practice, including:
  - Knowledge and application of 3D animation and/or modeling tools
  - Design methodologies for 2D and 3D product development
  - Conceptual modeling, prototyping and product delivery
  - Fundamental concepts of visual communication (e.g., page design/layout)
  - Design principles, typography and color theory
  - Knowledge and application of a range of digital (vector and raster) authoring tools for Web or interface design
- *Social Sciences*– Coursework in the following key areas:
  - Psychology (general, cognitive and behavioral)
  - Sociology and anthropology (ethnography)
  - Cross-cultural psychology and communication
  - Information management and/or Information and library science

How to Apply

The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated.

Submit a resume, transcripts, a personal statement, and letters of recommendation to:

Graduate Admissions Committee
School of Informatics and Computing 535 W. Michigan Street, IT 475
Indianapolis, IN 46202

1. Complete and submit the IUPUI Graduate Online Application form. Paper applications are not accepted. Choose "M.S. Informatics" and Human-Computer Interaction in the "Academic Interest" section.
2. Submit a resume listing your education, work, research, honors/awards and computer programming experience. This may be attached to your online application or sent separately.
3. Submit a personal statement (visit the IU Writing Center for instructions on how to write such a statement). This may be attached to your online application or sent separately. Your personal statement should indicate the following:
   - Why you're applying to the program
   - Your post-graduation career plans
4. Submit all official transcripts from previous colleges and universities. *NOTE: we do not require transcripts from Indiana University campuses.*
5. Submit three references from academic instructors and/or employers. To submit references, you will input contact information for each person on your electronic application. The reference will receive a form via email to fill out and submit electronically.
6. Complete the Graduate Record Examination (GRE) and ensure that IUPUI receives your score report from the GRE exam board (when applying for financial support). The Informatics and Computing school code for the GRE is 1325 – enter this code on the exam's answer sheets.
7. Submit English language proficiency exam score (International and non-native English speaking students only – see instructions below).
8. Pay your $65 application fee.

Special Instructions for International Students and Non-native English Speakers

If your native language is not English, submit with your application one of the following official test scores from within the past two years:

- Test of English as a Foreign Language (TOEFL): Minimum required scores: 250 for the computer-based test, 600 for the paper test and 79 for the Internet-based test.
- International English Language Testing System (IELTS): Minimum required score of 6.5 or higher

Use IUPUI School Code 1325 to ensure correct routing of your score to IUPUI.

- The TOEFL may be waived if a B.S. or M.S. degree has been earned in the United States
- If you are in the Indianapolis area, placement into G013 or higher on the IUPUI ESL Placement Test may replace the TOEFL requirement for admission. Test registration is arranged by calling

317-274-4240. You must have submitted your application and received a University ID to be eligible to register for this test.
- If you need additional English language study, you may enroll at the ELS Language Centers intensive English program at IUPUI and successfully complete Level 112. We accept successful completion of ELS 112 in place of a TOEFL report.

Last updated: 04/24/2017

Health Informatics

Health Informatics

Promising applicants lacking competencies necessary for admission to our **Master of Science in Health Informatics** program may be allowed to take courses that will satisfy those requirements, as determined by School of Informatics and Computing faculty. Those courses, however, would not count towards degree or certificate completion.

Prerequisites
- Minimum of a Bachelor's degree in computer science, engineering, biology, biochemistry, nursing, mathematics, statistics, physics, health information administration, or other similar or health-related discipline.
- Successful coursework (or equivalent) in programming (i.e. C, C++, Java or equivalent), databases, medical terminology, human anatomy and physiology.
- Minimum Overall GPA: 3.0 *(4.0 point scale)*
- Graduate Record Exam (GRE) scores from within the past five years if you are seeking direct financial assistance (such as an assistantship or fellowship) from the School of Informatics and Computing. A GRE score is not required to submit your FAFSA or to seek other federal or private financial assistance opportunities.

How to Apply
The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated.

Submit a resume, transcripts, a personal statement, and letters of recommendation to:

Graduate Admissions Committee
School of Informatics and Computing 535 W. Michigan Street, IT 475
Indianapolis, IN 46202

HIT Certificate Graduates
If you have graduated from the HIT certificate within the last year, you may use your previous HIT application materials for the Health Informatics Master's application or submit new materials. This includes your resume/CV, college transcripts (unless a non-IU updated transcript is necessary), personal statement, and letters of reference. If the online application system will NOT let you submit without listing a reference you can put one reference down and inform that person that they do NOT need to respond. Their lack of response will NOT impede your application. Your file will still be complete with the addition of your previous references. Please inform the Health Informatics academic advisor that you would like to use your HIT application materials for this application. Successful completion of the HIT Certificate program does NOT guarantee admission into the Health Informatics Master's program.

1. Complete and submit the IUPUI Graduate Online Application form. Paper applications are not accepted. Choose "M.S. Informatics" and Health Informatics in the "Academic Interest" section.
2. Submit a resume listing your education, work, research, honors/awards and computer programming experience. This may be attached to your online application or sent separately.
3. Submit a personal statement (visit the IU Writing Center for instructions on how to write such a statement). This may be attached to your online application or sent separately. Your personal statement should indicate the following:
   - Why you're applying to the program
   - Your post-graduation career plans
4. Submit all official transcripts from previous colleges and universities. *NOTE: we do not require transcripts from Indiana University campuses.*
5. Submit three references from academic instructors and/or employers. To submit references, you will input contact information for each person on your electronic application. The reference will receive a form via email to fill out and submit electronically.
6. Complete the Graduate Record Examination (GRE) and ensure that IUPUI receives your score report from the GRE exam board (when applying for financial support). The Informatics and Computing school code for the GRE is 1325 – enter this code on the exam's answer sheets.
7. Submit English language proficiency exam score (International and non-native English speaking students only – see instructions below).
8. Pay your $65 application fee.

Special Instructions for International Students and Non-native English Speakers
If your native language is not English, submit with your application one of the following official test scores from within the past two years:

- Test of English as a Foreign Language (TOEFL): Minimum required scores: 250 for the computer-based test, 600 for the paper test and 79 for the Internet-based test.
- International English Language Testing System (IELTS): Minimum required score of 6.5 or higher

Use IUPUI School Code 1325 to ensure correct routing of your score to IUPUI.

- The TOEFL may be waived if a B.S. or M.S. degree has been earned in the United States
- If you are in the Indianapolis area, placement into G013 or higher on the IUPUI ESL Placement Test may replace the TOEFL requirement for admission. Test registration is arranged by calling 317-274-4240. You must have submitted your application and received a University ID to be eligible to register for this test.
- If you need additional English language study, you may enroll at the ELS Language Centers intensive

English program at IUPUI and successfully complete Level 112. We accept successful completion of ELS 112 in place of a TOEFL report.

Last updated: 04/24/2017

Master's Program Admissions

Master's Program Admissions

Applications for all graduate certificate and **M.S. programs** must be received by **January 15 (early action), March 15 for fall admission** and **September 1 (international students) and October 1 (domestic students) for spring admission**.

Applications for admission to the **M.L.S. program** must be received by **July 15 for fall admission, November 15 for spring admission** and by **April 1 for summer admission**.

The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated. Specific application details are available at the program/degree links in the left navigation bar.

Last updated: 04/24/17

Library Science (M.L.S.)

Library Science (M.L.S.)

The Department of Library and Information Science welcomes applications to our **Masters of Library Science** program from individuals interested in entering the library and information professions. Applicants to the Indianapolis program bring a range of backgrounds to their graduate education, through both their prior education and work experience. Applications from those who have been in the work force and from recent graduates are equally desirable.

Admission Requirements
Bachelor's Degree Students holding a bachelor's degree from regionally accredited four-year collegiate institutions are eligible to apply for admission. Applicants in the final year of their undergraduate program may apply and be granted admission conditional upon being awarded the bachelor's degree.

An applicant must have a minimum grade point average (GPA) of 3.0 on a 4.0 scale or its equivalent in the total undergraduate program, or an average of 3.2 in the latest graduate degree or representative graduate hours (usually 30 semester hours) completed.

If the applicant does not meet the minimum undergraduate (or graduate) GPA requirements, he or she must submit Graduate Record Exam scores.

GRE Revised Test (Nov.2011) – Initial GRE scoring conversion charts are available. These charts may be updated as more student test data is collected by the GRE board.

LIS looks at the whole application in making an admissions decision. The following scores will be considered to have met the minimum required – V: 153, Q: 144, and AW (not decided at this time).

See GRE Score Interpretation.

- GRE – IU Institutional Code: 1324
- GRE – Library Science Code: 4701

How to Apply
The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated.

Have transcripts sent directly to:

Department of Library and Information Science
Indiana University School of Informatics and Computing
535 West Michigan Street, IT 475
Indianapolis, IN 46202

1. Complete and submit the IUPUI Graduate Online Application form. Paper applications are not accepted.
2. Submit a 750 – 1500 word personal statement. Your personal statement should indicate the following:
   - In what manner do you see yourself as a future library/information leader in your future organization and community?
   - What examples can you provide that illustrate how you work as a constructive member of a team to solve problems?
   - Provide your perspective on or experiences with technology in information services.
3. Submit official transcripts from all post-secondary colleges and universities (graduate and undergraduate), except for Indiana University campuses.
4. Submit three references from academic instructors and/or employers. To submit references, you will input contact information for each person on your electronic application. The reference will receive a form via email to fill out and submit electronically.
5. If necessary, complete the Graduate Record Examination (GRE) and ensure that IUPUI receives your score report. The IUPUI and MLS program codes are listed above. The Informatics and Computing school code for the GRE is 1325 – enter this code on the exam's answer sheets.
6. For international and non-native English speaking students, submit English language proficiency exam score (see below).
7. Pay your $65 application fee.

Special Instructions for International Students and Non-native English Speakers
Graduate applicants are expected to have completed the equivalent of a U.S. Bachelor's degree in order to be considered for graduate study, such as:

1. Have completed at least 16 years of primary +secondary+tertiary education and have earned a university first degree, or

2. Have completed a university first degree that grants eligibility for graduate study in a recognized university in that same country.

Persons without this background cannot be accepted for graduate study, regardless of the name of any first degree they may hold.

Once minimum eligibility is determined, Indiana University graduate programs will make the final admissions decision, based on reviewing the applicant's educational credentials to determine if the applicant is academically competitive and has the preparation needed for success in that program. The Office of International Affairs at IUPUI will provide evaluations of the applicant's educational background and academic documents upon request from the departments.

International applicants must submit both GRE and TOEFL (Test of English as a Foreign Language) scores. To gain admission, international applicants must earn minimum scores in the table below.
TOEFL and GRE details:

- TOEFL – TOEFL minimum 600 (Paper test) or 250 (Computer test) or 100 (new test Fall 2005)
- TOEFL – IU Institutional Code: 1325;

International applicants must comply with the deadline dates indicated in Office of International Affairs Web site at www.iupui.edu/~oia.

Last updated: 04/24/2017

Media Arts and Science

Media Arts and Science

Successful applicants to our **Master of Science program in Media Arts and Science** must have a strong background in computing, information technology, and design. You should be able to demonstrate the skills and knowledge required of the undergraduate Informatics degree.

Promising applicants lacking competencies necessary for admission may be allowed to take courses that will satisfy those requirements, as determined by School of Informatics and Computing faculty. Those courses, however, would not count towards degree or certificate completion.

Prerequisites

- Minimum of a Bachelor's degree *(with demonstrated technical skills)*
- Minimum Overall GPA: 3.0 *(4.0 point scale)*
- Graduate Record Exam (GRE) scores from within the past five years if you are seeking direct financial assistance (such as an assistantship or fellowship) from the School of Informatics and Computing. A GRE score is not required to submit your FAFSA or to seek other federal or private financial assistance opportunities.
- Strong background in media arts and science, fine arts, graphic design, computer science, informatics, communication/media studies or film/cultural studies
- Students with backgrounds in the sciences or the humanities are also encouraged to apply if your interest is in developing a multidisciplinary approach to media arts.
- Applicants with background in more visual/graphic/ media fields should provide a professional portfolio.
- Applicants without a new media, art or graphic design background should provide samples of academic writing, published papers, software or programs, or any other evidence of scholarship.

How to Apply

The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated.

Submit a resume, transcripts, a personal statement, and letters of recommendation to:

Graduate Admissions Committee
School of Informatics and Computing 535 W. Michigan Street, IT 475
Indianapolis, IN 46202

1. Complete and submit the IUPUI Graduate Online Application form. Paper applications are not accepted. Choose "M.S. Informatics" and Media Arts and Science in the "Academic Interest" section.
2. Submit a resume listing your education, work, research, honors/awards and computer programming experience. This may be attached to your online application or sent separately.
3. Submit a personal statement (visit the IU Writing Center for instructions on how to write such a statement). This may be attached to your online application or sent separately. Your personal statement should indicate the following:
   - Why you're applying to the program
   - Your post-graduation career plans
4. Submit all official transcripts from previous colleges and universities. *NOTE: we do not require transcripts from Indiana University campuses.*
5. Submit three references from academic instructors and/or employers. To submit references, you will input contact information for each person on your electronic application. The reference will receive a form via email to fill out and submit electronically.
6. Applicants with background in visual/graphic/ media fields should provide a professional portfolio. Applicants without these backgrounds should provide samples of academic writing, published papers, software or programs developed, or other evidence of scholarship.
7. Complete the Graduate Record Examination (GRE) and ensure that IUPUI receives your score report from the GRE exam board (when applying for financial support). The Informatics and Computing school code for the GRE is 1325 – enter this code on the exam's answer sheets.
8. Submit English language proficiency exam score (International and non-native English speaking students only – see instructions below).
9. Pay your $65 application fee.

Special Instructions for International Students and Non-native English Speakers

If your native language is not English, submit with your application one of the following official test scores from within the past two years:

- Test of English as a Foreign Language (TOEFL): Minimum required scores: 250 for the computer-based test, 600 for the paper test and 79 for the Internet-based test.
- International English Language Testing System (IELTS): Minimum required score of 6.5 or higher

Use IUPUI School Code 1325 to ensure correct routing of your score to IUPUI.

- The TOEFL may be waived if a B.S. or M.S. degree has been earned in the United States
- If you are in the Indianapolis area, placement into G013 or higher on the IUPUI ESL Placement Test may replace the TOEFL requirement for admission. Test registration is arranged by calling 317-274-4240. You must have submitted your application and received a University ID to be eligible to register for this test.
- If you need additional English language study, you may enroll at the ELS Language Centers intensive English program at IUPUI and successfully complete Level 112. We accept successful completion of ELS 112 in place of a TOEFL report.

Last updated: 04/24/2017

Informatics

Informatics

Our **Master of Science program in Informatics offers the following specializations:**

The Master of Science in Informatics with a specialization in Data Analytics provides core competencies in data analysis, data management and infrastructure, client–server application development, and ethical and professional management of informatics projects as well as additional competencies in the management of massive, high-throughput data stores, cloud computing, and the data lifecycle.

Sports Analytics

The School of Physical Education and Tourism Management and the School of Informatics and Computing have teamed up to offer an M.S. and B.S./M.S. in Sports Analytics. The Master of Science in Informatics with a specialization in Sports Analytics provides core competencies in data analysis, data management and infrastructure, client–server application development, and ethical and professional management of informatics projects as well as additional competencies in sports sales and marketing, the management of massive, high-throughput data stores, cloud computing, and the data lifecycle.

Although applicants must complete a bachelor's degree prior to enrollment, this degree is open to all majors.

Prerequisites

- Minimum of a Bachelor's degree *(with demonstrated technical skills)*
- Minimum Overall GPA: 3.0 *(4.0 point scale)*
- Graduate Record Exam (GRE) scores from within the past five years if you are seeking direct financial assistance (such as an assistantship or fellowship) from the School of Informatics and Computing. A GRE score is not required to submit your FAFSA or to seek other federal or private financial assistance opportunities.

How to Apply

The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated.

Submit a resume, transcripts, a personal statement, and letters of recommendation to:

Graduate Admissions Committee
School of Informatics and Computing 535 W. Michigan Street, IT 475
Indianapolis, IN 46202

1. Complete and submit the IUPUI Graduate Online Application form. Paper applications are not accepted. Choose "M.S. Informatics" and Human-Computer Interaction in the "Academic Interest" section.
2. Submit a resume listing your education, work, research, honors/awards and computer programming experience. This may be attached to your online application or sent separately.
3. Submit a personal statement (visit the IU Writing Center for instructions on how to write such a statement). This may be attached to your online application or sent separately. Your personal statement should indicate the following:
   - Why you're applying to the program
   - Your post-graduation career plans
4. Submit all official transcripts from previous colleges and universities. *NOTE: we do not require transcripts from Indiana University campuses.*
5. Submit three references from academic instructors and/or employers. To submit references, you will input contact information for each person on your electronic application. The reference will receive a form via email to fill out and submit electronically.
6. Complete the Graduate Record Examination (GRE) and ensure that IUPUI receives your score report from the GRE exam board (when applying for financial support). The Informatics and Computing school code for the GRE is 1325 – enter this code on the exam's answer sheets.
7. Submit English language proficiency exam score (International and non-native English speaking students only – see instructions below).
8. Pay your $65 application fee.

Special Instructions for International Students and Non-native English Speakers
If your native language is not English, submit with your application one of the following official test scores from within the past two years:

- Test of English as a Foreign Language (TOEFL): Minimum required scores: 250 for the computer-based test, 600 for the paper test and 79 for the Internet-based test.
- International English Language Testing System (IELTS): Minimum required score of 6.5 or higher

Use IUPUI School Code 1325 to ensure correct routing of your score to IUPUI.

- The TOEFL may be waived if a B.S. or M.S. degree has been earned in the United States
- If you are in the Indianapolis area, placement into G013 or higher on the IUPUI ESL Placement Test may replace the TOEFL requirement for admission. Test registration is arranged by calling

317-274-4240. You must have submitted your application and received a University ID to be eligible to register for this test.
- If you need additional English language study, you may enroll at the ELS Language Centers intensive English program at IUPUI and successfully complete Level 112. We accept successful completion of ELS 112 in place of a TOEFL report.

Last updated: 04/24/2017

Bioinformatics

Bioinformatics

Successful applicants to our **Ph.D. program in Bioinformatics** must have a strong background in computing, information technology, and biology. You should be able to demonstrate the skills and knowledge required of the undergraduate Informatics degree.

Promising applicants lacking competencies necessary for admission may be allowed to take courses that will satisfy those requirements, as determined by School of Informatics and Computing faculty. Those courses, however, would not count towards degree or certificate completion.

Prerequisites
- Minimum of a Bachelor's degree *(with demonstrated technical skills)*
- Minimum Overall GPA: 3.0 *(4.0 point scale)*
- Graduate Record Exam (GRE) scores from within the past five years.

Students holding a bachelor's degree in computer science or a related field from an accredited four-year collegiate institution must have completed all or part of the prerequisite courses listed below:

- K322 Genetics and Molecular Biology and K324 Cell Biology or BIOL 507 Molecular Biology

Students holding a bachelor's degree in life sciences or a related field from an accredited four-year collegiate institution must have completed all or part of the prerequisite courses listed below:

- Programming in C, C++, or Java (3 credits)
- Programming/Database (3 credits) (e.g. N510 Web-Database Concepts)
- Statistics (3 credits) (e.g. SPEA K300 or PSY B305)

How to Apply
The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated.

Submit a resume, transcripts, a personal statement, and letters of recommendation to:

Graduate Admissions Committee
School of Informatics and Computing 535 W. Michigan Street, IT 475
Indianapolis, IN 46202

1. Complete and submit the IUPUI Graduate Online Application form. Paper applications are not accepted. Choose "Ph.D. Informatics" and "Informatics" in the "Academic Interest" section. Be sure to indicate on your personal statement your intended area of specialization.
2. Submit a resume listing your education, work, research, honors/awards and computer programming experience. This may be attached to your online application or sent separately.
3. Submit a personal statement (visit the IU Writing Center for instructions on how to write such a statement). This may be attached to your online application or sent separately. Your personal statement should indicate the following:
   - Why you're applying to the program
   - Your post-graduation career plans
   - Your intended area of specialization
4. Submit all official transcripts from previous colleges and universities. *NOTE: we do not require transcripts from Indiana University campuses.*
5. Submit three references from academic instructors and/or employers. To submit references, you will input contact information for each person on your electronic application. The reference will receive a form via email to fill out and submit electronically.
6. Complete the Graduate Record Examination (GRE) and ensure that IUPUI receives your score report from the GRE exam board. The Informatics and Computing school code for the GRE is 1325 – enter this code on the exam's answer sheets.
7. Submit English language proficiency exam score (International and non-native English speaking students only – see instructions below).
8. Pay your $65 application fee.

Special Instructions for International Students and Non-native English Speakers
If your native language is not English, submit with your application one of the following official test scores from within the past two years:

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- International English Language Testing System (IELTS): Minimum required score of 6.5 or higher

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- If you are in the Indianapolis area, placement into G013 or higher on the IUPUI ESL Placement Test may replace the TOEFL requirement for admission. Test registration is arranged by calling 317-274-4240. You must have submitted your application and received a University ID to be eligible to register for this test.
- If you need additional English language study, you may enroll at the ELS Language Centers intensive English program at IUPUI and successfully complete Level 112. We accept successful completion of ELS 112 in place of a TOEFL report.

Last updated: 04/24/2017

Human-Computer Interaction

Human-Computer Interaction

Successful applicants to our Ph.D. program in **Human-Computer Interaction** must have a strong background in computing and information technology. You should be able to demonstrate the skills and knowledge required of the undergraduate Informatics degree.

Promising applicants lacking competencies necessary for admission may be allowed to take courses that will satisfy those requirements, as determined by School of Informatics and Computing faculty. Those courses, however, would not count towards degree or certificate completion.

Prerequisites

- Minimum of a Bachelor's degree *(with demonstrated technical skills)*
- Minimum Overall GPA: 3.0 *(4.0 point scale)*
- Graduate Record Exam (GRE) scores from within the past five years if you are seeking direct financial assistance (such as an assistantship or fellowship) from the School of Informatics and Computing. A GRE score is not required to submit your FAFSA or to seek other federal or private financial assistance opportunities.

Successful applicants will have a foundation of core knowledge and skills (from either past education or work experience) in one or more of the following proficiency areas:

- *Programming*- Proficiency in programming/scripting, including:
  - One or more languages (e.g., HTML, JAVA, C++ and Visual Basic)
  - A basic understanding of programming methodologies, such as system design and architecture, problem and algorithm analysis
  - Other systems knowledge such as artificial intelligence and database analysis/database technology
- *Design*- Proficiency with the principles and processes of visual communication, industrial design, new media or other disciplines that deal with design theory and practice, including:
  - Knowledge and application of 3D animation and/or modeling tools
  - Design methodologies for 2D and 3D product development
  - Conceptual modeling, prototyping and product delivery
  - Fundamental concepts of visual communication (e.g., page design/layout)
  - Design principles, typography and color theory
  - Knowledge and application of a range of digital (vector and raster) authoring tools for Web or interface design
- *Social Sciences*– Coursework in the following key areas:
  - Psychology (general, cognitive and behavioral)
  - Sociology and anthropology (ethnography)
  - Cross-cultural psychology and communication
  - Information management and/or Information and library science

How to Apply

The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated.

Submit a resume, transcripts, a personal statement, and letters of recommendation to:

Graduate Admissions Committee
School of Informatics and Computing 535 W. Michigan Street, IT 475
Indianapolis, IN 46202

1. Complete and submit the IUPUI Graduate Online Application form. Paper applications are not accepted. Choose "Ph.D. Informatics" and "Informatics" in the "Academic Interest" section. Be sure to indicate on your personal statement your intended area of specialization.
2. Submit a resume listing your education, work, research, honors/awards and computer programming experience. This may be attached to your online application or sent separately.
3. Submit a personal statement (visit the IU Writing Center for instructions on how to write such a statement). This may be attached to your online application or sent separately. Your personal statement should indicate the following:
   - Why you're applying to the program
   - Your post-graduation career plans
   - Your intended area of specialization
4. Submit all official transcripts from previous colleges and universities. *NOTE: we do not require transcripts from Indiana University campuses.*
5. Submit three references from academic instructors and/or employers. To submit references, you will input contact information for each person on your electronic application. The reference will receive a form via email to fill out and submit electronically.
6. Complete the Graduate Record Examination (GRE) and ensure that IUPUI receives your score report from the GRE exam board. The Informatics and Computing school code for the GRE is 1325 – enter this code on the exam's answer sheets.
7. Submit English language proficiency exam score (International and non-native English speaking students only – see instructions below).
8. Pay your $65 application fee.

Special Instructions for International Students and Non-native English Speakers

If your native language is not English, submit with your application one of the following official test scores from within the past two years:

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- If you are in the Indianapolis area, placement into G013 or higher on the IUPUI ESL Placement Test may replace the TOEFL requirement for admission. Test registration is arranged by calling 317-274-4240. You must have submitted your application and received a University ID to be eligible to register for this test.
- If you need additional English language study, you may enroll at the ELS Language Centers intensive English program at IUPUI and successfully complete Level 112. We accept successful completion of ELS 112 in place of a TOEFL report.

Last updated: 04/24/2017

Health Informatics

Health Informatics

Promising applicants to the **Ph.D. in Health Informatics program** lacking competencies necessary for admission may be allowed to take courses that will satisfy those requirements, as determined by School of Informatics and Computing faculty. Those courses, however, would not count towards degree or certificate completion.

Prerequisites

- Minimum of a Bachelor's degree in computer science, engineering, biology, biochemistry, nursing, mathematics, statistics, physics, health information administration, or other similar or health-related discipline.
- Successful coursework (or equivalent) in programming (i.e. C, C++, Java or equivalent), databases, medical terminology, human anatomy and physiology.
- Minimum Overall GPA: 3.0 *(4.0 point scale)*
- Graduate Record Exam (GRE) scores from within the past five years.

How to Apply

The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated.

Submit a resume, transcripts, a personal statement, and letters of recommendation to:

Graduate Admissions Committee
School of Informatics and Computing 535 W. Michigan Street, IT 475
Indianapolis, IN 46202

1. Complete and submit the IUPUI Graduate Online Application form. Paper applications are not accepted. Choose "Ph.D. Informatics" and "Informatics" in the "Academic Interest" section. Be sure to indicate on your personal statement your intended area of specialization.
2. Submit a resume listing your education, work, research, honors/awards and computer programming experience. This may be attached to your online application or sent separately.
3. Submit a personal statement (visit the IU Writing Center for instructions on how to write such a statement). This may be attached to your online application or sent separately. Your personal statement should indicate the following:
   - Why you're applying to the program
   - Your post-graduation career plans
   - Your intended area of specialization
4. Submit all official transcripts from previous colleges and universities. *NOTE: we do not require transcripts from Indiana University campuses.*
5. Submit three references from academic instructors and/or employers. To submit references, you will input contact information for each person on your electronic application. The reference will receive a form via email to fill out and submit electronically.
6. Complete the Graduate Record Examination (GRE) and ensure that IUPUI receives your score report from the GRE exam board. The Informatics and Computing school code for the GRE is 1325 – enter this code on the exam's answer sheets.
7. Submit English language proficiency exam score (International and non-native English speaking students only – see instructions below).
8. Pay your $65 application fee.

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- If you need additional English language study, you may enroll at the ELS Language Centers intensive English program at IUPUI and successfully complete Level 112. We accept successful completion of ELS 112 in place of a TOEFL report.

Last updated: 04/24/2017

PhD Programs

Ph.D. Programs Admission

Applicants to the **Ph.D. program** are only eligible for fall admission and must submit applications by **January 15**.

The Graduate Admissions Committee will not review applications until the application fee and all required

materials are completed and received by the deadlines indicated. Specific application details are available at the program/degree links in the left navigation bar.

Last updated: 04/24/2017

Data Science
Data Science

The prepares graduates to develop and evaluate novel approaches to collecting, organizing, managing, and extracting knowledge and insights from massive, complex, heterogeneous datasets. Graduates will learn to define and investigate relevant research problems in data science.

Prerequisites

- Minimum of a Bachelor's degree in a related social science, health, data science or computing discipline computer science.
- Successful coursework (or equivalent) in programming (i.e. C++, HTML/JavaScript, JAVA, Python or equivalent),programming methodologies, systems knowledge such as artificial intelligence and database administration.
- Minimum Overall GPA: 3.0 *(4.0 point scale)*
- Graduate Record Exam (GRE) scores from within the past five years.

How to Apply
The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated.

Submit a resume, transcripts, a personal statement, and letters of recommendation to:

Graduate Admissions Committee
School of Informatics and Computing 535 W. Michigan Street, IT 475
Indianapolis, IN 46202

1. Complete and submit the IUPUI Graduate Online Application form. Paper applications are not accepted. Choose "Ph.D. Informatics" and "Informatics" in the "Academic Interest" section. Be sure to indicate on your personal statement your intended area of specialization.
2. Submit a resume listing your education, work, research, honors/awards and computer programming experience. This may be attached to your online application or sent separately.
3. Submit a personal statement (visit the IU Writing Center for instructions on how to write such a statement). This may be attached to your online application or sent separately. Your personal statement should indicate the following:
    - Why you're applying to the program
    - Your post-graduation career plans
    - Your intended area of specialization
4. Submit all official transcripts from previous colleges and universities. *NOTE: we do not require transcripts from Indiana University campuses.*
5. Submit three references from academic instructors and/or employers. To submit references, you will input contact information for each person on your electronic application. The reference will receive a form via email to fill out and submit electronically.
6. Complete the Graduate Record Examination (GRE) and ensure that IUPUI receives your score report from the GRE exam board. The Informatics and Computing school code for the GRE is 1325 – enter this code on the exam's answer sheets.
7. Submit English language proficiency exam score (International and non-native English speaking students only – see instructions below).
8. Pay your $65 application fee.

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- Test of English as a Foreign Language (TOEFL): Minimum required scores: 250 for the computer-based test, 600 for the paper test and 79 for the Internet-based test.
- International English Language Testing System (IELTS): Minimum required score of 6.5 or higher

Use IUPUI School Code 1325 to ensure correct routing of your score to IUPUI.

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- If you are in the Indianapolis area, placement into G013 or higher on the IUPUI ESL Placement Test may replace the TOEFL requirement for admission. Test registration is arranged by calling 317-274-4240. You must have submitted your application and received a University ID to be eligible to register for this test.
- If you need additional English language study, you may enroll at the ELS Language Centers intensive English program at IUPUI and successfully complete Level 112. We accept successful completion of ELS 112 in place of a TOEFL report.

Last updated: 04/24/2017

Graduate Admissions

Graduate Admissions

Applications for all graduate certificate and **M.S. programs** must be received by **January 15 (early action) and March 15 for fall admission** and **September 1 (international students) and October 1 (domestic students) for spring admission**.

Applications for admission to the **M.L.S. program** must be received by **July 15 for fall admission, November 15 for spring admission** and by **April 1 for summer admission**.

Applicants to the **Ph.D. program** are only eligible for fall admission and must submit applications by **January 15**.

The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated. Specific application details for each graduate program are available in the links located on the left navigation bar.

Last updated: 04/26/17

Admission

How to Apply: Current IUPUI Students
If you are an IUPUI student not currently enrolled in the School of Informatics and Computing, but would like to pursue a Media Arts and Science, Informatics or Health Information Management degree, please schedule an appointment to speak with one of our advisors who can help evaluate your situation and guide you through the process.

Current School of Informatics and Computing Students
If you would like to change your major within the School of Informatics and Computing, please schedule a time to meet with your advisor to discuss your options.

Admission

How to Apply: B.S. Health Information Administration Admissions
Students may begin the HIA Professional Program in either the fall or spring semester. Students must have all of their pre-requisite courses completed prior to starting the professional program and apply during the semester prior to their anticipated start date. Completed applications should be emailed directly to the Academic Advisor, Julie Reagan at jdreagan@iupui.edu.

Admissions Requirements and Standards
Completion of all required prerequisite courses with a grade of C or higher (C- grades are not acceptable).

A minimum IU cumulative GPA of 2.5 or higher is needed. You may complete the "Petition for Exceptional Consideration" found on the HIA application if you do not meet this requirement but still feel equipped to succeed in the HIA program. Students who seek exceptional consideration may be asked to schedule an interview. You will be contacted if this is necessary.

Note: Students looking to begin work towards the Health Information Administration degree and who have not yet been admitted to IUPUI or the School of Informatics and Computing should choose the appropriate category from the menu provided here to find out how to apply.

Note for transfer students: Transfer students who have completed HIA professional program prerequisites through another institution must first apply and be admitted to IUPUI before being considered for admission in the professional program.

Admission

How to Apply: High School and First-Time College Students
You'll actually apply for admission online through the IUPUI Office of Admissions. We encourage you to apply for **direct admission**, which allows you to enter IUPUI as a School of Informatics and Computing student your very first semester. To pursue direct admission, you must list your intended major (B.S. in Media Arts and Science, Informatics or Health Information Management) or certificates (Medical Coding, Legal Informatics, Human Computer Interaction) on your IUPUI admissions application and meet eligibility criteria.

Another option is to start in IUPUI's University College, where you'll begin taking courses, declare your major and then certify into the School of Informatics and Computing early in your college career. But that doesn't stop you from immediately joining one of our student groups, meeting with our advisors and becoming part of the informatics community.

Visit IUPUI's Office of Admissions to begin your application or check your admission status.

Requirements
Please make sure to review IUPUI's admission requirements through the Office of Admissions.

For **direct admission**, we're looking for students with:

- Competitive grades and class rank
- Strong SAT or ACT scores
- Commitment to a career in computing and information technology

To certify into the School of Informatics and Computing from University College, you will need to have achieved the following:

- 2.5 GPA
- 12 credits of completed coursework

Admission

Undergraduate Admissions

We want to do everything we can to make becoming part of the School of Informatics and Computing family as simple and convenient as possible. Please choose the category below that applies to you to learn more about the admissions process.

- High School or First-time College Students
- Transfer Students
- Returning Students
- International Students
- Current IUPUI Students

Deadlines for undergradutate admission applications can be found at IUPUI's Office of Undergraduate Admissions.

Graduate Admissions
Applications for all graduate certificate and **M.S. programs** must be received by **January 15 (early action)**, **March 15 for fall admission** and **September 1 (international students) and October 1 (domestic students) for spring admission**.

Applications for admission to the **M.L.S. program** must be received by **July 15 for fall admission, November 15 for spring admission** and by **April 1 for summer admission**.

Applicants to the **Ph.D. program** are only eligible for fall admission and must submit applications by **January 15**.

The Graduate Admissions Committee will not review applications until the application fee and all required materials are completed and received by the deadlines indicated. Specific application details for each graduate program are available in the links located on the left navigation bar.

Last updated: 04/24/2017

Admission

How to Apply: International Students
International students wishing to enroll at the School of Informatics and Computing must first apply through the Office of International Affairs.

Further information about international admissions, including details about the many scholarships available to international students, are available through the Office of International Affairs. They offer a wealth of information in multiple languages, including Spanish, Portuguese, Arabic and Chinese.

Requirements
The Office of International Affairs maintains its own requirements for international students seeking admission to IUPUI. Please visit their site to review those requirements, including English proficiency standards and what academic records and immigration documentation you will need to provide.

Admission

How to Apply: Returning Students
Welcome home! No matter how long you've been away, it's never too late to finish your education.

If less than two semesters have passed since you left (with the exception of summer terms), please contact your academic advisor.

If you haven't enrolled in IUPUI courses for one year or more, you will need to reapply (admission fee waived) through the IUPUI Office of Admissions.

If you are a previous student of the School of Informatics and Computing applying for readmission, please be aware of potential curricula changes. If you've been gone less than two years, you will return to your original program curriculum. If it's been two or more years, you will be readmitted under the current curriculum.

Returning students new to the School of Informatics and Computing are invited to apply for admission.

Requirements
Returning students are assessed on a case-by-case basis depending upon past credits, transcripts and desired course of study. If you've been away from IUPUI for two or more semesters, we encourage you to complete the reapplication process so that your situation can be reviewed by the IUPUI Office of Admissions and the School of Informatics and Computing.

Admission

How to Apply: Transfer Students
So you want to transfer to IUPUI and the School of Informatics and Computing? We have to say, you've made an excellent choice!

The IUPUI Office of Admissions' Transfer Central will tell you all you need to know.

- If you are transferring from another campus of Indiana University, please review the intercampus transfer process.
- If you are transferring from a college or university other than Indiana University, follow these important instructions.
- If you are an IUPUI student wishing to change majors, please see the current IUPUI Students page.

TransferIN is a good source to determine how your credits may transfer to IUPUI from other Indiana schools, or you may contact one of our advisors. If transferring from an out-of-state school, IUPUI recommends u.select. And don't forget to review IUPUI's Transfer Credit Policy.

Transfer Student Information Sessions
We strongly encourage any prospective transfer students from ANY undergraduate program/school (including IUPUI) to attend one of our regularly scheduled transfer student information sessions. Our advisors will provide a comprehensive overview of the transfer process for the School of Informatics and Computing, including how your existing credits fit into our program curricula and what courses we recommend you take in future semesters.

Check out our undergraduate "Visit Us" page for upcoming dates and to sign up.

Requirements
Your application will be evaluated by the IUPUI Office of Admissions according to IUPUI's transfer admission requirements. It will then be forwarded to the School of Informatics and Computing for review, at which point one of our advisors will contact you for a consultation and recommendations.

Graduate Academic Regulations

Graduate Academic Regulations

In addition to the many topics covered below, students enrolled in the School of Informatics and Computing's graduate programs are encouraged to review the **MS** student handbooks.

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 9 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.

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
A–	3.7
B+	3.3
B	3.0
B–	2.7
C+	2.3
C	2.0
C–	1.7
D+	1.3
D	1.0
D-	0.7
F	0 - Failed
I	Incomplete
R	Deferred
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.

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.

Last updated: 04/24/2017

Academic Policies & Procedures

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 or equivalent distress 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.

Degree Application
Candidates for graduation must file an application with the school by June 15 for December graduation and November 1 for May and February 1 for 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 and Computing follows the official grading system of Indiana University described in the front of this bulletin. Additionally, all undergraduate School of Informatics and Computing students must earn a grade of C or higher in all courses, including major, minor, and electives. Students earning lower than these requirements must meet with their academic advisor prior to the next semester's registration to discuss retaking courses.

Pass/Fail
During an undergraduate program, students in the School of Informatics in good standing (not on probation) may enroll in up to a maximum of eight university elective courses to be taken with a grade of P (pass) or F (fail). Students may take up to two Pass/Fail courses during an academic year. The procedure for declaring this option may be found in the Schedule of Classes. 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.

Probation/Dismissal/Readmission for Undergraduate Students of the IU School of Informatics and Computing

Academic Warning
A student whose semester (fall or spring) grade point average (GPA) falls below a 2.0, but whose cumulative GPA is a 2.0 or higher will be placed on academic warning. An advising hold will be placed on the student's record and the student will be required to meet with their academic advisor prior to registration.

Academic Probation
A student whose cumulative grade point average (CGPA) falls below a 2.0 or has two consecutive semesters (fall and spring) with a GPA below a 2.0 will be placed on probation for the subsequent semester. A probation hold will be placed on the student's record and the student will be required to meet with their academic advisor prior to registration. Probation will be removed if the cumulative GPA reaches 2.0 or higher or if the semester GPA reaches 2.0 or higher, if the cumulative GPA is already at 2.0 or higher.

Dismissal
A student on probation who has completed a minimum of 12 IU GPA hours is subject to dismissal upon failing to attain a GPA of at least 2.0 in any two consecutive semesters (fall and spring) and the student's cumulative IU GPA is below 2.0.

First--#Semester Student Dismissal
A first--#semester student who has attempted a minimum of 12 IU GPA hours is subject to dismissal upon failing to attain a GPA of at least 1.0 in the student's first semester in the School of Informatics and Computing.

Readmission
Students who are dismissed for the first time must sit out for a minimum of one regular (fall or spring) semester and petition by the established deadlines to be eligible for readmission. Students dismissed two or more times must remain out of school for two regular (fall and spring) semesters and petition by the established deadlines to be eligible for readmission. Readmitted students may only begin in either the fall or spring semester.

Grade Replacement
The Grade Replacement Policy is available only to undergraduate students. It may be exercised for a maximum of 15 credit hours, no more than two times for a given course, with each attempted replacement counting toward the 15 credit hour limit. Any grade may be replaced with the last grade earned for the course, as long as the most recent grade is equal to or higher than the grade being replaced. The replaced grade will then be excluded from the cumulative grade point average. However, the course listing and the replaced grade will remain on the student's academic record with an "X" notation indicating that the grade is excluded from the cumulative grade point average.

The policy became effective beginning with the fall 1996 semester, and any courses being used to replace an earlier grade must have been taken in the fall of 1996 or later. Grades previously granted FX will be honored and will count toward the 15 credit hour limit. Once invoked, a student may not subsequently request reversal of the grade replacement granted for a given course. Also, this policy is not available for graduate students or students seeking any second undergraduate degree. Please see your academic advisor to discuss grade replacement and obtain a form. For more information about the policy, visit http://registrar.iupui.edu/replace.html

Human-Computer Interaction Certificate

Human-Computer Interaction Certificate
If you have an interest in how people interact with technology or computers, or you like design, psychology, sociology, or any number of additional fields that HCI intersects with, HCI could be a good fit.

HCI is the branch of informatics that studies and supports the design, development, and implementation of humanly usable and socially acceptable information technologies.

Because human–computer interaction studies a human and a machine in conjunction, it draws from supporting knowledge on both the machine and the human side. On the machine side, techniques in computer graphics, operating systems, programming languages, and development environments are relevant. On the human side, communication theory, graphic and industrial design disciplines, linguistics, social sciences, cognitive psychology, and human factors such as computer user satisfaction are relevant

Due to the multidisciplinary nature of HCI, people with different backgrounds contribute to its success.

Certificate Requirements
The Undergraduate Certificate in Human-Computer Interaction (HCI) is a 15-credit-hour program allowing students to become certified in the fundamental theory and application of human-computer interaction. Students can seek this certificate in addition to their major or as a stand-alone certificate.

- **INFO I270 Introduction to HCI Principles & Practices**
- **INFO I275 Introduction to HCI Theory**
- INFO I300 Human-Computer Interaction
- NEWM N450 Usability Principles for New Media Interfaces

Note: courses above marked in bold can be counted towards a student's general education requirement.

Choose one:

NEWM N328 Visualizing Information

INFO I400 Experience Design and Evaluation of Access Technologies

INFO I480 Experience Design and Evaluation of Ubiquitous Computing

Last updated: 04/24/17

Undergraduate Certificate Programs

Undergraduate Certificate 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 and Computing. 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.

The School of Informatics and Computing offers the following undergraduate certificates:

- Human-Computer Interaction
- Legal Informatics
- Medical Coding

Last updated: 04/24/17

Legal Informatics Certificate

Legal Informatics Certificate

Legal Informatics has been described as "the study of the application of information technologies to the field of law and the use of these technologies by legal professionals." Therefore, the focus of the Certificate in Legal Informatics is on the effective use of cutting-edge technology in the study and practice of law. Legal informatics also includes the law related to technology, such as intellectual property law, and security. All of the courses for the Certificate in Legal Informatics are offered online.

Certificate Requirements
The following five (5) courses comprise the Certificate in Legal Informatics, for a total of 15 credit hours:

- INFO I330 Legal and Social Informatics of Security (3 cr.)
- INFO I350 Foundations in Legal Informatics (3 cr.)
- INFO I410 Electronic Discovery (3 cr.)
- INFO I470 Litigation Support Systems and Courtroom Presentation (3 cr.)
- NEWM N480 Technology and the Law (3 cr.)

Students who complete all five courses as part of their undergraduate degree will earn a Certificate in Legal Informatics. Students can also earn the Certificate in Legal Informatics as a free-standing certificate. Students must earn a C or higher in all five courses in order to qualify for the Certificate in Legal Informatics.

For additional information, please contact soicindy@iupui.edu.

Last updated: 04/24/2017

Medical Coding Certificate

Student Consumer Information about this Program

The Medical Coding Certificate is a 28-credit-hour program focusing on pathophysiology, pharmacology, coding, medical reimbursement and basic concepts of health information and is designed to better prepare you to sit for industry standard certifications.

The curriculum includes a unique professional practicum component that integrates classroom instruction with applied, technical experience in an actual healthcare facility.

The program begins each fall. Courses may be taken part-time or full-time, and all courses may be completed via distance education (with the exception of the professional practicum).

Credit earned for the certificate may be applied toward a bachelor's degree in Health Information Management (application and acceptance into the HIM program required). Graduates are also eligible to seek the Certified Coding Associate (CCA) credential offered by the American Health Information Management Association (AHIMA).

Admission and Requirements

Prospective students must first be admitted to IUPUI as an undergraduate student. You must also acquire knowledge of anatomy, physiology and database design through the completion of designated prerequisites with a minimum grade of C (2.0). Students must achieve a minimum cumulative G.P.A. of 2.5 to begin courses.

Prerequisites (12 cr.)

- BIOL N222 Anatomy for Health Care Management (3 cr.) Fall
- BIOL N222 Physiology for Health Care Management (3 cr.) Spring
- HIM M110 Computer Concepts for Health Information (3 cr.)
- HIM M330 Medical Terminology (3 cr.)

Required Courses (28 cr.)

- HIM M325 Healthcare Information Requirements and Standards (3 cr.)
- INFO I400 Information Governance (3 cr.)
- HIM M350 Pathophysiology & Pharmacology for HIM I (3 cr.)
- HIM M355 ICD-10-CM/PCS Coding (3 cr.)
- HIM M351 Pathophysiology & Pharmacology for HIM II (3 cr.)
- HIM M358 CPT Coding (3 cr.)
- HIM M345 Medicine, Law, and ROI (3 cr.)
- HIM M470 Healthcare Reimbursement Systems (3 cr.)
- HIM M457 Practicum in Medical Coding (4 cr.)

Last updated: 04/24/2017

Five Year Bachelor's and Master's Program

Five Year Bachelor's and Master's Program
A fast track to future success!

The School of Informatics and Computing also offers the following innovative, accelerated 5-year B.S./M.S. degree programs in the following areas:

- B.S. Health Information Management + M.S. Health Informatics
- B.S. Informatics + M.S. Bioinformatics
- B.S. Informatics + M.S. Health Informatics
- B.S. Informatics + M.S. Human-Computer Interaction
- B.S. Informatics + Master of Jurisprudence
- B.S. Media Arts & Science + M.S. Human-Computer Interaction
- B.S. Media Arts & Science + M.S. Media Arts & Science
- B.S. Biology + M.S. Bioinformatics
- B.S. Health Sciences + M.S. Health Informatics
- B.S. Nursing + M.S. Health Informatics
- B.S. Sports Management + M.S. Sports Analytics

Informatics and computing professionals are in constant demand within an ever-evolving and growing field. As a result, employers are seeking graduates with the highest qualifications and skill sets to emerge as tomorrow's technology leaders. With these needs in mind, the IU School of Informatics and Computing at IUPUI offers four, for top-achieving and motivated students.

These forward-thinking programs combine our very best degree offerings in an accelerated format designed to prepare highly-skilled, marketable and successful graduates. Alumni of our BS+MS programs will be well-equipped not only for success in the computing and information technology fields, but also the healthcare, science, business, interactive media and design industries, among others. Key benefits of our five-year BS +MS degree programs include:

- Save time and tuition
- Stand out in the job market with advanced skills and education
- Increased lifetime earning potential

Last updated: 04/24/2017

Bachelor of Science in Health Information Management

Bachelor of Science in Health Information Management

To pursue a degree in Health Information Management, you must first apply and be accepted to IUPUI.

You'll then want to meet with an undergraduate advisor to review your plan of study. The program is evenly split between pre-professional coursework and professional program coursework which is normally completed during the junior and senior years.

The Professional Program
Students may begin the HIM Professional Program in either the fall or spring semester. Students must have all of their pre-requisite courses completed prior to starting the professional program. Upon successful completion of the professional program students are eligible to sit for the internationally recognized Registered Health Information Administrator (RHIA) credential.

The Professional Practicum Experience
Our program offers one-of-a-kind experiential learning that gives you a distinct advantage as you begin your career. Students will experience a mentored professional practicum within a variety of healthcare related settings. Practicums are project-based allowing students to integrate classroom based knowledge in a real world setting solving real world problems.

Last updated: 04/24/2017

B.S. in Health Information Administration - Plan of Study

B.S. in Health Information Administration - Plan of Study
Below is the plan of study for students beginning in the fall of 2013. Students who began prior to the fall of 2013 should review their plan of study found on the top right hand side of this page. Students are responsible for completing the degree requirements for their particular plan of study. Transfer students should consult a School of Informatics and Computing academic advisor regarding potential course exceptions and/or substitutions. We encourage all students to meet with an academic advisor prior to registration each semester.

The HIA degree consists of 120 credit hours. All courses must be completed with a C or better to count towards degree completion. The professional program may be completed fully online and students may start the professional program in either the fall or spring semester.

Pre-HIA Core (62 cr.)
HIA Pre-requisite Requirements (29 cr.)

- INFO I100 First Year Experience (1 cr.)
- HIA M110 Computer Concepts for Health Information (3 cr.)
- HIA M210 Data Organization & Presentation in Healthcare Environment (3 cr.)
- HIA M300 Database Design for HIA (3 cr.)
- HIA M220 Healthcare Decision Support (3 cr.)
- BUS X100 Intro to Business Administration (3 cr.)
- BUS L203 Commercial Law (3 cr.)
- HIA M270 Foundations & Principles of Health Information Management (2 cr.)
- HIA M330 Medical Terminology (3 cr)
- HIA M275 Effective Communication for the Healthcare Environment (3 cr.)
- NEWM N299 Directed Study (2 cr.)

NOTE: BIOL N212 Human Biology 1 (3 cr.) and BIOL N214 Human Biology 2 (3 cr.) are required but may be applied under the Life and Physical Sciences General Education Core requirements below. The BIOL N213 and BIOL N215 labs are OPTIONAL.

General Education Core Requirements (30 cr.)

Foundational Intellectual Skills
Students must take 15 credit hours related to Foundational Intellectual Skills. This includes 6 credits related to Core Communication skills, 6 credits in Analytical Reasoning, and 3 credits related to Cultural Understanding. The most recent list of approved classes can be found here:http://go.iupui.edu/gened.

Intellectual Breadth and Adaptiveness
Students must also take 15 credit hours related to Intellectual Breadth and Adaptiveness. This helps to foster the “ways of knowing” that are characteristic of particular fields ranging from science and the social sciences through humanities and arts. This includes 6 credits in the Life and Physical Sciences, and 9 credits distributed across the Arts/Humanities and the Social Sciences. The most recent list of approved classes can be found here:http://go.iupui.edu/gened.

General Electives (3 cr.)
The School of Informatics and Computing will not accept physical education activity courses, musical instrument or voice lesson courses towards elective credit. Students may use any other college level course credit (transferable to IUPUI) towards electives.

Notes:

- This plan of study is subject to revision. Please consult a HIA academic advisor each semester prior to registration.
- The pre-requisite courses total 62 credit hours and must be successfully completed prior to beginning the HIA Professional Program.
- Prerequiste courses must be completed prior to taking the stated course.
- All courses require a minimum grade of a C to be considered as successfully completed and to apply towards graduation.

Professional Program (58 cr.)
Professional program courses are open only to those junior and senior-level students who have successfully completed all pre-Health Information Administration courses and have received a letter of acceptance to the program.

Professional core courses are sequential and must be completed in the order specified during the third and fourth years of study.

First Fall Semester (14 cr.)

- HIA M325 Healthcare Information Requirements and Standards I (3 cr.)
- HIA M326 Lab for M325 (1 cr.)
- HIA M350 Medical Science for Health Information I (3 cr.)
- HIA M355 ICD-9-CM Coding (3 cr.)
- HIA M356 Lab for M355 (1 cr.)
- HIA M370 Health Information Management (3 cr.)

First Spring Semester (16 cr.)

- HIA M322 Hospital Organization and Management (3 cr.)
- HIA M327 Healthcare Information Requirements and Standards II (3 cr.)
- HIA M328 Lab for HIA M327 (1 cr.)
- HIA M445 Medicine and the Law (1 cr.)
- HIA M450 Medical Science for Health Information II (3 cr.)
- HIA M455 CPT Coding (3 cr.)
- HIA M456 Lab for M455 (1 cr.)
- HIA M461 Release of Information (1 cr.)

Second Fall Semester (14 cr.)

- HIA M315 Quantitative Methods and Research (2 cr.)
- HIA M375 Health Information Technology (3 cr.)
- HIA M420 Healthcare Planning and Information Systems (3 cr.)
- HIA M443 Professional Practicum in Health Information Administration I (4 cr.)
- HIA M462 Healthcare Quality Improvement (2 cr.)

Second Spring Semester (14 cr.)

- HIA M400 Health Information Storage/Retrieval (3 cr.)
- HIA M444 Professional Practicum in Health Information Administration II (4 cr.)
- HIA M470 Healthcare Reimbursement Systems (3 cr.)
- HIA M490 Directed Study (1 cr.)
- HIA M499 Health Information Administration Capstone Experience (3 cr.)

Notes:

- This plan of study is subject to revision. Please consult a HIA academic advisor each semester prior to registration.

- All courses require a minimum grade of a C to be considered as successfully completed and to apply towards graduation.
- The HIA Bachelor of Science degree in total equals 120 credit hours.
- The Professional Program courses total 58 credit hours and may be fully completed via online education on a full time or part time basis.

Last updated: 02/14/2014

Undergraduate Programs

Undergraduate 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 and Computing. 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.

The School of Informatics and Computing offers the following undergraduate degrees:

- Health Information Management
- Informatics
- Media Arts and Science

Bachelor of Science in Informatics

Bachelor of Science in Informatics

To pursue a degree in Informatics, you must first apply and be accepted to IUPUI.

You'll then want to schedule time with one of our undergraduate advisors to review your plan of study and get enrolled in I101 Introduction to Informatics.

I101 Introduction to Informatics is an interactive course using lecture, guest speakers and applied projects to:

- Explore the broad impact of informatics across disciplines
- Build your programming, database and structured query language (SQL) skills
- Identify career and graduate school opportunities
- Introduce you to possible areas of specialization

Area of Specialization
An area of specialization is an integrated program of courses concentrating on the applications – and impact – of informatics within the context of another discipline. Choosing an area of specialization is required, and you may select from virtually any IUPUI program to best customize your degree to your career interests. The most popular specializations include:

- 3D Graphics and Animation
- Biology
- Business
- Computer Information Technology
- Computer Science
- Game Design and Development
- Health Information Management
- Human-Computer Interaction
- Law (Legal Informatics)
- Media Arts and Science
- Pre-Med

Capstone Project
From there, you'll complete specialized, hands-on courses that give you the tools and techniques needed as a future computing and technology professional. This includes completion of a capstone project during your senior year.

The capstone represents the culmination of your skills and knowledge within informatics and your chosen area of specialization. It may take the form of a thesis, a research project, a for-credit internship or an applied learning project to develop an information system.

Career Development
And before you graduate, you'll work with our Career Services Office to learn how to job search, assemble a portfolio of your work, pursue internship opportunities and connect with employers.

- Plan of Study
- Areas of Specialization
- Learning Outcomes

Last updated: 04/24/2017

Bachelor of Science in Informatics Plan of Study

Bachelor of Science in Informatics Plan of Study
Below is the plan of study for students beginning in the fall of 2013. Students who began prior to the fall of 2013 should review their plan of study found under "Additional Resources" on the top right hand side of this page. Students are responsible for completing the degree requirements for their particular plan of study. Transfer students should consult a School of Informatics and Computing academic advisor regarding potential course exceptions and/or substitutions. We encourage all students to meet with an academic advisor prior to registration each semester.

Students must earn a C- or higher in each individual course as well as a cumulative grade point average of a 2.0 or higher in order to graduate.

Core A (50 cr.)
- INFO I100 First Year Experience (1 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 I270 Introduction to Human Computer Interaction (3 cr.)**
- INFO I303 Organizational Informatics (3 cr.)
- INFO I305 Introduction to Research in Informatics (3 cr.)
- INFO I308 Information Representation (3 cr.)
- INFO I402 Informatics Project Management (3 cr.)

- INFO I421 Applications of Data Mining and Management (3 cr.)
- INFO I453 Computer and Information Ethics (3 cr.)
- NEWM N299 Directed Study (2 cr.)
  *** Beginning Fall 2013 NEWM N299 will replace Y195/Y295*
- INFO Y395 Career Development for Informatics Majors (1 cr.)
- NEWM N221 Media Applications I (3 cr.)
- NEWM N222 Media Applications II (3 cr.)

Note: courses marked in bold can be counted towards a student's general education requirement.

Core B (6 cr.)
Select two informatics courses at the 300 level or above.

Capstone Project (6 cr.)
Each option is two semesters in length, except the Internship option may be earned in one semester if the minimum hours are met (270 total working hours for 6 credit hours).

Select one:

- INFO I491 Capstone Project Internship (3/3 cr.) or
- INFO I492/493 Senior Thesis (3/3 cr.) or
- INFO I494/495 Design & Development of Information Systems (3/3 cr.)

Area of Specialization (15-21 cr.)
Select an area of specialization from our list of approved disciplines or choose any university-approved minor or certificate.

General Education Requirements (30 cr.)

Foundational Intellectual Skills
Students must take 15 credit hours related to Foundational Intellectual Skills. This includes 6 credits related to Core Communication skills, 6 credits in Analytical Reasoning, and 3 credits related to Cultural Understanding. The most recent list of approved classes can be found here: http://go.iupui.edu/gened.

Intellectual Breadth and Adaptiveness
Students must also take 15 credit hours related to Intellectual Breadth and Adaptiveness. This helps to foster the "ways of knowing" that are characteristic of particular fields ranging from science and the social sciences through humanities and arts. This includes 6 credits in the Life and Physical Sciences, and 9 credits distributed across the Arts/Humanities and the Social Sciences. The most recent list of approved classes can be found here: http://go.iupui.edu/gened.

General Electives (7 – 13 cr.)
Choose electives as needed to reach a total of 120 credit hours. The School of Informatics and Computing will not accept physical education activity courses or musical instrument or voice lesson courses towards elective credit. Students may use any other college level course credit (transferable to IUPUI) towards electives.

Last updated: 02/14/2014

Bachelor of Science in Informatics Areas of Specialization

Bachelor of Science in Informatics Areas of Specialization

In addition to taking Informatics courses that address the human and technical dimensions of information technology, students select an area of specialization in order to complete an Informatics degree.

An area of specialization is an integrated program of courses concentrating on the applications—and impact—of informatics within the context of another discipline. Choosing an area of specialization is required, and you may select from virtually any IUPUI program to best customize your degree to your career interests. The most popular specializations include:

- 3D Graphics and Animation
- Biology
- Business
- Computer Information Technology
- Computer Science
- Game Design and Development
- Health Information Management
- Human-Computer Interaction
- Law (Legal Informatics)
- Media Arts and Science
- Pre-Med

Choosing an area of specialization is required; most students have done so by the beginning of sophomore year. Although the areas listed above are the most popular, you may select approved minors or certificates from other IUPUI programs not listed here. If you are a new student or want more information on an Informatics major with a unique area of specialization, please contact your advisor.

Last updated: 04/24/2017

Bachelor of Science in Media Arts and Science

Bachelor of Science in Media Arts and Science

To pursue a degree in Media Arts and Science, you must first apply and be accepted to IUPUI.

You'll then want to sit down with one of our undergraduate advisors to review the program's plan of study and find out what courses to take.

You'll likely start with N100 Foundations of New Media, where you'll be introduced to the evolution of digital media and begin exploring your particular interest areas with hands-on projects.

Specialty Areas
From there, you'll take additional core courses and electives in your chosen specialty area(s), becoming fluent in the use of contemporary media tools and project management principles. A specialty area is your opportunity to customize your education in those aspects of media and production best-suited for your career goals. Specialty areas include:

- 3-D Graphics and Animation
- Digital Storytelling

- Game Design and Development
- Video Production and Sound Design
- Web Design and Development

Learn more about our specialty areas.

Capstone Project
With your skills sets firmly in place, you'll design and complete a faculty-mentored capstone project during your final semester. Your capstone project signals your readiness to graduate and represents the culmination of your knowledge and skill within your chosen specialty area(s).

And as a graduating senior, you'll showcase that education and passion to your fellow classmates, family, faculty, alumni and visiting employers during the School of Informatics and Computing Capstone Event held at the close of each semester.

Learn more about upcoming Capstone Events you can attend, as well as examples of past student capstones.

Last updated: 04/24/2017

B.S. in Media Arts and Science - Plan of Study

B.S. in Media Arts and Science - Plan of Study
Degree requirements listed on this page apply to students entering the program on or after fall 2013. Requirements for students matriculating prior to fall 2013 can be found here.

Students in the Media Arts and Science program must successfully complete a minimum of 120 credit hours. Please note that some courses have prerequisites. Transfer students should consult a School of Informatics and Computing academic advisor regarding potential course exceptions and/or substitutions.

Students are responsible for completing the degree requirements listed here. We encourage you to meet with an academic advisor prior to registration each semester. We also advise reviewing the official IUPUI Bulletin prior to registration, paying careful attention to conditions concerning award of credit.

Students must earn a C- or higher in each individual course as well as a cumulative grade point average of a 2.0 or higher in order to graduate.

Core (19 cr.)
- INFO I100 First Year Seminar (1cr.)
- NEWM N100 Foundations of New Media (3 cr.)
- NEWM N101 Multimedia Authoring Tools (3 cr.)
- NEWM N102 Digital Media Imagery (3 cr.)
- NEWM N202 Digital Storytelling (3 cr.)
- NEWM N299 Directed Study (2 cr.)
- NEWM N399 Directed Study III (1 cr.)
- NEWM N499 Capstone (3 cr.)

Note: courses marked in bold can be counted towards a student's general education requirement.

Computing Foundation (3 cr.)
- CSCI N301 Fundamental Computer Science Concepts (3 cr.)

Course of Study (57 cr.)
At least 45 credit hours must be NEWM courses, with at least 12 hours at the 300-level, 12 hours at the 400-level and 21 hours at any level. You may select up to 12 hours from the list of selectives below.

Note: courses marked in bold can be counted towards a student's general education requirement.

Selectives
- **INFO I270 Introduction to Human-Computer Interaction Principles and Practices** (3 cr.)
- **INFO I275 Introduction to Human-Computer Interaction Theory** (3 cr.)
- INFO I300 Human-Computer Interaction (3 cr.)
- INFO I400 Topics in Informatics (3 cr.)
- HER E101 Beginning Drawing I
- HER E102 Beginning Drawing II
- HER E103 Two-Dimensional Design for New Media
- HER E109 Color and Design
- HER E214 Visual Learning
- CSCI N241 Fundamentals of Web Development
- CSCI N341 Client-Side Web Programming
- CSCI N342 Server-Side Web Programming
- CSCI N351 Intro to Multimedia Programming
- CSCI N451 Web Game Development
- CIT 21400 Introduction to Data Management
- CIT 21500 Web Programming
- CIT 27000 Introduction to Java
- CIT 31200 Advanced Web Site Design
- CIT 41200 XML-Based Web Applications
- JOUR J152 Sports in Society
- JOUR J210 Visual Communication
- JOUR J320 Creative Advertising
- MUS Z315 Music for Film
- MUS Z317 Computer Music Composition I
- MUS Z320 Advanced Special Topics Non-Music Majors (*Not all sections of Z320 fulfill the selective requirement. Please check with your advisor before registering.*)

General Education Requirements (30 cr.)

Foundational Intellectual Skills
Students must take 15 credit hours related to Foundational Intellectual Skills. This includes 6 credits related to Core Communication skills, 6 credits in Analytical Reasoning, and 3 credits related to Cultural Understanding. The most recent list of approved classes can be found here: http://go.iupui.edu/gened.

Intellectual Breadth and Adaptiveness
Students must also take 15 credit hours related to Intellectual Breadth and Adaptiveness. This helps to foster the "ways of knowing" that are characteristic of particular fields ranging from science and the social sciences through humanities and arts. This includes 6 credits in the Life and Physical Sciences, and 9 credits distributed across the Arts/Humanities and the Social Sciences. The most recent list of approved classes can be found here: http://go.iupui.edu/gened.

General Electives (up to 11 cr.)
Choose from other IUPUI courses. Please note the School of Informatics and Computing will not count

physical education or music performance/lessons courses as general electives.

Last updated: 02/14/2014

B.S. in Media Arts and Science - Areas of Specialization

B.S. in Media Arts and Science - Areas of Specialization
Our program is designed to be flexible, with ample opportunity to concentrate or broaden your studies in one or more specialty areas. Some students develop a passion for a particular specialty, while others aim to become mixed-media virtuosos. Our specialty areas include:

- Storytelling Fundamentals
- Gaming
- Web Design and Development
- Programming
- Audio
- Video
- 3D Graphics
- 21st Century Workplace Skills

Storytelling Fundamentals
Develop your writing, illustration and narrative skills with courses on design, scriptwriting, storyboarding, animation and more.

Note: courses marked in bold can be counted towards a student's general education requirement.

- **N201 Design Issues in Digital Media**
- N202 Digital Storytelling
- N260 Scriptwriting
- N261 Storyboarding for Multimedia
- N238 2D Animation
- N241 Stop Motion Animation
- N285 Interactive Design
- N332 Sequential Narrative
- N432 Advanced Sequential Narrative
- N438 Advanced 2D Animation

Games
Become a future game-maker with coursework in storytelling, programming, character animation and game design/development.

- N230 Intro to Game Design and Development
- N284 Building Physical Prototypes
- N330 Game Design Development and Production
- N335 Character Design and Animation
- N431 Game On!
- N485 Serious Games
- N485 Advanced Game Design

Web Design and Development
Set your sights on mastering the web as you learn advanced fundamentals of web development.

- N215 Online Document Development I
- N315 Online Document Development II
- N413 Advanced Web
- N485 Online Video Streaming
- CSCI/N241 Fundamentals of Web Development

Programming
Apps are everywhere. Here's your chance to become an expert in the development of rich, interactive applications using sophisticated programming and interface design.

- N221 Media Applications I
- N222 Media Applications II
- N321 Actionscript in 3D
- N322 Dynamic Data Applications
- N421 Physical Object Interfaces
- N422 Advanced Interactive Production

Audio
Sound is an important addition to any story, film, animation, game, etc. Learn the latest in sound engineering, composition and design.

- N255 Intro to Digital Sound
- N265 Sound Composition
- N355 Intermediate Sound
- N455 Advanced Sound Design

Video
Explore your inner filmmaker through experiential learning using industry-standard equipment, advanced editing software, lighting techniques and digital effects. Work on videos in multiple genres, including interviews, dramas, documentaries and field productions.

- N253 Intro to Digital Video
- N353 Intermediate Video
- N356 Lighting and Field Production
- N357 Digital Effects
- N440 DV and CGI Effects
- N453 Advanced Video

3D Graphics
Bring your imagination to life using computer-generated imagery (CGI) in movies, games, advertising, scientific illustration and more. Course topics include special effects and 3D modeling, animation and production.

- N243 Introduction to 3D
- N342 3D Animation
- N343 3D Modeling
- N344 3D Production
- N440 DV and CGI Effects
- N442 Advanced 3D Animation Techniques
- N443 Advanced Lighting and Texturing
- N444 Stereoscopic Production and Display

21st Century Workplace Skills
Round out your education with coursework that helps develop soft skills and teaches you the ins-and-outs of the media industry. You'll learn teamwork and how to manage a project from concept through post-production.

- N250 Team Building in Technology
- N290 Creative Concept Development
- N300 Digital Media Production
- N385 Seeing Sideways
- N420 Multimedia Project Development
- I3XX Project Management

Last updated: 02/14/2014

Informatics Minor

Informatics Minor
The undergraduate minor in Informatics allows a student majoring in another subject to receive instruction in the application of informatics tools and principles to that subject area.

Plan of Study
Students must earn a C or higher in each individual course as well as a cumulative grade point average of a 2.0 or higher in order to graduate.

Required Courses (12 cr.)
- **INFO I101 Introduction to Informatics (4 cr.)**
- INFO I210 Information Infrastructure I (4 cr.)
- INFO I211 Information Infrastructure II (4 cr.)

Additional Requirements (9 cr.)
Choose three courses.

- **INFO I202 Social Informatics (3 cr.)**
- **INFO I270 Introduction to Human-Computer Interaction Principles and Practices (3 cr.)**
- **INFO I275 Introduction to Human-Computer Interaction Theory (3 cr.)**
- INFO I300 Human Computer Interaction (3 cr.)
- INFO I303 Organizational Informatics (3 cr.)
- INFO I305 Introduction to Research in Informatics (3 cr.)
- INFO I308 Information Representation (3 cr.)
- INFO I330 Legal and Social Informatics of Security (3 cr.)
- INFO I350 Foundations in Legal Informatics (3 cr.)
- INFO I399 Current Topics in Informatics (3 cr.)
- INFO I400 Topics in Informatics (3 cr.)
- INFO I402 Informatics Project Management (3 cr.)
- INFO I410 Electronic Discovery (3 cr.)
- INFO I421 Applications of Data Mining and Management (3 cr.)
- INFO I425 Applying Web Services in Information Systems (3 cr.)
- INFO I433 Protocol Design and Analysis (3 cr.)
- INFO I445 Competitive Intelligence for Informatics I (3 cr.)
- INFO I453 Computer and Information Ethics (3 cr.)
- INFO I465 Informatics for Social Change (3 cr.)
- INFO I470 Litigation Support Systems and Courtroom Presentations (3 cr.)

Note: courses marked in bold can be counted towards a student's general education requirement.

Last updated: 04/24/17

3D Graphics and Animation Minor

3D Graphics and Animation Minor

The undergraduate minor in 3D Graphics and Animation enables students to design, model, texture, animate, light, and render 3D computer animated creatures, characters, props, scenery, and artifacts. Students learn the process from preproduction, to production, to postproduction for films, videogames, environments, motion graphics, commercial graphics, visual stories, scientific simulation, 3D printing, and virtual and augmented reality. Students develop production quality projects with advanced aesthetics using the entire 3D production pipeline.

Plan of Study

Prerequisite

The minor requires knowledge of Adobe Photoshop, which may be demonstrated by test, portfolio, credential, or by taking a course that cover Photoshop, such as CGT 11700 Illustrating for Visualization and Communication, CGT 21100 Raster Imaging for Computer Graphics, or NEWM N102 Digital Media Imagery.

Required Courses (15 cr.)

- NEWM N243 Introduction to 3D (3 cr.) or CGT 11600 Geometric Modeling for Visualization and Communication (3 cr.)
- NEWM N341 Lighting and Materials (3 cr.) or CGT 34000 Digital Lighting and Rendering for Computer Animation (3 cr.)
- NEWM N342 3D Animation (3 cr.) or CGT 24100 Introduction to Computer Animation (3 cr.)
- NEWM N343 Hard Surface 3D Modeling (3 cr.)
- NEWM N345 Organic Modeling and Texturing (3 cr.)

Students must earn a C or higher in each course to graduate with the 3D Graphics and Animation minor.

Admissions and Advising

The minor is open to IUPUI students in any major except Computer Graphics Technology and Media Arts and Science. Media Arts and Science students may pursue the 3D Graphics and Animation specialization instead.

Email Jill Mathews at jilmathe@iupui.edu to declare the 3D Graphics and Animation minor. For academic advising, contact the advisors for the minor at soicindy@iupui.edu or 317-278-4636.

Last updated: 04/24/17

Digital Humanities Minor

Digital Humanities Minor

The Digital Humanities minor is for students whose interests encompass the arts and humanities, social sciences, and computing. As such, it is offered jointly by the Indiana University School of Liberal Arts, School of Informatics and Computing, and Herron School of Art and Design.

The minor guides students in employing visual communication and informatics in the arts, social sciences, and humanities. Students will learn to work with large datasets and perform data analysis on texts. The minor prepares students to understand the technologies they use as objects of humanistic and artistic design, laden with historical and cultural perspectives that interact with political and economic systems. This experience with digital technologies and humanistic thinking expands opportunities to work in today's highly interconnected global environment.

Prerequisite

The minor requires knowledge of Adobe Photoshop, which may be demonstrated by test, portfolio, credential, or by

taking a course that cover Photoshop, such as CGT 11700 Illustrating for Visualization and Communication, CGT 21100 Raster Imaging for Computer Graphics, or NEWM N102 Digital Media Imagery.

Required Courses (15 cr.)

- NEWM N243 Introduction to 3D (3 cr.) or CGT 11600 Geometric Modeling for Visualization and Communication (3 cr.)
- NEWM N341 Lighting and Materials (3 cr.) or CGT 34000 Digital Lighting and Rendering for Computer Animation (3 cr.)
- NEWM N342 3D Animation (3 cr.) or CGT 24100 Introduction to Computer Animation (3 cr.)
- NEWM N343 Hard Surface 3D Modeling (3 cr.)
- NEWM N345 Organic Modeling and Texturing (3 cr.)

Students must earn a C or higher in each course to graduate with the 3D Graphics and Animation minor.

Admissions and Advising

The Digital Humanities minor is open to IUPUI students in any major. To declare the minor, complete the declaration form at the School of Liberal Arts website. For academic advising, contact the History advisor in the School of Liberal Arts or an Informatics advisor.

Last updated: 04/24/17

Game Design and Development Minor

Game Design and Development Minor

The undergraduate minor in Game Design and Development enables students to leverage knowledge and skills acquired in their major in creating mobile, console, and computer games. Students conceptualize and prototype games by using formal and dramatic game elements motivated by cognitive theories. This includes writing a game narrative, modeling and animating characters, and constructing interactive levels and environments. Students learn how to recruit and guide participants through a playtest, evaluate the results by applying human factors research methods, and use reports to improve gameplay outcomes. Upon completion, students can create 2D and 3D games from initial concept to full production using commercial game engines.

Plan of Study (15–16 cr.)

Introductory Course (3 cr.)

- NEWM N132 Game Design Psychology: Theory and Prototyping (3 cr.)

3D Graphics or Programming Course (3–4 cr.)

Select one of the following courses:

- NEWM N243 Introduction to 3D (3 cr.)
- CGT 11600 Geometric Modeling for Visualization and Communication (3 cr.)
- CSCI 23000 Computing I (4 cr.)
- CIT 21500 Web Programming (3 cr.)
- INFO I210 Information Infrastructure I (3 cr.)
- NEWM N220 Introduction to Media Application Development (3 cr.)

Students may test out of the 3D graphics or programming requirement by prior learning assessment, in which case they take an additional advanced course.

Two Course Gaming Core

- NEWM N230 Introduction to Game Design and Development (3 cr.)
- NEWM N330 Intermediate Game Design and Development (3 cr.)

Advanced Course or Elective

Select one of the following courses:

- NEWM N331 Game Testing and Evaluation (3 cr.) (recommended)
- NEWM N430 Advanced Game Design and Development (3 cr.) (recommended)
- CGT 11600 Geometric Modeling for Visualization and Communication (3 cr.) or NEWM N243 Introduction to 3D (3 cr.)
- CSCI 43700 Introduction to Computer Graphics (3 cr.)
- CSCI 43800 Advanced Game Development (3 cr.)
- CSCI N355 Introduction to Virtual Reality (3 cr.)
- CSCI N451 Web Game Development (3 cr.)
- NEWM N233 Introduction to Creature and Character Design (3 cr.)
- NEWM N261 Storyboarding for Multimedia (3 cr.)
- NEWM N335 Character Design and Animation (3 cr.)
- NEWM N337 Virtual World Design and Development (3 cr.)
- NEWM N339 Augmented Reality Application Design and Development (3 cr.)
- NEWM N434 Serious Games and Simulations (3 cr.)
- NEWM N436 Game Production (3 cr.)

A minimum grade of C is required in any course counted toward the minor.

Admissions and Advising

The minor in Game Design and Development is open to IUPUI students in any major except Media Arts and Science who may pursued the specialization instead.

Email Jill Mathews at jilmathe@iupui.edu to declare the Game Design and Development minor. For academic advising, contact the advisors for the minor at soicindy@iupui.edu or 317-278-4636.

Last updated: 04/24/17

Studio Art and Technology Minor

Studio Art and Technology Minor

The Studio Art and Technology (“ArTech”) minor is an 18 credit hour interdisciplinary minor offered jointly with IU Herron School of Art and Design that uniquely combines courses from Media Arts and Science, Fine Arts and Visual Communication Design.

By taking this minor, students at SoIC will be introduced to and become proficient with a wide variety of skills related to drawing techniques, design thinking, artistic and visual forms, and visual communication design that complements the cutting-edge technology and digital media design and production courses in the Media Arts and Science program.

Minor Requirements

18 credit hours are required for the minor. The minor is only open to students majoring in Media Arts and Science.

- HER E101 Beginning Drawing (or D101 Drawing 1)
- HER E102 Beginning Drawing 2 (or D102 Drawing 2)
- HER S320 Figural Sculpture

Choose one of the following:

- NEWM N201 Design Issues in Digital Media (may be counted as a general education course in the Arts and Humanities)
- NEWM N215 Intermediate Multi-Device Web Development (Prerequisite: N115)
- NEWM N243 Introduction to 3D
- NEWM N253 Introduction to Digital Video
- NEWM N255 Introduction to Digital Sound

Choose two of the following:

- HER D251 Anatomy for Artists
- HER Q261 Introduction to CNC
- HER V201 Making Meaning
- HER D230 Figure Drawing
- HER V211 Typography
- HER V311 Type and Image (HER V211 is pre-req)

Last updated: 04/24/17

Human Computer Interaction (HCI) Undergraduate Certificate

Human Computer Interaction (HCI) Undergraduate Certificate
Upon completion of the undergraduate Human-Computer Interaction Certificate, students will be able to demonstrate knowledge in the following core competencies:

1. **Basic Human-Computer Interaction Theory and Usability Terms, Principles and Practices**
   - Understanding of human-computer interaction and usability terms, concepts, principles and practices
   - Problem space definition and conceptual models of interactive products
   - User-centered approaches to interaction design as applied to software and the web
   - User profiling, needs and requirements
   - Interface design principles and processes; including related areas of visual design
   - Cognitive and information processing
   - Processes and life-cycles of interactive product design
   - Interactive product evaluation and testing methods, both qualitative and quantitative
2. **Ability to Understand and Demonstrate Basic Design and Evaluation of Interactive Products Up to the High Fidelity Prototype Stage**
   - Interactive product interface design and prototyping based on user/needs assessments
   - Human-computer interaction principles and a user-centered approach to interaction design as applied to software and the Web
   - Apply evaluation and usability testing methods to interactive products to validate design decisions

Last update: 02/04/2014

Undergraduate Informatics Certificate

Undergraduate Informatics Certificate
Upon completion of the undergraduate Informatics Certificate, students will be able to demonstrate knowledge in the following core competencies:

1. **Technical Knowledge:**
   - Define terms and explain basic principles important to the operation of computing systems, as well as fundamental programming concepts
   - Demonstrate knowledge and skills in data representation, models, structures and management
2. **Social Dynamics of Informatics and Information Technology:**
   - Understand and apply major societal trends affecting the development and deployment of modern day IT, such as access, privacy, intellectual property, security and others
   - Critically analyze the impact of IT on individuals, groups and organizations at local and global levels
   - Analyze the social, cultural and organizational settings in which technology solutions will be deployed to achieve successful implementation
3. **Domain-specific* Critical Thinking and Problem Solving Skills:**
   - Define terms and explain basic principles, concepts and theories from another domain or discipline in which IT skills will be applied
   - Access evolving trends in information technology and IT research
   - Synthesize and analyze information and ideas from multiple sources and perspectives
   - Evaluate data, arrive at reasoned conclusions and solve challenging problems
4. **Collaborative Teamwork:**
   - Select and effectively utilize oral, written, visual and quantitative communication skills within the context of an interdisciplinary team
   - Identify and demonstrate the skills, behaviors and attitudes necessary to function as an effective team member, including working cooperatively with diverse group members
   - Articulate legal and ethical issues when using the creative work of others; respect the intellectual property of others
5. **Professional Ethics and Development:**
   - Participate in the development of a personal code of ethics that considers information ethics
   - Articulate principles for resolving ethical conflicts

Last update: 02/04/2014

Undergraduate Legal Informatics Certificate

Undergraduate Legal Informatics Certificate
Upon completion of the undergraduate Legal Informatics Certificate, students will be able to demonstrate knowledge in the following core competencies:

- Students will be prepared to find employment in law firms and legally-related agencies and organizations, such as courts, law schools, non-profit organizations, regulatory agencies, and vendors that develop and sell products for the legal industry. For example, most federal courts in the U.S. use electronic filing, docket control and document retrieval, provide legal documents and information to the public through websites, offer webinars of oral arguments and other proceedings and have sophisticated systems for courtroom presentations. State courts are moving to become what is known as “the electronic courtroom.” The International Legal Technology Association (ITLA) has a long list of job openings that would provide interesting positions for those who complete the Certificate in Legal Informatics. Moreover, *Fifty Legal Careers for Non-Lawyers* describes a number of career opportunities that are encompassed in the legal informatics curriculum.
- Students who are already working as law technology professionals or paralegals will have an opportunity to update their skills and to have a recognizable certificate from a high-quality institution of higher education, namely, the IU School of Informatics, IUPUI.
- Students will be prepared to bring cutting edge technology to law practices and other legally-related organizations and will not require training on these systems beyond a customary orientation program.
- Students will implement systems and technology that will impact the quality and cost of client services, ease the workload and enhance the productivity of busy attorneys and add greater efficiency to a variety of legally-related agencies and organizations.
- Students who want to focus on electronic discovery in their future careers will be able to sit for the electronic discovery certification examinations being developed by the Organization of Legal Professionals (OLP).

Last update: 02/06/2014

Undergraduate Medical Coding Certificate

Undergraduate Medical Coding Certificate
Students completing the Medical Coding Certificate will aquire competencies in several domains.

Domain I - Life Sciences

1. **Anatomy and Physiology**
   - Identify the structures and functions of the human body
   - Locate anatomical online lookups (Adam, etc.)
2. **Medical Terminology**
   - Demonstrate their ability to spell, define, and pronounce medical terms of major disease processes, diagnostic procedures, laboratory tests, abbreviations, drugs, and treatment modalities
   - Demonstrate knowledge of root/suffix/prefix word build concepts and common medical terms
3. **Pathophysiology**
   - Identify specific disease processes by human body system
   - Identify cause, diagnosis, and treatment for each disease process
4. **Pharmacotherapy & Laboratory Findings**
   - Recognize the action of drugs such as: absorption, distribution, metabolism and excretion by the body.
   - Differentiate between drug classifications
   - Identify the most commonly prescribed drugs
   - Describe a formulary
   - Match drugs to common conditions
   - Match drugs to lab findings

Domain II - Information Technology

1. **Introduction to Desktop Applications**
   - Demonstrate keyboard and web access skills
   - Identify concepts related to hardware and software
   - Demonstrate knowledge of Microsoft Office Suite applications
2. **Computer Software Applications in Healthcare**
   - Recognize commonly used software in healthcare
   - Compile public reporting for disease and disease trends
   - Describe how acute care organizations store and retrieve electronic health records
   - Analyze different types of encoder software
   - Analyze online coding tools (coding reference tools)
   - Evaluate Computer Assisted Coding (CAC) software
   - Identify the issues involving the migration from a paper-based Health Information Management department to an electronic Health Information Management department
   - Summarize acute care environment vendors and their system strengths.
   - Evaluate an Electronic Health Record (EHR)
   - Evaluate a Personal Health Record (PHR)
   - Evaluate Heath Information Exchanges (HIE)

Domain III - Health Information Management

1. **Introduction to Health Information Management**
   - Recognize the content & structure of healthcare data
   - List the content of medical records
   - State the documentation requirements for medical records

- Identify legal/ethics issues in Health Information Management such as privacy, security, and the Health Insurance Portability & Accountability Act
- Recognize release of Information issues
- Identify the Code of Ethics for Health Information Management

2. **Healthcare Delivery Systems**
   - Identify types of healthcare organizations
   - Identify types of healthcare workers
   - Identify healthcare settings that employ coders
   - Understand the types and levels of Healthcare Delivery Systems in the U.S., and of the governing bodies that regulate the Health Information Management processes, and an understanding how eHIM will change this environment
   - Recognize the organization of healthcare delivery
   - Interpret accreditation standards
   - Discuss licensure/regulatory agencies

Domain IV - Clinical Classification Systems

1. **Basic Diagnosis Coding Systems**
   - Demonstrate knowledge of the International Classification of Diseases ICD-9-CM
   - Recognize diagnostic based prospective payment groups such as DRG, APR-DRG, & RUGS.
   - Recognize the International Classification of Diseases ICD-10-CM
   - Recognize the Systematized Nomenclature of Medicine (SNOMED)
   - Demonstrate knowledge of Current Procedural Terminology (CPT)
   - Recognize procedure based payment systems such as Resource Based Relative Value (RBRV), Evaluation &Management and Ambulatory Payment Classification (APC)
   - Identify the impact that coding and sequencing has on reimbursement

2. **Reimbursement Methodologies**
   - Identify Ambulatory Surgery Center reimbursement
   - Identify third party payers
   - Describe billing and insurance procedures
   - Discuss an explanation of benefits
   - Recognize Quality Improvement Organizations (QIO) and their role in the payment process
   - Identify charge master description and maintenance
   - Describe managed care/capitation
   - Recognize compliance issues
   - Audit and monitor the coding process for regulatory compliance

Last updated: 02/04/2014

Bachelor of Science in Health Information Administration

Bachelor of Science in Health Information Administration

Upon graduation, students are eligible for a national registry examination offered through the American Health Information Management Association (AHIMA) and earn the credential of Registered Health Information Administrator (RHIA). This credential exhibits the graduate's expertise in the professional fields of Health Information Management.

Indiana University takes great pride in the fact that graduates of the Health Information Management program have exceeded the AHIMA national average scores on all core competencies on the Registered Health Information Administrator (RHIA) national exam.

Graduates of the Health Information Administration undergraduate program will demonstrate expertise in the following core competencies essential to success as an informatics, computing and information technology professional specializing in health information:

1. **Health Data Management**
   1. Health Data Structure, Content and Standards
   2. Healthcare Information Requirements and Standards
   3. Clinical Classification Systems
   4. Reimbursement Methodologies

2. **Health Statistics, Biomedical Research and Quality Management**
   1. Healthcare Statistics and Research
   2. Quality Management and Performance Improvement

3. **Health Services Organization and Delivery**
   1. Healthcare Delivery Systems
   2. Healthcare Privacy, Confidentiality, Legal and Ethical Issues

4. **Information Technology & Systems**
   1. Information and Communication Technologies
   2. Data, Information, and File Structures
   3. Data Storage and Retrieval
   4. Data Security
   5. Healthcare Information Systems

5. **Organization and Management**
   1. Human Resources Management
   2. Financial and Resource Management
   3. Strategic Planning and Organizational Development
   4. Project and Operations Management

Last updated: 02/04/2014

Student Learning Outcomes

Student Learning Outcomes

Informatics is an applied, professional computing discipline. It responds to society's need to solve increasingly complex problems in all fields of human endeavor by acquiring, managing and interpreting data. Informatics studies the ways in which people, information and digital technologies interact.

Nearly all fields benefit from the rapidly evolving fields of computing and information science. Informatics graduates

solve problems through the application of computing or computation in the sciences, business, the humanities and the arts.

Computing and information technology are evolving rapidly. The student learning outcomes articulated here are central to educating Informatics graduates who possess both the technological and human-centered design skills necessary to develop and deploy useful digital tools that acquire and manage data for informed decision-making. They incorporate intellectual and ethical standards that every School of Informatics graduate should attain.

Bachelor of Science
- Health Information Management
- Informatics
- Media Arts and Science

Undergraduate Certificate
- Human-Computer Interaction
- Legal Informatics
- Medical Coding

Last updated: 04/24/2017

Bachelor of Science in Informatics

Bachelor of Science in Informatics
Graduates of the Informatics undergraduate program will demonstrate expertise in the following core competencies essential to success as an informatics, computing and information technology professional:

1. **Technical Knowledge:**
   - Demonstrate knowledge and skills in the mathematical and logical foundations of informatics, data representation, models, structures and informatics-centric management
   - Define terms and explain basic principles essential to the design and development of IT and computing systems
   - Acquire fundamental concepts and skills in software architectures and the development of information systems
2. **Social Dynamics of Informatics and Information Technology:**
   - Understand and apply major societal trends affecting the development and deployment of modern day IT, such as access, privacy, intellectual property, security and others
   - Critically analyze the impact of IT on individuals, groups and organizations at local and global levels
   - Apply a user-centered approach to interaction design and product usability, including techniques for quantitative and qualitative testing of interface and interaction design
   - Utilize digital tools to communicate with a range of audiences
   - Analyze the social, cultural and organizational settings in which IT solutions will be deployed to achieve successful implementation
3. **Domain-specific* Critical Thinking and Problem Solving Skills:**

   **Domains are areas of specialization that may include business, science, the arts or humanities.*
   - Define terms and explain basic principles, concepts and theories from another domain or discipline in which IT skills will be applied
   - Deploy IT resources in the context of another domain and/or discipline
   - Synthesize, analyze and conceptualize information and ideas from multiple sources and perspectives
   - Evaluate data, arrive at reasoned conclusions and solve challenging problems
4. **Collaborative Teamwork:**
   - Select and effectively utilize oral, written, visual and quantitative communication skills within the context of an interdisciplinary team
   - Identify and demonstrate the skills, behaviors and attitudes necessary to function as an effective team member, including working cooperatively with diverse group members
   - Acquire the skills to initiate, manage and execute an IT project
   - Articulate legal and ethical issues when using the creative work of others; respect the intellectual property of others
5. **Professional Ethics and Development:**
   - Create a personal code of ethics; articulate principles for resolving ethical conflicts
   - Commit to a regular program of continuing education and lifelong learning that is independent of employer sponsorship
   - Participate in professional organizations that promote responsible computing and service to society

   Last updated: 02/04/2014

Bachelor of Science in Media Arts and Science

Bachelor of Science in Media Arts and Science
Graduates of the Media Arts and Science undergraduate program will demonstrate expertise in the following core competencies essential to success as an informatics, computing and information technology professional specializing in new and interactive media:

1. Understand digital media and its effective use as a form of communication.
2. Communicate ideas effectively in written and oral form to a range of audiences.
3. Work effectively as a member of a team to achieve a common goal.
4. Analyze a problem, identify and evaluate alternatives, plan an appropriate solution.
5. Appreciate the history, theory, and traditions of digital media. Evaluate media from multiple perspectives using the theories, concepts, and language of digital media.
6. Demonstrate mastery of the concepts, techniques, and tools in one or more digital media specialties.

7. Apply knowledge and skills to develop professional quality digital media productions in a timely manner and utilizing best practices and standards.
8. Explain the impact of digital media on individuals, organizations, and society.
9. Acknowledge diverse opinions regarding professional, ethical, legal, and social issues with a global perspective.
10. Appreciate the need for lifelong learning and have a plan for continuing professional development.

Last updated: 02/04/2014

Undergraduate Programs

Undergraduate Programs

The School of Informatics and Computing offers a Bachelor of Science degree in Informatics, a Bachelor of Science degree in Media Arts and Science, and a Bachelor of Science degree in Health Information Management.

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 and Computing will periodically review and revise the curricula to ensure that students are prepared to meet contemporary workplace and intellectual demands.

Accelerated Bachelor's and Master's

Earn a bachelor's and master's degree by completing both undergraduate and graduate programs in only 5 years, and get an accelerated start to your future career.

Please contact the School of Informatics and Computing office, or refer to our Web site at https://soic.iupui.edu to confirm current program requirements.

Last Updated: 4/26/2017

Clinical Informatics

Clinical Informatics

Student Consumer Information about this Program

Passionate about information technology, workflow redesign and engagement strategies for health care clinicians? This one-year certificate program is designed for licensed physicians, nurses and other clinical health care professionals seeking leadership roles leveraging information systems to

- Improve health care safety and quality
- Maximize workflow efficiencies
- Preserve user and patient satisfaction

New government requirements for electronic health record adoption and utilization will create a shortage of qualified clinical leaders who truly understand information systems and how to implement them to decrease medical errors and adverse events, while improving overall quality and patient outcomes. Completion of this training program prepares the participant for the implementation of certified electronic health record systems.

Training includes two core courses, three specialized courses and a mentored practicum for a total of 18 credit hours to be completed within one year.

Core Curriculum

- INFO B530 Foundation of Health Informatics
- INFO B581 Health Informatics Standards and Terminology

Specialized Courses (Choose 3)

- INFO B505 Informatics Project Management
- INFO B578 Data Analysis
- LIS S644 Consumer Health Informatics
- INFO B641 Business of Health Informatics
- INFO B643 Natural Language Processing
- INFO B535 Clinical Information Systems
- INFO B642 Clinical Decision Support Systems

Mentored Practicum

- INFO B584 Practicum in Health Information Technology

The mentored practicum provides the opportunity to synthesize coursework and demonstrate competency in clinical informatics in the context of a real-world health care environment.

Human-Computer Interaction

Human-Computer Interaction

Student Consumer Information about this Program

The **Graduate Certificate in Human-Computer Interaction** (HCI) program is a 15-credit-hour program focusing on the core theory and best practices of the discipline. All certificate requirements must be completed within three years and with a minimum cumulative G.P.A. of 3.0 (B). Courses with a grade below a B- will not count. All courses may be taken via distance education.

Admission requirements for the certificate program are the same as those for the M.S. program.

Required Core (12 cr.)

Course	Fall	Spring	Online
INFO H541 Interaction Design Practice (3 cr.)	Yes	No	Yes
INFO H563 Psychology of HCI (3 cr.)	Yes	No	Yes
INFO H543 Interaction Design Methods (3 cr.)	Yes	No	Yes
INFO H561 Meaning and Form in HCI (3 cr.)	No	Yes	Yes

Specialization Requirements (3 cr.)

Select one course.

Course	Fall	Spring	Online
INFO H564 Prototyping for Interactive Systems (3 cr.)	No	Yes	Yes
INFO H590 Ubiquitous Computing (3 cr.)	No	Yes	No
INFO H590 Social Computing (3 cr.)	No	Yes	No

Note: *The semester a course is offered can change. The student is responsible for checking the Registrar for confirmation.*

Note: Applicants who have already earned credit for one or more equivalent courses from other institutions and programs may request to apply/transfer up to three credits toward this certificate, subject to approval. No undergraduate courses can be applied to certificate requirements.

Health Information Management and Exchange

Health Information Management and Exchange

Student Consumer Information about this Program

The primary intent of this certificate training program is to produce skilled participants able to improve health care delivery through the timely collection, management, retrieval, exchange and analysis of electronic health information.

Upon successful completion of the program, participants will

- Achieve a fundamental level of understanding of secure biomedical information management and exchange
- Possess an advanced level of proficiency with respect to coding, classification and medical terminologies
- Achieve an advanced level of proficiency with respect to data management, data quality and data exchange.
- Be competitive for careers like “EHR Implementation Analyst” within health care and public health organizations

The Health Information Management and Exchange Specialist program is designed for post-baccalaureate graduates in healthcare degree programs who desire specialized training in information systems, storage and retrieval.

This 18 credit hour program includes five courses and mentored practicum to be completed within one year.

Core Curriculum

- INFO B582 Health Information Exchange
- INFO B583 Security and Privacy Policies and Regulations for Health Care
- INFO B641 Business of Health Informatics
- INFO B530 Foundations of Health Informatics
- INFO B581 Health Informatics Standards and Terminology

Mentored Practicum

- INFO B584 Practicum in Health Information Technology

The mentored practicum provides the opportunity to synthesize the coursework and demonstrate competency in the role of an EHR Implementation Analyst. Students will be able to demonstrate their comprehension, critical thinking, and problem solving abilities alongside faculty and staff in a real-world environment with a proven leader in health information exchange.

Health Information Security

Health Information Security

Student Consumer Information about this Program

This certificate program provides comprehensive knowledge and skill in health information security program development and administration, including policy, procedures, architectures, risk assessment, disaster recovery and business continuity for both health care and public health organizations. Program graduates will be prepared to take on the roles like:

- Information Security Officer
- Health Information Privacy and Security Specialist
- Chief Healthcare and Information Privacy and Security Officers (CISO),

Successful applicants will possess a bachelors or masters degree who are seeking professional education in health IT.

This 18 credit hour program includes six courses and mentored practicum to be completed within one year.

Core Curriculum

- INFO B535 Clinical Information Systems
- INFO B581 Health Informatics Standards and Terminology
- INFO B583 Security and Privacy Policies and Regulations for Health Care
- INFO B590 Topics in Informatics

Mentored Practicum

- INFO B584 Practicum in Health Information Technology

The mentored practicum allows students to integrate classroom training with real-world experiences. Depending upon the venue chosen, this practical experience may include:

- Working alongside faculty/staff from the Indiana School of Medicine and Regenstrief in electronic health care systems
- Developing and integrating security and privacy policies into real health care systems
- Participating in privacy/security projects that involve the Marion County Public Health Department

- Involvement in one of many funded research groups with projects in-progress across the broad spectrum of clinical, public health and health informatics

Health Information Systems Architecture

Health Information Systems Architecture
This certificate program transforms applicants with IT and computer science backgrounds into health information system architects for health information systems design and development. Participants gain both theoretical and practical background in health information system design. Practical experience may come from projects with OpenMRS or commercial health information systems available through Regenstrief Institute and the School of Informatics and Computing.

Upon successful completion of the program, participants will possess the following:

- A basic understanding of health informatics and health information systems
- Practical experience in developing software tools for health information systems
- Excellent knowledge of technical issues associated with health information system development, such as security, client-server application development, health information reporting and data analysis

Qualified applicants are expected to have an undergraduate or graduate degree in Computer Science or in a closely-related field, with a strong programming and database skill set.

This 18 credit hour program includes five courses and mentored practicum to be completed within one year.

Core Curriculum
- INFO B535 Clinical Information Systems
- INFO B581 Health Informatics Standards and Terminology
- LIS S644 Consumer Health Informatics
- INFO B530 Foundations of Health Informatics
- INFO B585 BioHealth Analytics

Mentored Practicum
- INFO B584 Practicum in Health Information Technology

The mentored practicum allows trainees the opportunity to work on real-world health information systems.

Graduate Certificate Programs

Graduate Certificate Programs

In addition to Master's and PhD degree programs, the School of Informatics and Computing offers a number of graduate certificate programs:

- Human-Computer Interaction
- Clinical Informatics (Clinician Leader)
- Informatics for Public Health Professionals (Public Health Leader)
- Informatics in Health Information Management and Exchange (Health Information Management Exchange Specialist)
- Informatics in Health Information Security (Health Information Privacy and Security Specialist)
- Informatics in Health Information Systems Architecture (Programmer and Software Engineer)

Informatics for Public Health Professionals

Informatics for Public Health Professionals

Student Consumer Information about this Program

The Public Health Leader certificate training program prepares public health professionals to develop, procure and implement information systems that meet public health program needs. This includes

- Supporting the development of strategic direction for public health informatics within the enterprise
- Using informatics standards
- Managing and monitoring IT operations
- Evaluating information systems and their applications
- Contributing to the development of interoperable public health information systems
- Implementing solutions that ensure the confidentiality, security, and integrity of captured data while maximizing the availability of information for public health

The scope of this program is designed to meet the core competencies for public health informaticians as described by the Centers for Disease Control and Prevention. Based upon this guidance, ideal eligible students entering this program will have a graduate or doctoral level preparation in public health, including demonstrated course work in epidemiology and data analysis. The requirement for masters or doctorate level preparation may be waived by the demonstration of significant public health experience through years of service and a leadership role at a public health agency. Participants will complete a mentored project in health informatics with a focus on a public health research or community project.

Training includes two core courses, three specialized courses, and a mentored practicum to be completed within one year.

General Course Requirements
18 graduate credit hours are required, including:

- Two core courses (6 credits)
- Three specialization courses (9 credits)
- Practicum (3 credits)

Core Courses (6 credits)
- PBHL P650 Readings in Public Health with subtopic Foundations in Public Health Informatics
- INFO B581 Health Information Standards and Terminology

Specialization (9 credits)
- INFO B505 Informatics Project Management
- INFO B578 Data Analysis
- LIS S644 Consumer Health Informatics
- INFO B535 Clinical Information Systems

- INFO B583 Security and Privacy Policies and Regulations for Health Care

Mentored Practicum (3 credits)
- INFO B584 Practicum in Health Information Technology

The mentored practicum focuses on participation in the development of knowledge management tools for the public health enterprise, ensuring that the knowledge, information, and data needs of the project, program users and other stakeholders are met, applying public health informatics research, and supporting the use of informatics to integrate clinical health, environmental risk and population health.

Additionally, all training participants are expected to participate in the Indiana Center of
Excellence in Public Health Informatics (ICEPHI) monthly work-in-progress seminars.
The ICEPHI brings together the expertise of the following institutions:

- The Polis Center, a national leader in community-based and public health research and applications using geographic information technologies
- The Indiana State Health Department
- The Marion County (Ind.) Health Department
- The IU School of Medicine's Department of Public Health
- The Department of Geography in the School of Liberal Arts at IUPUI
- IUPUI's Center for Health Geographics
- A data visualization group at IU-Bloomington

After training participants complete their mentored practicum, they are required to present their outcomes at a monthly ICEPHI meeting.

Bioinformatics

Bioinformatics
The M.S. in Bioinformatics is a 36-credit-hour program that integrates knowledge from informatics, computation, information systems, mathematics, biology and other related areas. Successful applicants are expected to have an introductory background in both informatics (or computer science) and biology.

The program may be completed in two years by a full-time student. Part-time study options are available for domestic students. However, international students and any students funded directly by the School of Informatics and Computing (in the form of an assistantship or fellowship) must complete the program in two years.

You may choose one of three tracks:

1. Project track
2. Thesis track
3. A non thesis/project track

Project Track

Required Core Courses (18 cr.)
- INFO B519 Introduction to Bioinformatics (3 cr.)
- INFO B532 Seminar in Bioinformatics (3 cr.)
- INFO B556 Biological Database Management (3 cr.)
- INFO B573 Programming for Chem/Life Science (3 cr.)
- INFO B606 Algorithms in Bioinformatics (Previously offered as CSCI 590) (3 cr.)
- INFO B616 Integrative Big Data Analysis (currently offered as B590 High Throughput Data in Biology) (3 cr.)

Advanced Core Courses (12 cr.)
9 – 12 credits from the following 6 courses:

- INFO B529 Machine Learning in Bioinformatics (3 cr.)
- INFO B536 Statistical Methods in Bioinformatics (3 cr.)
- INFO B646 Computational System Biology (3 cr.)
- INFO B619 Structural Bioinformatics (3 cr.)
- INFO B656 Translational Bioinformatics Applications (3 cr.)
- INFO B636 Advanced Genomics and Translational Bioinformatics (3 cr.)

0 – 3 credits from the following 4 courses:

- INFO B535 Clinical Information Systems (3 cr.)
- INFO B642 Clinical Decision Support Systems (3 cr.)
- INFO B590 Next Generation Sequencing (3 cr.)
- INFO B585 BioHealth Analytics (3 cr.)

Project (3 cr.)
- INFO B692 Bioinformatics Project (3 cr.)

Electives (3 cr.)
Students can take other graduate courses either inside or outside the School of Informatics and Computing.

Thesis Track

Required Core Courses (18 cr.)
- INFO B519 Introduction to Bioinformatics (3 cr.)
- INFO B532 Seminar in Bioinformatics (3 cr.)
- INFO B556 Biological Database Management (3 cr.)
- INFO B573 Programming for Chem/Life Science (3 cr.)
- INFO B606 Algorithms in Bioinformatics (Previously offered as CSCI 590) (3 cr.)
- INFO B616 Integrative Big Data Analysis (currently offered as B590 High Throughput Data in Biology) (3 cr.)

Advanced Core Courses (12 cr.)
9 – 12 credits from the following 6 courses:

- INFO B529 Machine Learning in Bioinformatics (3 cr.)
- INFO B536 Statistical Methods in Bioinformatics (3 cr.)
- INFO B646 Computational System Biology (3 cr.)
- INFO B619 Structural Bioinformatics (3 cr.)
- INFO B656 Translational Bioinformatics Applications (3 cr.)
- INFO B636 Advanced Genomics and Translational Bioinformatics (3 cr.)

0 – 3 credits from the following 4 courses:

- INFO B535 Clinical Information Systems (3 cr.)
- INFO B642 Clinical Decision Support Systems (3 cr.)

- INFO B590 Next Generation Sequencing (3 cr.)
- INFO B585 BioHealth Analytics (3 cr.)

Thesis (6 cr.)
- INFO B692 Bioinformatics Thesis (6 cr.)

Non-Thesis or Project Track

Required Core Courses (18 cr.)

- INFO B519 Introduction to Bioinformatics (3 cr.)
- INFO B532 Seminar in Bioinformatics (3 cr.)
- INFO B556 Biological Database Management (3 cr.)
- INFO B573 Programming for Chem/Life Science (3 cr.)
- INFO B606 Algorithms in Bioinformatics (Previously offered as CSCI 590) (3 cr.)
- INFO B616 Integrative Big Data Analysis (currently offered as B590 High Throughput Data in Biology) (3 cr.)

Advanced Core Courses (12 cr.)
9 – 12 credits from the following 6 courses:

- INFO B529 Machine Learning in Bioinformatics (3 cr.)
- INFO B536 Statistical Methods in Bioinformatics (3 cr.)
- INFO B646 Computational System Biology (3 cr.)
- INFO B619 Structural Bioinformatics (3 cr.)
- INFO B656 Translational Bioinformatics Applications (3 cr.)
- INFO B636 Advanced Genomics and Translational Bioinformatics (3 cr.)

0 – 3 credits from the following 4 courses:

- INFO B535 Clinical Information Systems (3 cr.)
- INFO B642 Clinical Decision Support Systems (3 cr.)
- INFO B590 Next Generation Sequencing (3 cr.)
- INFO B585 BioHealth Analytics (3 cr.)

Electives (6 cr.)
Students can take other graduate courses either inside or outside the School of Informatics and Computing.

Last updated: 02/25/2014

Human-Computer Interaction

Human-Computer Interaction
The M.S. in Human-Computer Interaction is a 36-credit-hour program that integrates computing, usability, interface design, the social sciences and other disciplines in the design and development of user-friendly technologies, software and information systems.

As a graduate, you'll be well prepared for a career in private industry or academia, or for admission to the Ph.D. in Informatics program with a human-computer interaction specialization.

The program may be completed in two years by a full-time student. Part-time study options are available for domestic students. However, international students and any students funded directly by the School of Informatics and Computing (in the form of an assistantship or fellowship) must complete the program in two years.

A thesis or applied research project is required to complete your degree.

For students starting Fall 2013

Core (24 cr.)
- INFO H501 Introduction to Informatics (3 cr.)
- INFO H541 Interaction Design Practice (3 cr.)
- INFO H543 Interaction Design Methods (3 cr.)
- INFO H561 Meaning and Form in HCI (3 cr.)
- INFO H563 Psychology of HCI (3 cr.)
- INFO H564 Prototyping for Interactive Systems (3 cr.)
- INFO H590 Ubiquitous Computing (3 cr.)
- INFO H590 Social Computing (3 cr.)

Final Project or Thesis (6 cr.)

Final Project Option
All HCI students must complete a final project by registering for two courses: H680 HCI Professional Practice 1 (offered ONLY in the Fall) and H681HCI Professional Practice 2 (offered ONLY in the Spring). Each course includes a formally scheduled in-class time that students must attend. Students will work on one final project that extends throughout the two courses, i.e., in both fall and spring semesters. Students will receive an official grade at the conclusion of each course/semester. Students are encouraged to propose a project that can be realistically completed by the conclusion of H681, the Spring semester. Incompletes are NOT permitted.

Required Courses
- INFO H680 HCI Professional Practice 1 (3 cr.) – Required for Final Project
  Note: Pre-requisites: INFO H541, H561, H543, H563, and H564
- INFO H681 HCI Professional Practice 2 (3 cr.) – Required for Final Project
  Note: Pre-requisites: INFO H680

Thesis Option
The Thesis option is reserved for students who possess a demonstrated ability to carry out publishable empirical research. Qualified students must find a research-active faculty member willing to advise them on a thesis by the end of the second semester.

Students taking the Thesis option must take and successfully pass I575 Informatics Research Design by the completion of their first year. They should also take an additional statistics course prior to their final regular semester (see the plan of study). As with the final project, an incomplete will NOT be permitted. It is the student's responsibility to propose a thesis that can be completed within a two-semester timeline. To do this, students MUST provide their primary thesis advisor with a full thesis proposal and outline that includes a timeline for the writing of the thesis.

Required Course
- INFO H694 HCI Thesis (6 cr.)

Electives (6 cr.)

School of Informatics and Computing
- INFO H503 Social Impact of Information Technologies (3 cr.)

- INFO B505 Informatics Project Management (3 cr.)
- INFO H534 Seminar in Human Computer Interaction (1-3 cr.)
- INFO H550 Legal and Business Issues in Informatics (3 cr.)
- INFO H554 Independent Study in Human Computer Interaction (1-3 cr.)
- INFO I575 Informatics Research Design (3 cr.)
- INFO H590 Topics in Informatics (3 cr.)
- LIS S503 Organization and Representation of Knowledge & Information (3 cr.)
- LIS S532 Information Architecture for the Web (3 cr.)
- NEWM N503 Digital Media Application Design Processes (3 cr.)
- NEWM N510 Web-Database Concepts (3 cr.)
- NEWM N501 Foundations of Digital Production (3 cr.)
- NEWM N504 Advanced Interactive Design Applications (3 cr.)

Herron School of Art / Design Thinking & Methods*
- HER V501 Intro to Design Thinking [Fall Wks 1-8 Seminar] (1.5 cr.)
- HER V502 Intro to Human Factors in Design [Fall Wks 1-8 Seminar] (1.5 cr.)
- HER V511 People-Centered Design Research [Fall Wks 1-8 Methods] (1.5 cr.)
- HER V521 Design Analysis [Fall Wks 9-16 Methods] (1.5 cr.)
- HER V531 Design Synthesis [Spring Wks 1-8 Methods] (1.5 cr.)
- HER V541 Design Evaluation [Spring Wks 9-16 Methods] (1.5 cr.)
- HER R511 Studio: Designing Integrated Experiences 1 [Fall] (3 cr.)
- HER R512 Studio: Designing Integrated Experiences 2 [Spring] (6 cr.)

Note: Herron design courses are offered during the day. Full-time graduate students are encouraged to register for these courses as electives.

Social Sciences
- PSY I643 Field Methods and Experiments (3 cr.)
- SOC S551 Sociological Research Methods (3 cr.)
- SOC S659 Qualitative Methods in Sociology (3 cr.)
- ANTH E404 Field Methods in Ethnography (3 cr.)
- X000 Courses from the social sciences: psychology, sociology, anthropology (3 cr.)

Computer Science
- CSCI 507 Object-Oriented Design and Programming (3 cr.)
- CSCI 550 Computer Graphics (3 cr.)
- CSCI 552 Advanced Graphics and Visualization (3 cr.)

For students enrolled prior to Fall 2013

Core (18 cr.)
- INFO H501 Introduction to Informatics (3 cr.)
- INFO H541 Interaction Design Practice (3 cr.)
- INFO H561 Human-Computer Interaction Design II (3 cr.)
- INFO H543 Usability and Evaluative Methods (3 cr.)
- INFO H563 Psychology of HCI (3 cr.)
- INFO H564 Prototyping for Interactive Systems (3 cr.)

Final Project/Thesis (6 cr.)
- INFO H680 HCI Professional Practice 1 (3 cr.) – Required for Final Project
  Note: Pre-requisites: INFO H541, H561, H543, H563, and H564
- INFO H681 HCI Professional Practice 2 (3 cr.) – Required for Final Project
  Note: Pre-requisites: INFO H680

** For the Thesis option (only with special permission), take INFO H694 HCI Thesis (6 cr.) instead of H680/H681. There are additional required courses for students who take the Thesis option (see Plan of Study).*

Electives (12 cr.) Informatics / Media Arts & Science
- INFO H503 Social Impact of Information Technologies (3 cr.)
- INFO B505 Informatics Project Management (3 cr.)
- INFO H534 Seminar in Human Computer Interaction (1-3 cr.)
- INFO H550 Legal and Business Issues in Informatics (3 cr.)
- INFO H554 Independent Study in Human Computer Interaction (1-3 cr.)
- INFO H575 Informatics Research Design (3 cr.)
- INFO H590 Topics in Informatics (3 cr.)
- NEWM N503 Digital Media Application Design Processes (3 cr.)
- NEWM N510 Web-Database Concepts (3 cr.)
- NEWM N501 Foundations of Digital Production (3 cr.)
- NEWM N504 Advanced Interactive Design Applications (3 cr.)

Herron School of Art / Design Thinking & Methods*
- HER V501 Intro to Design Thinking [Fall Wks 1-8 Seminar] (1.5 cr.)
- HER V502 Intro to Human Factors in Design [Fall Wks 1-8 Seminar] (1.5 cr.)
- HER V511 People-Centered Design Research [Fall Wks 1-8 Methods] (1.5 cr.)
- HER V521 Design Analysis [Fall Wks 9-16 Methods] (1.5 cr.)
- HER V531 Design Synthesis [Spring Wks 1-8 Methods] (1.5 cr.)
- HER V541 Design Evaluation [Spring Wks 9-16 Methods] (1.5 cr.)
- HER R511 Studio: Designing Integrated Experiences 1 [Fall] (3 cr.)
- HER R512 Studio: Designing Integrated Experiences 2 [Spring] (6 cr.)

Note: Herron design courses are offered during the day. Full-time graduate students are encouraged to register for these courses as electives.

Library & Information Science
- LIS S505 Organization and Representation of Knowledge & Information (3 cr.)
- LIS S509 Introduction to Research and Statistics (3 cr.)
- LIS S545 Systems Analysis and Design (3 cr.)
- LIS S546 User-centered Database Design (3 cr.)

- LIS S571 Information Architecture for the Web (3 cr.)
- LIS S625 Information in the Social Sciences (3 cr.)

Social Sciences

- PSY I643 Field Methods and Experiments (3 cr.)
- SOC S551 Sociological Research Methods (3 cr.)
- SOC S659 Qualitative Methods in Sociology (3 cr.)
- ANTH E404 Field Methods in Ethnography (3 cr.)
- X000 Courses from the social sciences: psychology, sociology, anthropology (3 cr.)

Computer Science

- CSCI 507 Object-Oriented Design and Programming (3 cr.)
- CSCI 550 Computer Graphics (3 cr.)
- CSCI 552 Advanced Graphics and Visualization (3 cr.)

Last Updated: February, 2014.

Health Informatics

Health Informatics

The School of Informatics and Computing 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 the 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.

Informatics 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. Faculty in the department is externally funded to conduct research in medical informatics and bioinformatics. Other academic programs in public health, applied health sciences, and hospital administration offer important supporting course work.

Degree Requirements

The M.S. in Health Informatics is a 36-credit-hour program that integrates knowledge from informatics, healthcare, health information technology and other disciplines to analyze and protect patient data, increase healthcare efficiencies and produce higher quality patient care.

Degree requirements listed on this page apply to students entering the program on or after fall 2012. Requirements for students matriculating prior to fall 2012 can be found here.

Project Track

- INFO B501 Introduction to Informatics (3 cr.)
- INFO B530 Foundations of Health Informatics (3 cr.)
- INFO B535 Clinical Information Systems (3 cr.)
- INFO B581 Health Informatics Standards and Terminology (3 cr.)
- INFO B583 Security and Privacy Policies (3 cr.)
- INFO B642 Clinical Decision Support Systems (3 cr.)
- INFO B505 Informatics Project Management (3 cr.)
- INFO B691 Project in Health Informatics (3 cr.)
- Elective (3 cr.)
- Elective (3 cr.)
- Elective (3 cr.)
- Elective (3 cr.)

Thesis Track

- INFO B501 Introduction to Informatics (3 cr.)
- INFO B530 Foundations of Health Informatics (3 cr.)
- INFO B535 Clinical Information Systems (3 cr.)
- INFO B581 Health Informatics Standards and Terminology (3 cr.)
- PBHL B651 Introduction to Biostatistics (3 cr.)
- INFO B642 Clinical Decision Support Systems (3 cr.)
- INFO I575 Informatics Research Design (3 cr.)
- INFO B691 Thesis (3 cr.)
- Elective (3 cr.)
- Elective (3 cr.)
- Elective (3 cr.)
- Elective (3 cr.)

Note: *The semester a course is offered can change. The student is responsible for checking the Registrar for confirmation.*

Sample Elective Options

Other elective courses are possible upon approval of the faculty.

- INFO B551 Independent Study
- INFO B578 Data Administration: Clinical Administration Decision Making (3 cr.)
- INFO B582 Health Information Exchange
- INFO B583 Privacy and Security in Health Care
- INFO B590 Topical
- INFO B601 Introduction to Complex Systems
- INFO B605 Social Foundations of Informatics Yes
- INFO H611 Math & Log Foundations of Informatics No
- INFO B617 Informatics in Life Sciences and Chemistry No
- INFO B641 Business of Health Informatics Yes

- INFO B643 Natural Language Processing No
- LIS S644 Consumer Health Informatics Yes
- INFO H543 Usability and Evaluative Methods in Interactive Design Yes
- INFO H563 Psychology of HCI Yes
- INFO H564 Prototyping for Interactive Systems Yes
- GRAD 610 Topic in Translation and Implementation of Research
- GRAD 660 Clinical Research Methods
- GRAD 661 Clinical Trial
- GRAD G667 Tools and Techniques in Translational Research
- GRAD G668 Quantitative Aspects in Translational Research
- GRAD G672 Translational Research and Entrepreneurship
- PHBL P563 Intro to Applied Stat Methods

Last updated: 02/06/2014

MS Degree Programs

MS Degree Programs
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 and Computing offers **Master of Science** degrees in:

- Bioinformatics
- Health Informatics
- Human-Computer Interaction
- Media Arts and Science

All Master of Science degrees require 36 credits, including the completion of common graduate core courses.

To learn more about the M.S. degree programs review the following information:

- Academic Regulations
- Admission to the M.S. Program
- Financial Assistance

Media Arts and Science

Media Arts and Science
The M.S. in Media Arts and Science is a 30-credit-hour professional program emphasizing an applied, project-based approach to the latest in digital media production. The program can be customized with study in other fields, including media production, design thinking and usability analysis, psychology, communication theory, information management, and computing. Projects will be based on your specific area(s) of interest to build a valuable portfolio and advance your career.

The program easily accommodates working professionals with many evening courses and a flexible timetable for degree completion for the part-time student. Full-time students can complete the program in two years.

Core (9 cr.)

- NEWM N500 Principles of Multimedia Technology (3 cr.)
- NEWM N501 Foundations of Digital Production (3 cr.)
- NEWM N503 Digital Media Application Design Processes (3 cr.)

Project or Thesis (6 cr.)

- NEWM N506 Thesis/Project (3 cr.) *Taken each of your final two semesters.*

Electives (15 cr.)

School of Informatics and Computing
Media Arts and Science

- NEWM N502 Digital Media Motion and Simulation Methods
- NEWM N504 Advanced Interactive Design Applications
- NEWM N505 Internship in Media Arts
- NEWM N585 Serious Games
- NEWM N585 Psychology of Media
- NEWM N510 Web Database Concepts
- NEWM N553 Independent Study (1-3 cr.), *can be repeated*

Human-Computer Interaction
Note: completion of this set of courses earns the Graduate Certificate in HCI

- INFO H541 HCI Design 1
- INFO H561 Meaning and Form in HCI
- INFO H543 Interaction Design Methods
- INFO H563 Psychology of HCI
- INFO H564 Prototyping for Interactive Systems

Informatics

- INFO H501 Introduction to Informatics
- INFO B505 Informatics Project Management
- INFO H503 Social Impact of Information Technologies
- INFO B512 Scientific and Clinical Data Management
- INFO H550 Legal and Business Issues in Informatics
- INFO H575 Informatics Research Design
- INFO H590 Topics in Informatics, *can be repeated*
- INFO H600 Professionalism and Pedagogy in Informatics
- INFO H605 Social Foundations of Informatics

Department of Library and Information Science

- LIS S503 Organization and Representation of Knowledge & Information
- LIS S532 Information Architecture for the Web

Herron School of Art, Department of Visual Communication

- HER V501 Intro to Design Thinking
- HER V502 Intro to Human Factors in Design
- HER V511 People-Centered Design Research
- HER V521 Design Analysis
- HER V531 Design Synthesis
- HER V541 Design Evaluation
- HER R511 Studio: Designing Integrated Experiences 1

- HER R512 Studio: Designing Integrated Experiences 2

School of Liberal Arts, Department of Communication Studies

- COMM C500 Advanced Communication Theory
- COMM C510 Health Provider-Consumer Communication
- COMM C526 Effective Media Strategies
- COMM C531 Media Theory and Criticism
- COMM C582 Advanced Intercultural Communication
- COMM C620 Computer-Mediated Communication

Last updated: 04/01/2015

PhD Degree Programs

Ph.D. Programs
The Indiana University School of Informatics and Computing, the first of its kind in the country, was created as a place where innovative multidisciplinary programs could thrive, a program where students can apply the skills of technology to a range of other fields.

All Ph.D. candidates must meet with their academic and/or research advisor for course selection and plan of study.

The School of Informatics offers a **Doctoral (Ph.D.)** program with specializations in:

- Bioinformatics
- Health and Biomedical Informatics
- Human-Computer Interaction
- Data Science

Bioinformatics

The **Ph.D. in Informatics with Bioinformatics specialization** is a 90-credit-hour program that integrates knowledge from informatics, computation, information systems, mathematics, biology and other related areas.

The program includes core courses, research rotations, your choice of minor, qualifying examinations and a dissertation.

Degree requirements listed on this page apply to students entering the program on or after fall 2012. Requirements for students matriculating prior to fall 2012 can be found here.

Core Courses (Core A: 18 cr.)

- INFO B519 Introduction to Bioinformatics (3 cr.)
- INFO B573 Programming for Chem/Life Science (3 cr.)
- INFO B556 Biological Database Management (3 cr.)
- INFO B590 Computational Methods for Analyzing High-Throughput Data in Biomedicine (3 cr.)
- CSCI 590 Algorithms in Bioinformatics (3 cr.)
- INFO B600 Professionalism and Pedagogy in Informatics (3 cr.)

Advanced Courses (Core B: 12 cr.)
Select four:

- INFO B529 Machine Learning in Bioinformatics (3 cr.)
- INFO B619 Structural Bioinformatics (3 cr.)
- INFO B646 Computational System Biology (3 cr.)
- INFO B656 Translational Bioinformatics Applications (3 cr.)
- GRAD 652/R607 Biostatistics II / Advanced Statistics (3 cr.)
- INFO B590 Next Generation Sequencing (3 cr.)

Seminar Courses (6 cr.)

- INFO B627 Advanced Seminar I – Bioinformatics (3 cr.)
- INFO B637 Advanced Seminar II – Bioinformatics (3 cr.)

Independent Study/Rotation (6 cr.)
Students are required to take 6 credit hours of rotation as part of the thesis research credits. It is recommended to take these credit hours early in the Ph.D. program by enrolling in INFO B790.

May be taken twice

- INFO B790 Independent Study/Rotation (3 cr.)

Electives
No minimum or maximum credits Students may take other electives (subject to approval) at the graduate level as needed for their specific research.

Minor (minimum 12 cr.)
All students will be required to have an appropriate minor outside or partially inside the School of Informatics and Computing for a minimum 12.0 credit hours. Minors will be selected with the advisor's recommendation. Some appropriate minors would include: biology, chemistry, cognitive psychology, computer science, information science, or statistics. In all cases the number of hours to be included in the minor will be consistent with the requirements of the unit granting the minor. Some of the courses included in the minor may also count toward the student's methodology or other requirements.

Qualifying Examination – Written
All students will take a written qualifying examination that covers the core courses (CORE A and B). The examination will be set by a group of faculty who are familiar with the content of the core courses. Examinations will be offered in August. Examinations must be completed by the beginning of the student's fourth year in the program but can be completed before that time when the core courses are completed. Students who do not successfully complete the examination can retake the examination a second time.

Qualifying Examination – Oral

1. The oral examination will take place after the student successfully passes the written exam. Students must pass both the written and oral exam before passing on to candidacy. Only two attempts to pass the oral examination will be allowed.
2. The oral exam will be based on the student's response to the written exam and any material from the core courses.

Dissertation Proposal
This is an oral review that covers in-depth knowledge of the student's primary research area and dissertation proposal. The research proposal for dissertation must be approved by the student's research committee. That

committee may have the same membership as the program committee or the students may choose different members. The advisor for the dissertation will be a faculty member in the School of Informatics and Computing and a member of the Graduate Faculty. At least one the three members of the committee will be based outside of the school. The student will defend the thesis proposal at a public colloquium in the school. The review should be completed within one-year after passing the Qualifying Examinations.

Dissertation (30 cr. minimum)

- INFO B890 Thesis/Project in Bioinformatics (1-6 cr.)

Please refer to the IUPUI Graduate School Bulletin for more details on the dissertation process.

Last updated: 02/25/2014

Health Informatics

The **Ph.D. in Informatics with a Health Informatics specialization** is a 90-credit-hour program that integrates knowledge from informatics, healthcare, health information technology and other disciplines to analyze and protect patient data, increase healthcare efficiencies and produce higher quality patient care.

The program includes core courses, research rotations, your choice of minor, qualifying examinations and a dissertation.

Foundations in Health Informatics (21 cr.)

- INFO B501 Introduction to Informatics (3 cr.)
- INFO B530 Foundations of Health Informatics (3 cr.)
- INFO B535 Clinical Information Systems (3 cr.)
- INFO I575 Informatics Research Design (3 cr.)
- INFO B581 Health Informatics Standards & Terminology (3 cr.)
- INFO B642 Clinical Decision Support Systems (3 cr.)
- PHBL B651 Introduction to Biostatistics I (3 cr.)

Electives (12 cr.)

Choose four courses.

- INFO B582 Health Information Management (3 cr.)
- INFO B583 Privacy and Security in Health Care (3 cr.)
- INFO B601 Introduction to Complex Systems (3 cr.)
- INFO B605 Social Foundations of Informatics (3 cr.)
- INFO H611 Mathematical Foundations (3 cr.)
- INFO B641 Business of Health Informatics (3 cr.)
- INFO B643 Natural Language Processing (3 cr.)
- INFO B590 Health Analytics (3 cr.)
- LIS S644 Consumer Health Informatics (3 cr.)

Other elective courses are possible upon approval of the faculty advisor.

HCI Courses

- INFO H543 Usability and Evaluative Methods in Interactive Design (3 cr.)
- INFO H563 Psychology of HCI (3 cr.)
- INFO H564 Prototyping for Interactive Systems (3 cr.)

Graduate School Courses

- GRAD 610 Topic in Translation and Implementation of Research (3 cr.)
- GRAD 661 Clinical Trials (3 cr.)
- GRAD 653 Introduction to Applied Statistic Methods (3 cr.)

Required Ph.D. Specific Courses (9 cr.)

- INFO B600 Professionalism and Pedagogy in Informatics (3 cr.)
- PBHL P652 Introduction to Biostatistics II (3 cr.)
- GRAD 660 Clinical Research Methods (3 cr.)

Required Seminar Courses (6 cr.)

- INFO B667 Seminar in Health Informatics I (3 cr.)
- INFO B668 Seminar in Health Informatics II (3 cr.)

Required Independent Study/Rotation (6 cr.)
May be taken twice

- INFO B790 Independent Study/Rotation (3 cr.)

Minor (12 cr.)
All students will be required to have an appropriate minor outside or partially inside the school. Minors will be selected with the advisor's recommendation. The selected minor should be appropriate to the student's choice of sub discipline within informatics. Some appropriate minors would include biology, chemistry, cognitive psychology, computer science and information science. In all cases the number of hours to be included in the minor will be consistent with the requirements of the unit granting the minor.

Qualifying Examinations

Written Exam
All students will take a written qualifying examination that covers the (1) core courses of the Master In Health Informatics Program and (2) critical review of Health Informatics Research. The examination will be set by a group of faculty who are familiar with the content of the core courses. Examinations will be offered in August. Examinations must be completed by the beginning of the student's third year in the program, but can be completed before that time when the core courses are completed. Students who do not successfully complete the examination can retake the examination a second time.

Oral Exam
The oral examination will take place after the student successfully passes the written exam. Students must pass both the written and oral exam before passing on to candidacy. Only two attempts to pass the oral examination will be allowed.

The oral exam will be based on the student's response to the written exam and any material from the core courses.

Dissertation

Proposal (Required)
This is an oral exam that covers in-depth knowledge of the student's primary research area and dissertation proposal. The research proposal for dissertation must be approved by the student's research committee. That committee may have the same membership as the program committee or the students may choose different members. The advisor for the dissertation will be a faculty member in the School of Informatics and Computing and a member of the Graduate Faculty. At least one the three members of the

committee will be based outside of the school. The student will defend the thesis proposal at a public colloquium in the school. The examination should be completed within one-year after passing the Qualifying Examinations. Only two attempts to pass this examination will be allowed.

Dissertation (21 to 30 cr.)
A written elaboration of significant original research, which must be successfully presented to the research committee in a public defense as described in the Graduate School Bulletin.

- INFO B890 Thesis/Project in Health Informatics (1-12 cr. repeatable)

Please refer to the IUPUI Graduate School Bulletin for more details on the dissertation process.

Last updated: 02/25/2014

Human-Computer Interaction

The **Ph.D. in Informatics with a Human-Computer Interaction** specialization is 90-credit-hour program that integrates computing, usability, interface design, the social sciences and other disciplines in the design and development of user-friendly technologies, software and information systems.

The program includes core courses, research rotations, your choice of minor, qualifying examinations and a dissertation.

Core A (15 cr.)
- INFO H541 Interaction Design Practice (3 cr.)
- INFO H543 Interaction Design Methods (3 cr.)
- INFO H563 Psychology of Human-Computer Interaction (3 cr.)
- INFO H564 Prototyping for Interactive Systems (3 cr.)
- INFO H590 Ubiquitous Computing (3 cr.)

Core B (12 cr.)
- INFO H501 Introduction to Informatics (3 cr.)
- INFO H600 Professionalism and Pedagogy in Informatics (3 cr.)
- INFO H624 Advanced Seminar I in Human-Computer Interaction (3 cr.)
- INFO H634 Advanced Seminar II in Human-Computer Interaction (3 cr.)

Research Rotation (6 cr.)
- INFO H790 Research Rotations (6 cr.)

Research Theory/Methods (9 cr.)
- INFO I575 Informatics Research Design (3 cr.)

Besides I575, two additional courses in research methods are required to better prepare you in the necessary theory, knowledge and techniques of quantitative and qualitative methodologies. These courses may be taken from programs outside the School of Informatics and Computing, such as the social sciences (e.g., psychology, anthropology, sociology, or communication). See the plan of study document for recommended research methods courses.

Electives (9 – 18 cr.)

You may take other electives (subject to approval) at the graduate level as needed for your specific research. View the plan of study for more information.

Minor (12 cr.)
You must complete a minor within a domain appropriate to your choice of specialization and/or research area. All courses must be graduate-level and outside the School of Informatics and Computing.

Qualifying Examinations
1. **Written Exam** – You must successfully complete a written qualifying examination by the end of the program's second year. The exam is established by faculty and covers subject matter taken in the program's core courses. The exam may be retaken once.
2. **Oral Exam –** An oral examination takes place within weeks after successful completion of the written exam. You must pass both the written and oral exam before passing on to Ph.D. candidacy. The oral exam is based on the student's response to the written exam and core course material. The exam may be retaken once.

Guide to the HCI PhD Qualifying Exams

Dissertation
A dissertation is a written elaboration of original research that makes creative contributions to your chosen area of specialization. Students will enroll multiple times in INFO H890 Thesis Readings and Research (1-12 cr.) as you work to complete your dissertation. All requirements must be completed within seven years of passing the qualifying exams. The dissertation process includes the following components:

1. **Proposal** – This is an in-depth oral review undertaken by students who have made significant progress in their research. The proposal will be defended at a public colloquium. You must complete the proposal within one year of passing the qualifying exams.
2. **Defense** – You must defend your dissertation in an open seminar scheduled when doctoral research is almost complete.

Please refer to the IUPUI Graduate School Bulletin for more details on the dissertation process.

Last updated: 02/25/2014

Data Science

The **Ph.D. in Informatics with Data Science specialization** is a 90-credit-hour program that prepares students to address data research problems with inventive and creative solutions that generate new knowledge through studies that demonstrate a high degree of intellectual merit and the potential for broader impact. The Ph.D. curriculum also prepares students to make research contributions that advance the theory and practice of data science.

The program includes core courses, methods courses, your choice of minor, qualifying examinations and a dissertation.

Degree requirements listed on this page apply to students entering the program on or after spring 2017.

Core Courses (24 cr.)

- INFO I501 Introduction to Informatics (3 cr.)
- LIS #S517 Web Programming (3 cr.)
- CSCI 54100 Database Systems (3 cr.) or NEWM N510 Web Database Concepts (3 cr.)
- CSCI 57300 Data Mining (3 cr.) or INFO H515 Introduction to Data Analytics (3 cr.)
- CSCI 59000 Cloud Computing (3 cr.) or INFO H516 Applied Cloud Computing for Data Intensive Sciences (3 cr.)
- INFO I600 Professionalism and Pedagogy in Informatics (3 cr.)
- INFO I790 Independent Study/Rotation(3 cr.)
- INFO I575 Informatics Research Design (3 cr.)

Methods Courses, choose six (18 cr.)

- CSCI 55200 Data Visualization
- NURS-L 650 Data Analysis for Clinical and Administrative Decision-Making (3 cr.)
- NURS-R 612 Interpretive Data Analysis (2 cr.)
- PBHL-B 515 Biostatistics Practicum (3 cr.)
- PBHL-B 527 Introduction to Clinical Trials (3 cr.)
- PBHL-B 546 Applied Longitudinal Data Analysis (3 cr.)
- PBHL-B 621 Advanced Statistical Computing (3 cr.)
- PBHL-B 636 Advanced Survival Analysis (3 cr.)
- PBHL-B 646 Advanced Generalized Linear Models (3 cr.)
- PSY 60000 Statistical Inference (3 cr.)
- PSY 60100 Experimental Design (3 cr.)
- PSY 60800 Measurement Theory and Interpret Data (3 cr.)
- PSY 64000 Survey of Social Psychology I (3 cr.)
- PSY-I 643 Field Methods & Experiments (3 cr.)
- SOC-R 551 Quantitative Methods (3 cr.)
- SOC-R 559 Intermediate Soc. Statistics (3 cr.)
- STAT 51100 Statistical Methods 1 (3 cr.)
- STAT 51200 Applied Regression Analysis (3 cr.)
- STAT 51600 Basic Probability Applications (3 cr.)
- STAT 51900 Introduction to Probability (3 cr.)
- STAT 52100 Statistical Computing (3 cr.)
- STAT 52200 Sampling and Survey Techniques
- STAT 52400 Applied Multivariate Analysis (3 cr.)
- STAT 52500 Generalized Linear Model (3 cr.)
- STAT 52800 Mathematical Statistics I (3 cr.)
- STAT 52900 Applied Decision Theory and Bayesian Statistics (3 cr.)
- STAT 53600 Introduction to Survival Analysis (3 cr.)
- STAT 61900 Probability Theory (3 cr.)
- STAT 62800 Advanced Statistical Inference (3 cr.)

Specialization (18 cr.)

1. Disciplinary Affinities (0–6 cr.)
2. Minor (12–18 cr.)

Qualifying Examination – Written
All students will take a written qualifying examination that covers the core courses (CORE A and B). The examination will be set by a group of faculty who are familiar with the content of the core courses. Examinations will be offered in August. Examinations must be completed by the beginning of the student's fourth year in the program but can be completed before that time when the core courses are completed. Students who do not successfully complete the examination can retake the examination a second time.

Qualifying Examination – Oral

1. The oral examination will take place after the student successfully passes the written exam. Students must pass both the written and oral exam before passing on to candidacy. Only two attempts to pass the oral examination will be allowed.
2. The oral exam will be based on the student's response to the written exam and any material from the core courses.

Dissertation Proposal
This is an oral review that covers in-depth knowledge of the student's primary research area and dissertation proposal. The research proposal for dissertation must be approved by the student's research committee. That committee may have the same membership as the program committee or the students may choose different members. The advisor for the dissertation will be a faculty member in the School of Informatics and Computing and a member of the Graduate Faculty. At least one the three members of the committee will be based outside of the school. The student will defend the thesis proposal at a public colloquium in the school. The review should be completed within one-year after passing the Qualifying Examinations.

Dissertation (30 cr. minimum)

Please refer to the IUPUI Graduate School Bulletin for more details on the dissertation process.

Last updated: 04/24/2017

Graduate Degree Programs

Graduate Programs

The School of Informatics and Computing offers **Master of Science** degrees in:

- Bioinformatics
- Health Informatics
- Human-Computer Interaction
- Media Arts and Science

All Master of Science degrees require 36 credits, including the completion of common graduate core courses.

Through its Department of Library and Information Science, the school also offers a Master of Library Science.

The School of Informatics and Computing also offers a **Doctoral (Ph.D.)** program with specializations in:

- Bioinformatics
- Health Informatics
- Human-Computer Interaction
- Data Science

All Ph.D. candidates must meet with their academic and/or research advisor for course selection and plan of study.

Finally, the School of Informatics and Computing offers a number of **Graduate Certificate Programs**:

- Human-Computer Interaction
- Clinical Informatics (Clinician Leader)
- Informatics for Public Health Professionals (Public Health Leader)
- Informatics in Health Information Management and Exchange (Health Information Management Exchange Specialist)
- Informatics in Health Information Security (Health Information Privacy and Security Specialist)
- Informatics in Health Information Systems Architecture (Programmer and Software Engineer)

Certificate in Human-Computer Interaction

Certificate in Human-Computer Interaction
Graduates of the Human-Computer Interaction Graduate Certificate program will demonstrate expertise in the following core competencies essential to success:

1. Basic HCI theory, terms, principles, and conceptual models
2. User-centered design theory and practices related to interaction design
3. HCI design and development processes and life-cycle
4. User profiling to interaction design (needs and requirements)
5. System requirements and product assessments
6. Interface design principles and processes
7. Product usability evaluations and testing methods
8. The purpose of the graphic user interface
9. Usability theory, terms, and the applied techniques
10. Principles of the interface design and prototyping processes
11. Interface grids and typographical devices
12. Information architecture and content management
13. Classic user testing theory and tools
14. Advanced user requirements and profiling
15. Interface design standards / guidelines for cross cultural and disabled users
16. Interaction design styles and choosing interaction devices and elements
17. Develop an evaluative strategy; planning who, what, when, and where
18. Decide how to collect data and prepare for the final evaluation
19. Analysis and interpretation of the evaluation data
20. Inspect a user interface, including a range of evaluative processes
21. Prototype design basics: theory and practice; including basic terms
22. Psychological and behavioral science of HCI
23. Cognitive architecture, memory, problem-solving, mental models, perception, and action related to HCI
24. Impact the design and testing of interactive technologies

Graduates will also be able to apply HCI theory and principles to product development:

1. Apply HCI principles and a user-centered approach to interaction design
2. Analyze user needs and requirements
3. Design and develop prototypes based on user assessments (needs and requirements), while applying HCI principles and models.
4. Apply evaluation and usability testing methods to interactive products to validate design decisions
5. Develop pre-design and post-design usability testing techniques on the developed Web site
6. Assess user needs and requirements
7. Categorize, design, and develop information in proper architectural structures
8. Create interface design prototypes based on a range of design principles and user data, and user assessments
9. Apply prototype principles and a user-centered approach to interaction design
10. Apply evaluation and usability testing methods to prototypes to validate design decisions and to the Web product to validate design decisions using: a) Classic user testing, and b) Heuristic inspection
11. Analyze test data and write a comprehensive report on the product development process of their redesigned Web site, i.e. of the stages of pre-design, design, and post-design, testing, and data analysis
12. Implement a HCI research proposal, including research questions, collecting the relevant literature and methodology
13. Develop a general framework, with a hierarchy of concepts and topics, including a refinement of the research question
14. Understand and apply the various research methods regarding qualitative and quantitative data

Last updated: 02/04/2014

Certificate in Informatics in Health Information Management and Exchange

Certificate in Informatics in Health Information Management and Exchange
Individuals graduating from this program will support the collection, management, retrieval, exchange, and/or analysis of information in electronic form, in healthcare and public health organizations.

1. Understanding Technology and Methodologies for processing data, information and knowledge in Health Care
    - Explain concepts of information and communication technologies.
    - Elaborate basic informatics terminology like data, information, knowledge, hardware, software, networks, information systems, information systems management, databases.
    - Implement standards and terminologies for documenting health events and exchanging protected health information.
2. Information Literacy for Health Care

- Determine the nature and extent of the information needed to build effective health information exchange services.
- Propose infrastructure needed for health information exchange effectively and efficiently.
- Evaluate information and its sources critically and incorporates selected information into health information exchange services.
- Evaluate outcomes of health information exchange services on health care outcomes.

3. Information Management
   - Verbalize the importance of health information exchange to health care outcomes.
   - Have knowledge of various types of health information exchange services.
   - Assure confidentiality of protected patient health information when using health information exchange.
   - Assure access control in the use of health information exchange.
   - Assure the security of health information exchange.
   - Possess the skills as outlined in supportive functions component of the HL7 model applicable to health information exchange.
   - Understand the principles upon which organizational and professional Health Information System for providers and consumers are based.

Last updated: 02/04/2014

Certificate of Informatics in Health Information Security

Certificate of Informatics in Health Information Security
Graduates of the Graduate Certificate in Informatics in Health Information Security program will be qualified to serve as institutional/organizational information privacy or security officers:

1. Understanding Technology and Methodologies for Processing Information in Healthcare:
   - Explain concepts of information and communication technologies
   - Analyze network service management (i.e. DNS/DHCP, web, email, spam filtering, resource sharing, database, directory services and authentication), network communication and security (i.e. network devices, firewalls, intrusion detection systems, and incident response/forensics), and administration (i.e. shell scripting, documentation/request management, policy and procedure management, data center considerations, and virtualization)
   - Implement standards and terminologies for maintaining privacy and security of protected health information
2. Information Literacy for Healthcare:
   - Determine the nature and extent of the privacy and security needed to protect health information
   - Propose infrastructure needed to safeguard protected health information effectively and efficiently
   - Evaluate administrative, technical and physical safeguards critically
   - Access privacy and security regulations for healthcare information transactions including policy, procedures, guidelines, security architectures, risk assessments, disaster recovery, and business continuity; particular attention given to the Health Insurance Portability and Accountability Act (HIPAA) and the Health Information Technology for Economic and Clinical Health (HITECH) Act
3. Information Management:
   - Verbalize the importance of health information exchange to healthcare outcomes
   - Have knowledge of various types of health information exchange services
   - Assure confidentiality of protected patient health information when using health information exchange
   - Assure access control in the use of health information exchange
   - Assure the security of health information exchange
   - Possess the skills as outlined in supportive functions component of the HL7 model applicable to health information exchange
   - Understand the principles upon which organizational and professional health information systems for providers and consumers are based
     Last update: 02/04/2014

Certificate of Informatics in Health Information Systems Architecture

Certificate of Informatics in Health Information Systems Architecture
Graduates of the Graduate Certificate in Informatics in Health Information Systems Architecture will be the architects and developers of advanced health IT solutions. These individuals will be cross-trained in IT and health domains, thereby possessing a high level of familiarity with health domains to complement their technical skills in computer and information science:

1. Understanding Technology and Methodologies for Processing Information Healthcare:
   - Explain health informatics and design and develop health information systems
   - Recommend usability and usefulness measures to evaluate health information systems
   - Discern principles of informatics that govern communication systems, health decisions, information retrieval, telemedicine, bioinformatics and evidence-based medicine, as well as ways in which information science

and computer technology can enhance evidence-based practice in healthcare

2. Information Literacy for Health Care:
    - Inspect solutions for management and mining of data generated in scientific laboratories and clinical trials for data mining and knowledge discovery, which include knowledge discovery techniques and databases, extraction of data/ metadata stored in data warehouses using Storage Area Networks and dealing with issues of handling this data
    - Design approaches to access needed information effectively and efficiently
    - Analyze the principles and methodologies underlying most standards for healthcare data interchange and practical issues of reading and understanding specifications, implementing and translating between standards
3. Information Management:
    - Analyze theoretical and practical models for the delivery of consumer health information and implement them in the design and development of consumer health information resources

Last updated: 02/04/2014

Certificate in Clinical Informatics

Certificate in Clinical Informatics
Graduates of the Graduate Certificate in Clinical Informatics program will be able to lead the successful deployment and use of health IT to achieve transformational improvement in the quality, safety, outcomes and, thus, the value of health services in clinical areas:

1. Understanding technology and methodologies for processing data, information and knowledge in Health Care
    - Explain concepts of information and communication technologies.
    - Integrate data from disparate systems found in hospitals and clinics.
    - Implement standards and terminologies for documenting health events and exchanging protected health information.
2. Information Literacy for Health Care
    - Determine the nature and extent of the information needed.
    - Access needed information effectively and efficiently.
    - Evaluate outcomes of the use of information in clinical practice.
3. Information Management
    - Verbalize the importance of health information systems to clinical practice.
    - Have knowledge of various types of health information systems and their clinical and administrative uses.
    - Assure confidentiality of protected patient health information when using health information systems.
    - Assure access control in the use of health information systems
    - Assure the security of health information systems

Last updated: 02/04/2014

Certificate in Informatics for Public Health Professionals

Certificate in Informatics for Public Health Professionals
Individuals graduating from this program will be able to lead the successful deployment and use of health IT to achieve transformational improvement in the quality, safety, outcomes, and thus in the value of public health services.

1. Understanding Technology and Methodologies for processing data, information and knowledge in Healthcare
    - Explain concepts of information and communication technologies.
    - Integrate data from disparate systems such as clinical data, surveillance data, etc. for public health decision making.
    - Implement standards and terminologies for documenting public health events and exchanging protected health information for improved surveillance.
2. Information Literacy for Healthcare
    - Determine the nature and extent of the information needed for public health decisions.
    - Access needed information effectively and efficiently.
    - Evaluate outcomes of the use of information in public health.
3. Information Management
    - Verbalize the importance of health information systems to public health surveillance.
    - Have knowledge of various types of health information systems and their potential use in public health surveillance.
    - Evaluate when confidentiality of protected patient health information is superseded by public health needs.
    - Assure access control in the use of health information systems for public health needs.
    - Assure the security of health information systems.

Last updated: 02/04/2014

Student Learning Outcomes

Graduate Student Learning Outcomes

Informatics is an applied, professional computing discipline. It responds to society's need to solve increasingly complex problems in all fields of human endeavor by acquiring, managing and interpreting data.

Informatics studies the ways in which people, information and digital technologies interact.

Nearly all fields benefit from the rapidly evolving fields of computing and information science. Informatics graduates solve problems through the application of computing to their domains of expertise.

Computing and information technology are evolving rapidly. The student learning outcomes articulated here are central to educating Informatics graduates who possess both the technological and human-centered design skills necessary to develop and deploy useful digital tools that acquire and manage data for informed decision-making. They incorporate intellectual and ethical standards that every School of Informatics and Computing graduate should attain.

Master of Library Science
- Master of Library Science

Master of Science
- Bioinformatics
- Health Informatics
- Human-Computer Interaction
- Media Arts and Science

Doctor of Philosophy
- Bioinformatics
- Health Informatics
- Human-Computer Interaction
- Data Science

Graduate Certificate
- Clinical Informatics
- Human-Computer Interaction
- Informatics in Health Information Management and Exchange
- Informatics in Health Information Security
- Informatics in Health Information Systems Architecture
- Informatics for Public Health Professionals

Last updated: 04/24/2017

Master of Science in Bioinformatics

Graduates of the Bioinformatics program will demonstrate expertise in the following core competencies essential to success:

1. Extract information from different types of bioinformatics data (gene, protein, disease, etc.) including their biological characteristics and relationships.
2. Employ different data representation models and formats used for bioinformatics data representation including markup languages, such as SBML and CellML, and ontologies, such as GO ontology.
3. Apply the different approaches used for data integration and data management, including data warehouse and wrapper approaches.
4. Master computational techniques and diversified bioinformatics tools for processing data including statistical, machine learning and data mining techniques.
5. Analyze processed data in particular with the support of analytical and visualization tools.
6. Carry out bioinformatics research under advisement including systems biology, structural bioinformatics and proteomics.
7. Interact with non-bioinformatics professionals, such as biologists and biomedical researchers in order to better understand their bioinformatics needs for better support and service delivery.
8. Design and develop bioinformatics solutions by adapting existing tools, designing new ones, or a combination of both.

Last updated: 02/04/2014

Master of Science in Human-Computer Interaction

Graduates of the Human-Computer Interaction program will demonstrate expertise in the following core competencies essential to success:

1. Human-Computer Interaction Theory and Usability Terms, Principles, and Practices
   - Problem space definition and conceptual models
   - Social mechanisms used in communication
   - User-centered approaches to interaction design
   - User profiling and user needs and requirements
   - Interface design principles and processes
   - Cognitive and information processing
   - Product assessments related to a market analysis
   - Processes and life-cycles of interaction design
   - Interface design and related areas of visual design and aesthetics
   - Product evaluation and testing methods, both qualitative and quantitative
2. Develop and Apply Human-Computer Interation Principles and Practices Related to the Design and Evaluation of Interactive Products:
   - Produce interface designs and prototypes based on user and needs assessments.
   - Apply HCI theory, principles, and a user-centered approach to interaction design.
   - Design interactive products up to the prototype.
   - Apply evaluation and usability testing methods to interactive products to validate design decisions.

   Last updated: 02/04/2014

Master of Science in Health Informatics

Graduates of the Health Informatics program will master health informatics knowledge and skills, as well as acquire practical experience in three domains:

1. **Understanding technology and methodologies for processing data, information and knowledge in Health Care**
   - Explain concepts of information and communication technologies.
   - Elaborate basic informatics terminology like data, information, knowledge, hardware,

software, networks, information systems, information systems management, databases.
- Execute queries on large databases using data mining and testing hypothesis approaches.
- Integrate data from disparate systems found in hospitals and clinics.
- Implement standards and terminologies for documenting health events and exchanging protected health information.

2. **Information Literacy for Health Care**
   - Determine the nature and extent of the information needed.
   - Access needed information effectively and efficiently.
   - Evaluate information and its sources critically and incorporates selected information into his or her knowledge base and value system.
   - Either individually or as a member of a group, use information effectively to accomplish a specific health care purpose.
   - Propose/justify Decision Support Systems algorithm to support care delivery.
   - Integrate Natural Language Processing (NLP) with standards and terminologies used in healthcare.
   - Evaluate outcomes of the use of information in clinical practice.

3. **Information Management**
   - Verbalize the importance of health information systems to clinical practice.
   - Have knowledge of various types of health information systems and their clinical and administrative uses.
   - Assure confidentiality of protected patient health information when using health information systems.
   - Assure access control in the use of health information systems.
   - Assure the security of health information systems.
   - Estimate the Return of Investment (ROI) of health information technology applications for healthcare.
   - Possess the skills as outlined in direct care component of the HL7 EHRS model, which such as navigation, Decision Support, output reports and more.
   - Understand the principles upon which organizational and professional Health Information System for providers and consumers are based.

Last updated: 02/04/2014

Master of Science in Media Arts and Science

Graduates of the Media Arts and Science graduate program will demonstrate expertise in the following core competencies essential to success as an informatics, computing and information technology professional specializing in new and interactive media:

1. Design and create digital media products that are targeted to a specific purpose and that meet professional standards for quality.
2. Plan a coordinated collection of multi-media or trans-media communications and/or experiences, using each medium to good advantage.
3. Assess media communications and/or experiences, discriminating among features that influence effectiveness.
4. Recommend strategies, practices, and/or tools appropriate to a problem.
5. Predict future trends and developments in digital media, based on examination of the history, tradition, and current drivers in the field.
6. Communicate in written and oral form to a range of audiences.

Last updated: 02/05/2014

Doctor of Philosophy in Informatics - Bioinformatics

Upon completion of the Bioinformatics PhD program, students will be able to:

1. Analyze different types of bioinformatics data (gene, protein, disease, etc.) including their biological characteristics and relationships.
2. Formulate steps involved in transforming the data to knowledge, as well as introducing different techniques used at each step
3. Impact informatics on other disciplines such as biology from several perspectives including the social and economic aspects.
4. Establish different data representation models and formats used for bioinformatics data representation including markup languages, such as SBML and CellML, and ontologies, such as GO ontology.
5. Master different approaches used for data integration and data management, including data warehouse and wrapper approaches.
6. Develop computational techniques and employ diversified bioinformatics tools for data processing including statistical, machine learning and data mining techniques.
7. Analyze processed data in particular with the support of analytical and visualization tools.
8. Perform bioinformatics research in area of interest.
9. Interact with non-bioinformatics professionals, such as biologists and biomedical researchers in order to better understand their bioinformatics needs for better support and service delivery.
10. Develop the ability to design and develop bioinformatics solutions by adapting existing tools, designing new ones, or a combination of both.

Last updated: 02/05/2014

Doctor of Philosophy in Informatics - General

Graduates of the Ph.D. in Informatics program will demonstrate expertise in the following core competencies:

1. Identify, discuss, and apply the fundamental concepts, theory and practices in informatics such as information representation and architecture, retrieval, structured query language, information

extraction and integration from disparate data sources, information visualization and security, and data mining including the relevant tools and methodologies.
2. Identify and practice the knowledge of beginning statistics, including sampling and correlations, research paradigms such as constructivism and pragmatism, distinctions and limitations of qualitative, quantitative, and mixed method research designs, understanding validity and reliability.
3. Apply research proposals, conduct peer reviews, create an annotated bibliography, create and present a high-level presentation pertaining to research, and use SPSS.
4. Acquire and apply the ability to read and critique scientific articles by analyzing the problem presented, solutions proposed, and critically looking at the solutions and the results, as well as learn how organize and write a scientific article through critical thinking and discussion.
5. Write research proposals by examining NSF and NIH case studies, including style and grant specific requirements.
6. Develop and deliver class-room lectures, including processes for critically evaluating class-room lectures and how to prepare effective teaching materials.
7. Apply research methods and acquire more advanced knowledge in different areas of research through apprenticeship and mentorship.

Concentrations will have the above general outcomes plus additional ones.

Last updated: 2/05/2014

Doctor of Philosophy in Informatics - Human Computer Interaction

Graduates of the Human-Computer Interaction track will gain the additional and specific expertise described below:

1. Identify and explain HCI domain knowledge in the areas of both basic and applied research with considerable depth, including:
   - HCI theory and usability terms, principles and practices
   - Problem space definition and conceptual models
   - Social mechanisms used in communication,
   - User-centered approaches to interaction design
   - User profiling and user needs and requirements
   - Interface design principles and processes, as well as related areas of visual design and aesthetics
   - Cognitive and information processing
   - Product assessments related to a market analysis, as well as processes and life-cycles of interaction design
   - Product evaluation and testing methods, both qualitative and quantitative
2. Identify and apply HCI principles and practices during product design and evaluation (*development and usability testing*) of interactive products, including:
   - Producing interface designs and prototypes based on user and needs assessments
   - Validate design decisions through a user-centered approach to interaction design and the final analysis, evaluation and usability testing methods of interactive products
3. Identify and explain the broader HCI connections and associations among technology, theory, social analysis and application domains to arrive at a set of questions in preparation for final research and dissertation, as well as the broader significance of work within the context of past and current HCI research

Last updated: 02/05/2014

Doctor of Philosophy in Informatics - Health Informatics

Graduates of the Health Informatics track will gain the additional and specific expertise described below:

1. Become skilled in the analysis, design and implementation of information systems that support and expand the delivery of health care
2. Function as a translator between clinicians and information technology personnel
3. Ensure that information systems capture and present critical health information
4. Interact with non-health care professionals, such as computer science, information science, cognitive science and other researchers to better understand how their knowledge advances health informatics science
5. Demonstrate in-depth knowledge on health informatics research approaches
6. Propose innovative approaches to the development of health informatics knowledge

Last updated: 02/05/2014

Contact Information

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School of Informatics and Computing 535 W. Michigan Street, IT 475
Indianapolis, IN 46202

Phone: 317-278-4636
Fax: 317-278-7669
soicindy@iupui.edu

Department of BioHealth Informatics
soicindy@iupui.edu

Department of Human-Centered Computing
soicindy@iupui.edu

Department of Library and Information Science
soicindy@iupui.edu

Tuition & Financial Aid

Tuition & Financial Aid
IUPUI is an exceptional value and a world-class institution, recently ranked 8th on the list of Best Public Colleges in the Midwest by *Forbes Magazine* and the Center for College Affordability and Productivity.

And a School of Informatics and Computing graduate degree from Indiana University will make you even *more* valuable with its unique integration of computing, social science and information systems design that can be applied in any number of fields as an industry professional, faculty member or researcher.

The IUPUI Office of the Bursar maintains current tuition and detailed fee information, including a Tuition and Fee Estimator. They also accept several methods for payment designed to make paying for college as convenient as possible.

The Office of Student Financial Services provides current information for costs of attendance for full-time, resident and non-resident graduate students.

International students' costs of attendance are slightly different and include manadatory health insurance. Please consult with the IUPUI Office of International Affairs.

Financial Aid
As a master's or Ph.D. student, you have access to a wide range of financial assistance, including scholarships, grants, loans and work-study that help reduce costs. We encourage you to investigate and pursue all options for which you may be eligible.

The School of Informatics and Computing offers assistantships and fellowships to qualified Ph.D. and master's students. To be automatically considered for such support, you must submit the following by January 15 (Ph.D. students) or March 15 (master's and certificate students):

- A completed application with application fee;
- Your GRE score from within the past five years.

Direct financial support from the School of Informatics and Computing is reserved for qualified, full-time students matriculating in the fall semester. Direct financial support is rarely available for students matriculating in the spring.

To learn more about financial aid opportunities from the university or external sources, such as the federal government, please consult the IUPUI Office of Financial Aid and the IUPUI Graduate Office.

International Students
For information about specific financial resources for international students, please contact the IUPUI Office of International Affairs.

Last updated: 02/11/2014

Graduate Programs

Graduate Programs
The School of Informatics and Computing offers **Master of Science** degrees in:

- Bioinformatics
- Health Informatics
- Human-Computer Interaction
- Informatics
- Media Arts and Science

Through its Department of Library and Information Science, the school offers a **Master of Library Science** degree.

The School of Informatics and Computing also offers a **Doctoral (Ph.D.)** program with specializations in:

- Bioinformatics
- Health and Biomedical Informatics
- Human-Computer Interaction
- Data Science

And finally, in addition to Master's and PhD degree programs, the School of Informatics and Computing offers a number of **Graduate Certificate** programs:

- Human-Computer Interaction
- Certificate in Clinical Informatics (Clinician Leader)
- Certificate in Informatics for Public Health Professionals (Public Health Leader)
- Certificate in Informatics in Health Information Management and Exchange (Health Information Management Exchange Specialist)
- Certificate in Informatics in Health Information Security (Health Information Privacy and Security Specialist)
- Certificate in Informatics in Health Information Systems Architecture (Programmer and Software Engineer)

Courses

Informatics

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INFO-H 611 Mathematical and Logical Foundations of Informatics (3 cr.) An introduction to mathematical methods for information modeling, analysis, and manipulation. The topics include proof methods in mathematics, models or computation, counting techniques and discrete probability, optimization, statistical inference and core advanced topics that include, but are not limited to, Markov chains and random walks, random graphs, and Fourier analysis.

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INFO-H 504 Social Dimensions of Science Informatics (3 cr.) Course will examine ethical, legal, and social issues surrounding contemporary research and practice in science informatics. Topics include the nature of science and technology, the ramifications of recent advances in science informatics, and relevant science policy and research ethics. General knowledge of science informatics is assumed.

INFO-B 528 Computational Analysis of High-Throughput Biomedical Data (3 cr.) Course covers advanced concepts of genomics, molecular biology, and systems biology and explores computational methods for analyzing their high-throughput datasets. Problems in biology and biomedicine will motivate the development of algorithms to apply to these datasets.

INFO-B 585 Biomedical Analytics (3 cr.) Course introduces the use of patient data, genomic databases, and electronic health records (EHR) to improve patient care and to achieve greater efficiencies in public and private healthcare systems. The course explores clinical intelligence and the role of analytics in supporting a data-driven learning healthcare system. Topics include the value-driven healthcare system, measuring health system performance, existing quality/performance measurement frameworks (NQF, HEDIS), comparing healthcare delivery, attributes of high performing healthcare systems, and the IT infrastructure and human capital needed to leverage analytics for health improvement.

INFO-I 595 Professional Internship (1-6 cr.) An experiential learning course where students apply classroom theory and learning in degree-related work experience under the supervision of a mentoring supervisor and course instructor.

INFO-B 636 Genomic Data Analytics and Precision Medicine (3 cr.) This advanced course covers how massive clinical and biomedical genomic sequencing datasets from various sequencing platforms motivate computational needs and tasks for analysis, how to devise approaches for analyzing these datasets, how to develop sound hypotheses and predictions from them, and related ethical, privacy, and legal issues.

INFO-B 667 Seminar in Interprofessional Collaboration (3 cr.) This seminar provides graduate students with in depth experiences in interprofessional thinking and collaboration when implementing informatics applications. Biohealth Informatics applications are developed an interprofessional learning laboratory rooted in real-life innovation, discovery, and collaboration related to health and wellbeing.

INFO-B 668 Advanced Seminar in BioHealth Informatics (3 cr.) Course provides graduate students with knowledge on a wide range of current topics in health informatics from faculty and professionals engaged in cutting edge research and practice. Students connect with innovative faculty while learning through a combination of lectures, practicums, and discussions. The topics and presenters will be different each semester.

Graduate Course Descriptions
Media Arts and Science

NEWM-N 500 Principles of Multimedia Technology (3 cr.) This course examines issues related to 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 global communities. Topics also include: usability, intellectual property, and a diversity of user markets for new media products.

NEWM-N 501 Foundations of Digital Arts Production (3 cr.) This course examines the production process and management of digital multimedia. Students investigate and produce projects by researching foundations in the use of digital video with special emphasis on production process of storytelling. Skills learned will include: project development and video production. Students will develop presentation skills through research papers.

NEWM-N 502 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.

NEWM-N 503 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.

NEWM-N 504 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.

NEWM-N 595 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.

NEWM-N 506 Media Arts Project or Thesis (1-6 cr.)
Students prepare a thesis or project that includes

supporting documentation, as well as a final public defense. In either case, students are required to prepare a proposal that is approved by their advisor or committee chair before beginning their research.

NEWM-N 510 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.

NEWM-N 553 Independent Study (1-3 cr.) Research and/or production related to a particular theme or topic in media arts. Course topic, learning outcomes, and a plan of study must be developed by the student, with guidance from the instructor, prior to registration. Course can be repeated multiple times. Approval by the program advisor is required for registration.

NEWM-N 585 Seminars in Media Arts and Science (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.

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Human-Centered Computing

INFO-H 503 Social Impact of Information Technologies (3 cr.) An overview of important social, legal, and ethical issues raised by information technology.

INFO-H 504 Social Dimensions of Science Informatics (3 cr.) Course will examine ethical, legal, and social issues surrounding contemporary research and practice in science informatics. Topics include the nature of science and technology, the ramifications of recent advances in science informatics, and relevant science policy and research ethics. General knowledge of science informatics is assumed.

INFO-H 506 Globalization and Information (3 cr.) Explores the processes that promote and impede movement of human action and informational activities to the most general levels, e.g., the level of the world as a whole. Surveys diverse theories of globalization to identify the best approaches for professional informatics career planning and making information globally accessible.

INFO-B 505 Informatics Project Management (3 cr.) This course introduces standard project management concepts and capabilities, in the context of innovative and creative knowledge-work projects involving computers. These are targeted as a common ground for all members of a successful team, not only for the Project Manager. Through lecture, reading, discussion, computer lab exercises, and projects, students will become more proficient with basic project management terminology, techniques and technologies. Students will apply industry-standard project management in a framework of productive team dynamics, consumer frame of reference, and organizational change and optionally continuing to professional certification.

INFO-H 525 Organizational Informatics and Economics Security (3 cr.) Organizational process embed implicit and explicit decisions and information control. Security technologies and implementations make explicit organizational choices that determine individual autonomy within an organization. Security implementations allocate risk, determine authority over processes, make explicit relationships in overlapping hierarchies, and determine trust extended to organizational participants.

INFO-H 534 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.

INFO-H 538 Introduction to Cryptography (3 cr.) Introduction to the foundational primitives of cryptography and implementations. A primary goal of this course will be to understand the security definitions for each primitive and how they are used in cryptographic protocols. The ethics of insecure or on-the-fly protocol design will be discussed.

INFO-H 539 Cryptographic Protocols (3 cr.) The class teaches a basic understanding of computer security by looking at how things go wrong, and how people abuse the system. The focus of the class is on how computer systems are attacked, and once this is understood it is possible to propose ways to make the system secure.

INFO-H 540 Data Mining for Security (3 cr.) The objective of this course is to provide an understanding of the impact of data mining in security with a particular focus on intrusion detection. There will be an introduction to data mining where data mining techniques including association rules, clustering and classification are described. Security basics will be presented, focusing on topics such as authentication and access control that are relevant to data mining. This seminar course will explore recent research work in this area and intrusion detection.

INFO-H 559 MEDIA AND TECHNOLOGY ENTREPRENEURSHIP (3 cr.) This course is intended for students who are interested in starting their own company or who anticipate joining a start-up company. It will provide students with a solid foundation on a variety of legal and business matters that need to be considered when starting a new company, such as selecting a business structure (sole proprietorship, partnership, corporation, etc.), financing and credit, drafting business plans, preparing appropriate paperwork such as articles of incorporation and bylaws, tax implications, marketing and public relations, bankruptcy and other pitfalls, insurance, planning for growth, resources for entrepreneurs, contracts, real and personal property, shareholder and governance issues and working with professionals such as attorneys, accountants and insurance agents.

INFO-H 554 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 9 hours.

INFO-H 563 Psychology of Human Computer Interaction (3 cr.) Covers the psychological and behavioral science of human computer interaction, including cognitive architecture, memory, problem-solving, mental models, perception, action, and language. Emphasis is placed on developing an understanding of the interaction between human and machine systems and how these processes impact the design and testing of interactive technologies.

INFO-H 564 Prototyping for Interactive Systems (3 cr.) The course covers methodologies for designing and prototyping graphic user interfaces, including rapid (paper) and dynamic (interactive) prototypes. Principles of design research and visual communication are discussed in the context of interaction design, cognition and user behavior, as well as usability testing techniques for concept validation.

INFO-I 575 Informatics Research Design (3 cr.) Full spectrum of research concepts, designs, and methodologies used in informatics research, from quantitative to qualitative research; from deterministic, hypothesis-driven experimental designs to a posteriori discovery through data mining. Philosophical foundations to practical applications. Provides the conceptual framework in which the informatics graduate student may develop their own research agenda.

INFO-I 590 Topics in Informatics (3 cr.) Variable topic. Emphasis is on new developments and research in informatics. Can be repeated with different topics, subject to approval of the Dean.

INFO-I 600 Professionalism and Pedagogy in Informatics (3 cr.) Course will introduce students to topics and skills necessary for entering careers in industry or the academy. Topics covered will include career planning, curriculum development, effective teaching, research ethics, scholarly and trade publiching, grantsmanship, and intellectual property consideration.

INFO-H 604 Human Computer Interaction Design Theory (3 cr.) The course will explore, analyze, and criticize underlying assumptions and the rational rationale behind some of the most influential theoretical attempts in HC and related fields. The purpose of the course is to make students aware of how theories can influence practice and to develop critical thinking around the role, purpose, and function of theories.

INFO-I 605 Social Foundations of Informatics (3 cr.) Topics include the economics of information businesses and information societies, legal and regulatory factors that shape information and information technology use, the relationship between organization cultures and their use of information and information technology, and ownership of intellectual property.

INFO-H 611 Mathematical and Logical Foundations of Informatics (3 cr.) An introduction to mathematical methods for information modeling, analysis, and manipulation. The topics include proof methods in mathematics, models or computation, counting techniques and discrete probability, optimization, statistical inference and core advanced topics that include, but are not limited to, Markov chains and random walks, random graphs, and Fourier analysis.

INFO-H 624 Advanced Seminar I–Human-Computer Interaction (3 cr.) P: Advanced graduate standing or consent of instructor. Introduces students to major historical, contemporary, and emerging theories, methods, techniques, technologies, and applications in the field of human-computer interaction. Students will explore relevant and influential research, results, and application. Students will design an independent research program in relation to their individual research fields and personal interests.

INFO-H 634 Advanced Seminar II – Human Computer Interaction (3 cr.) P: Advanced graduate standing or consent of instructor. Introduces students to major historical, contemporary, and emerging theories, methods, techniques, technologies, and applications in the field

of human-computer interaction. Students will explore relevant and influential research, results, and applications. Students will develop an understanding of leading research approaches and paradigms, and will design an independent research program in relation to their individual research fields and personal interests.

INFO-H 651 The Ethnography of Informatics (3 cr.) Introduces ethnography as a social science methodology and way of knowing with which to study information and its social contexts. Places ethnography in relation to other research methodologies relevant to the production of the informatics knowledge base. Trains students in the use of a broad range of ethnographic techniques relevant to the study of automated information technology in use. Designed to be open to students from other programs with sufficient methodological and substantive background.

INFO-I 690 Topics in Informatics (3 cr.) Variable topic. Emphasis on new developments and research in informatics. Course is intended for Ph.D. students in the School of Informatics. Can be repeated with different topics, subject to approval of the dean.

INFO-H 694 Thesis/Project in Human-Computer Interaction (1-6 cr.) The student prepares and presents a thesis or project in an area of human-computer interaction. The product is substantial, typically multi-chapter paper, or a carefully designed and evaluated application, based on well-planned research or scholarly project. Details are worked out between the student and sponsoring faculty member.

INFO-I 698 Research in Informatics (1-12 cr.) Research under the direction of a member of the graduate faculty that is not dissertation related. Can be repeated for credit for a total of 30 credit hours.

INFO-I 699 Independent Study in Informatics (1-3 cr.) Independent readings and research for Ph.D. students under the direction of a faculty member, culminating in a written report. May be repeated for a maximum of 12 credit hours.

INFO-I 790 Informatics Research Rotation (3 cr.) Work with faculty, investigate research opportunities. Can be repeated for a total of 6 credit hours.

INFO-I 890 Thesis Readings and Research (1-12 cr.) Research under the direction of a member of the graduate faculty leading to a Ph.D. dissertation. Can be repeated for credit for a total of 30 credit hours.

INFO-H 680 Human-Computer Interaction Professional Practice I (3 cr.) P: INFO H541, H561, H543, H563, H564 This course represents Part One of a two-part course series, which fulfills the final HCI MS project requirement. Part One should showcase the accumulative knowledge of the student in the areas of product design and development. Students will explore relevant and applied research concepts, while considering various HCI design approaches. Final outcomes will include the completion of the first half of the final project, i.e., the completion of a final product.

INFO-H 681 Human Computer Interaction Professional Practice II (3 cr.) P: INFO H680 This course represents part two of a two-part course series, which fulfills the final HCI MS project requirement. The project will showcase the accumlative knowledge of the student in the areas of product assessment and documentation. Final outcomes will include the completion of the second half of the final project, i.e. product testing and analysis and writing of the paper.

INFO-I 501 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.

INFO-H 541 Interaction Design Practice (3 cr.) Human-computer interaction design (HCID) describes the way a person or group accomplishes tasks with a computer: what the individual or group does and how the computer responds; what the computer does and how the individual or group responds. Sometimes known as 'interface design,' HCID becomes increasingly important as computing intelligence and connectivity spread ubiquitously to home, work, and play environments. This course will be organized around a collection of readings and several design projects concerned with applying human-computer interaction principles to the design, selection, and evaluation of interactive systems.

INFO-H 543 Interaction Design Methods (3 cr.) Students will learn basic concepts and methods for usability studies and evaluation of interactive systems as well as apply those methods to actual system design evaluations. This course is not only for understanding the basics and traditional approaches in this area, but also for exploring new ways of evaluating the usability of state-of-the-art technology-based systems such as systems in ubiquitous computing, CSCW, tangible and social computing areas.

INFO-H 561 Meaning and Form in HCI (3 cr.) As a continuation of HCI1 (H541), students will learn methodologies and principles for two types of core activities in human-computer interaction design: a) requirements analysis, contextual inquiry and ethnography as applied to the design of interactive systems in the social context? b) conceptual design for the modeling of the interactive structure of web, hypermedia and software applications. Weekly readings on the text books will be integrated with academic and professional articles and online media.

INFO-G 599 Thesis Research (0 cr.) Master's students who have enrolled in 30 or more hours of graduate course work applicable to the degree and who have completed all other requirements of the degree except the thesis of final project of performance may enroll in G599. Requires section authorization.

INFO-H 500 Fundamental Comp Concepts Info (3 cr.) An introduction to fundamental principles of computer concepts for Informatics study, including an overview of computer architecture, computer algorithms, fundamentals of operating systems, data structure, file organization and database concepts.

INFO-H 502 Human-Centered Research Methods in Informatics (3 cr.) This course surveys a broad range of research methods employed in Informatics, exploring their meta-theoretical underpinnings and exemplifying their application to specific research questions. This course is intended for students in Informatics graduate

programs, especially PhD students, who need a grounding in research methods.

INFO-H 536 Foundational Mathematics of Cybersecurity (3 cr.) Students will learn mathematical tools necessary to understand modern cyber security. The course will cover introductory mathematical material from a number of disparate fields, including probability theory, computational theory, complexity theory, group theory, and information theory.

INFO-H 537 Legal and Social Informatics of Security (3 cr.) This is a case-based course on privacy and security in social contexts. Cases will particularly address the specific designs of technologies (e.g., P3P, PICS) and discuss how different technically feasible design choices would result in distinct regulatory regimes, business strategies, or support different forms of social interaction. This course will focus on specific security and privacy technologies as socio-technical systems.

INFO-H 628 Advanced Seminar I in Compex Systems (3 cr.) Introduces students to major historical contemporary and emerging theories, methods, and techniques in the field of complex systems. Students will examine and explore relevant and influential research, results and applications. Students will develop an understanding of leading research approaches and paradigms, and will design an independent research program in relation to their individual research fields and personal interests. The course will focus on the theory of complex systems, systems science and artificial life.

INFO-H 628 Advanced Seminar II in Compex Systems (3 cr.) Introduces students to major historical contemporary and emerging theories, methods, and techniques in the field of complex systems. Students will examine and explore relevant and influential research, results and applications. Students will develop an understanding of leading research approaches and paradigms, and will design an independent research program in relation to their individual research fields and personal interests. The course will be an exposition of "the science at the edge" and the forefront of research to complex systems.

Masters Level Courses

SLIS-S 516 Human-Computer Interaction (3 cr.) Examines the human factors associated with information technology and seeks to provide students with knowledge of the variables likely to influence the perceived usability, and hence the acceptability, of any information technology. In so doing, it will enable students to progress further toward specialist work in the important field of human-computer interaction.

SLIS-S 681 The Book 1450 to the Present (3 cr.) A survey of the book from 1450 to the present, with emphasis on the development of the book in the West. Focuses on the physical aspects of the book from the mid-fifteenth through the twentieth centuries, and on some of the many roles of the book in society during this period; also increases awareness of current scholarly trends in the history of the book.

SLIS-S 501 Reference (3 cr.) P: or Concurrent S401. This course introduces students to the basic information sources and services among different types of libraries and information centers, including academic, public, special, and school media.

SLIS-S 502 Collection Development and Management (3 cr.) Collection Development and Management examines the principles and techniques that guide the development, management, and evaluation of library collections and the selection of materials in various types of libraries. The course provides students with experience in the major phases involved in starting and developing collections of print and non-print materials: the formulation of collection development plans, the selection of materials, and the evaluation and preservation of library collections. It enables students to recognize and respond to challenges and opportunities of special interest to collection developers including changes in the production and distribution of information resources, issues of access and ownership, intellectual freedom, copyright, and resource sharing.

SLIS-S 503 Organization and Representation of Knowledge and Information (3 cr.) Introduces students to various disciplines' approaches to the understanding, organization, representation (summarizing), and use of knowledge and information. This survey looks for commonality among the approaches taken in information science, cognitive psychology, semiotics, and artificial intelligence, among others. The goal is to identify criteria for evaluation and improvement of ways to organize and represent information for future retrieval. Information systems currently used in libraries and information centers will be studied as examples. Emphasis in the course is on concepts and ideas, with appropriate attention to terminology and technology.

SLIS-S 504 Cataloging (3 cr.) P: S401. Historical development and principles essential to the understanding of the conceptual foundations of providing bibliographic access and control of materials and information. Discussion and examples in the application of AACR2r will be presented to illustrate and reflect current practice. Emphasis is on monographic publications.

SLIS-S 505 Evaluation of Library Sources and Services (3 cr.) P: S502. Examines the applied evaluation of library resources and services, including collections, document delivery, technical services, reference services, and overall library performance. Emphasis is placed on the available methods and methodological issues. The checklist method, availability studies, document delivery tests, use studies, applied bibliometrics, and the use of automation are covered.

SLIS-S 506 Introduction to Research (3 cr.) P: S401, completion of 6 credit hours in SLIS (S501 and S502 recommended), or consent of instructor. Introduces the research process, including concepts, design, conduct, and evaluation. Examines the principles and characteristics of approaches and methodologies relevant to research in the field. Examples of data sources and introduction to methods of statistical description and analysis; ethical issues.

SLIS-S 511 Database Design (3 cr.) P: S401 or consent of instructor. Concerned with a comprehensive view of the processes involved in developing formal access to information from a user-centered point of view. Considers various database models (such as flat file,

hierarchical, and relational), and hypertext (in terms of text, sound, numeric, image, and geographic data). Students will design and implement databases using several commercial database management systems.

SLIS-S 517 Web Programming (3 cr.) The main focus of this course is to instruct students to develop and implement dynamic and interactive web applications. In order to do so, students will learn the basics of an open source programming language both through lectures and hands-on exercises in the lab.

SLIS-S 519 Evaluation of Information Systems (3 cr.) P: S401. Theoretical and practical exploration of the issues surrounding contemporary information systems. A specific focus will be on evaluating information systems from the user perspective. This evaluation approach will cut across disciplinary frameworks: behavioral, cognitive, and social sciences. The approach will also touch on multiple research methods: online surveys, sense-making, critical incident, and network analysis.

SLIS-S 521 Humanities Information (3 cr.) P: S501 or consent of instructor. Introduction to information sources and services in the disciplines of performing arts, music, fine arts, literature, language, philosophy, and religion. In addition, the course addresses information needs and behavior patterns of users seeking these types of information.

SLIS-S 522 Social Sciences Information (3 cr.) P: S401 and S501 or consent of instructor. Study of the core information tools in the fields of anthropology, economics, history, political science, psychology, and sociology. Includes key bibliographic databases and electronic network tools. Evaluation of research dealing with information channels in these fields.

SLIS-S 523 Science and Technology Information (3 cr.) P: S401 and S501. General materials, reference books, periodicals, government documents, nonbook media in the individual literature of individual disciplines; patents and report literature. Examination of production, publication, distribution, and forms of scientific and technical literature.

SLIS-S 524 Adult Readers Advisory (3 cr.) P: S501 and S502. A review and discussion of trends reflected in subject content and use of book and nonbook materials for patrons in secondary school and public libraries in relation to changing young adult and adult needs and the role of libraries in meeting such needs.

SLIS-S 525 Government Information (3 cr.) P: S401 and S501. Survey of government information dissemination in all formats and at all levels of government. Consideration of government information policy. Primary emphasis given to U.S. government information but some consideration given to state and local publications in the United States, and those of international organizations.

SLIS-S 526 Business Information (3 cr.) P: S401 and S501 or consent of instructor. Introduction to basic business materials. Includes resources, research methods, current developments, automated systems, and databases.

SLIS-S 601 Directed Readings (1-4 cr.) P: Consent of instructor. Readings and study in any area of library or information science having an extensive literature. A student may enroll for this course twice in the same semester under different instructors. Normally S601 is completed under the direction of a full-time faculty member. Readings done under S601 shall not duplicate the content of any course now in the curriculum of the School of Library and Information Science. Proposal Form due by March 15th.

SLIS-S 532 Information Architecture for the Web (3 cr.) P: S401. Focuses on website development. Students study information architecture as an approach for site organization and design, and learn about product management for complex web development tasks. In lab sessions, students work with markup languages and scripting and develop sites, typically for real clients, as well as local libraries.

SLIS-S 533 Online Searching (3 cr.) P: S401 or consent of instructor. Principles, methods, and techniques of advanced online information retrieval (IR). Characteristics of and search strategies for the use of bibliographic, referral, citation, fact, numeric, and full text databases and search systems. Considers standards, use of communications software, front-ends and micro-based IR systems, and creation of in-house databases.

SLIS-S 541 Information Policy (3 cr.) Data creation, publication, dissemination, and use occur in a complex social context. Legal and regulatory structures continue to evolve to control these processes. This course explores international and U.S. principles, laws, and regulations affecting the information industry. Focus varies with the topic; for example, copyright of electronic information sources or transborder data flow. May be repeated for credit when topic varies.

SLIS-S 550 Perspectives on Librarianship (3 cr.) Overview of the library as a social institution-historically, currently, and for the future-within social, economic, political, and cultural contexts. Focuses on the institution, the collections and formats, and the users to create an understanding of the role and importance of libraries. S550 provides excellent opportunities to help students explore the library profession.

SLIS-S 551 Library Management (3 cr.) Management and administration of all types of libraries. Covers basics of organizational structure, planning, budget management, human resources issues and skills, and an understanding of the manager in the context of the organization.

SLIS-S 552 Academic Library Management (3 cr.) Management and administration of academic libraries, including specific material related to organization structure, planning, budget management, human resources issues and skills, and an understanding of the manager in the context of a higher education environment.

SLIS-S 553 Public Library Management (3 cr.) Management and administration of public libraries, including specific material related to organization structure, planning, budget management, human resources issues and skills, and an understanding of the manager in the context of a community environment.

SLIS-S 554 Library Systems (3 cr.) P: S401. Principles for the design, selection, implementation and management of automated systems of all types in libraries, including systems for technical services processing, reference and user services, and management. Focus is on present and

future applications of technology in libraries, their technical features, and their implications for library services and management. When possible, some practical experience with a particular application will be provided.

SLIS-S 556 Systems Analysis and Design (3 cr.) P: computer or consent of instructor. This course introduces the basic concepts underlying systems analysis and design, focusing on contextual inquiry/design and data modeling, as well as the application of those analysis techniques in the analysis and design of organizational information systems.

SLIS-S 571 Materials for Youth (3 cr.) Evaluation and use of books, magazines, recordings, films, radio and television broadcasts, and other sources of information and recreation.

SLIS-S 572 Youth Services (3 cr.) P: S571 or consent of instructor. This course emphasizes the history, philosophy, and description of children and young adult library services. It takes a holistic look at the role of the youth services librarian from planning and evaluation to specific services and programs, and examines the current and future outlook for this type of librarianship. Emphasis is on the public library, but cooperation with appropriate services and programs, such as school media centers, is also discussed.

SLIS-S 573 Education of Information Users (3 cr.) P: S401, S501 or S516.
Introduces students to the roles of librarians in adult education in university and college libraries and in public libraries. The course explores information literacy, library instructional models, education and training theories, and practical approaches for optimizing learning opportunities in library-based settings. Information literacy standards from the Association of College and Research Libraries (ACRL) and others are explored and applied to instructional design and practice. S573 also introduces students to outcomes-based planning and evaluation, a process for planning library-based educational programs with outcomes, or specific learning objectives in-mind.

SLIS-S 574 Information Inquiry for School Teachers (3 cr.) Information Inquiry for School Teachers (3 cr.; formerly L551) This course is intended to be an opportunity for teachers and future teachers (including school library media specialists as teachers) to practice methods in critically thinking about information/media, and to use the inquiry process as a means to teach their students to be critical reviewers and communicators as well. Application of national and state standards for information literacy K - 12. Offered over the Internet.

SLIS-S 580 History of Libraries (3 cr.) Development of libraries and information service from earliest times to the present, with emphasis on the library in relation to social, economic, cultural, and political trends.

SLIS-S 581 Archives and Records Management (3 cr.) Introduces basic theories, methods, and significant problems in archives and records management. The course also discusses how archivists are responding to the challenge of managing and preserving electronic records.

SLIS-S 582 Preservation (3 cr.) Examines causes of library and archival materials deterioration. Develops conceptual framework and management perspective for preservation programs using technical standards, program development tools, scientific and administrative research reports, and advocacy literature. Explores the new information technologies and media as both preservation tools and challenges.

SLIS-S 605 Internship in Library and Information Science (2-6 cr.) P: Permission of faculty advisor. Graded S/F. Supervised internship in an information management environment. Professionals in library and information management mentor each graduate student. Sixty on-site hours must be completed for each credit earned. Students document their experiences through journals, abstracts of related publications, and a final presentation. Normally, at least 18 credits must be completed before enrollment*. Guidelines and placement listings are available on the SLIS website.

SLIS-S 621 Audio and Video Sources (3 cr.) P: S401 concurrent or consent of instructor. User-focused approach to decision making in the digital audio and video information environment. Emphasizes collection development in support of user services, including access to remote collections and evaluation of multimedia materials and delivery mechanisms, and issues related to emerging technologies. Scope includes adult and young adult audiences.

SLIS-S 622 Resources and Services for People with Disabilities (3 cr.) Access to information is essential for sustained independence of people with disabilities. This course studies materials, services, and assistive technologies to support this access.

SLIS-S 631 Advanced Cataloging (3 cr.) P: S504. Provides extensive background in description and access for electronic and non-book resources.

SLIS-S 652 Digital Libraries (3 cr.) This course introduces digital libraries — networked information servers that provide access to multimedia data for local and remote users. Primary emphasis is on developing digital libraries, based on understanding tools for presentation and manipulation of multimedia as well as analysis of user needs.

SLIS-S 671 School Media (3 cr.) P: S501, S571, and S574 or concurrent or consent of instructor. Establishes the professional teaching and administrative role of the certified school library media specialist in K-12 settings. Situations are examined that pertain specifically to policy development, budgeting, collection development, instructional design, support staff training, facility design, district supervision, and information networking within the modern school corporation. Students make site visits to leading school information centers, conferences, and media fairs.

SLIS-S 602 Directed Research (1-3 cr.) P: Proposal form and consent of instructor and 15 SLIS graduate credit hours completed including S505 or S506. Individual research in a problem in the field of library and information science.

SLIS-S 603 Workshop in Library and Information Science (1-3 cr.) Group study of specific problems in the library and information field. Generally includes a hands-

on element. No more than 6 hours of S603 credit may be used toward the requirements for any SLIS degree.

SLIS-S 654 Law Librarianship (3 cr.) P: S501 or consent of instructor. An introduction to basic legal materials and law librarianship. Primary and secondary resources; indexes; digests and citators; specialized research methods; current developments in automated legal research. History of law libraries in the U.S., their organization and administration. The role of law librarians in law schools and law firms.

SLIS-S 672 Seminar on Literature for Youth (3 cr.) P: S571 or consent of instructor. An advanced seminar, addresses such topics as: images of minority groups, societal problems (e.g., poverty and family patterns), or informational needs and materials including access and availability of print, nonprint, and computer resources. May be repeated for credit when topic varies.

SLIS-S 650 Library Philanthropy (3 cr.) Introduces the role of private giving in support of libraries. Examines personal and corporate philanthropy and their applicability in libraries and information centers.

SLIS-S 640 Seminar in Intellectual Freedom (3 cr.) P: 9 hours of SLIS graduate credit or permission of instructor. Beginning with a history of and alternative philosophical justifications for censorship, the student is introduced to constraints, obligations, and problems relating to intellectual freedom.

SLIS-S 604 Topics in Library and Information Science (1-4 cr.) Study of specific topics in librarianship and preservation. May be repeated for credit when topic varies. Same course number used for different courses.

SLIS-S 632 Technical Services (3 cr.) C: S553, S551, S552 or consent of instructor
Principles of organization and function of library technical services, including acquisition, cataloging, serials, circulation. Special emphasis on research and development in library systems and technology. Includes file organization, documentation system development, analysis, and evaluation for manual, mechanical, and automated applications.

LIS-S 644 Consumer Health Informatics (3 cr.) P: S401, S501 or consent of instructor. This is a consumer health informatics course in which students will learn about how technologies are used to deliver healthcare to the public.

SLIS-S 653 Health Science Librarianship (3 cr.) P: S401, S501or consent of instructor;
Explores the roles of health sciences libraries, librarianship and informationists in academia and hospital libraries, health information technology and information services environments, and in research and administrative teams. This course provides an introduction to the healthcare industry, health sciences schools and education (medicine, nursing, dentistry, public health, pharmacy, allied health and others), and the culture of healthcare in the United States. Student gain extensive experience with popular reference resources, and searching MEDLINE, PubMed, and speciality bibliographic databases in the health sciences. Students will increase their understanding of librarian and informationist roles in information literacy education, evidence based practice, health literacy, and other issues

SLIS-S 623 Genealogy and Local History (3 cr.) P: S401, S501, & S502. This course is designed to focus on two specific collection areas: Genealogy Resources and Indiana Resources. Students will work on developing collection policies creating collections with limited funding, and evaluating existing special collections. The class will also look at the pros and cons of several issues (staffing issues, volunteers, integrated collections, circulating/non-circulating, limited resources, material types).

Informatics

INFO-I 501 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.

INFO-B 505 Informatics Project Management (3 cr.) This course introduces standard project management concepts and capabilities, in the context of innovative and creative knowledge-work projects involving computers. These are targeted as a common ground for all members of a successful team, not only for the Project Manager. Through lecture, reading, discussion, computer lab exercises, and projects, students will become more proficient with basic project management terminology, techniques and technologies. Students will apply industry-standard project management in a framework of productive team dynamics, consumer frame of reference, and organizational change and optionally continuing to professional certification.

INFO-B 510 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.

INFO-B 512 Scientific and Clinical Data Management (3 cr.) Management and mining of data generated in scientific laboratories and clinical trials for data mining and knowledge discovery requires robust solutions that include knowledge discovery techniques and databases, extraction of data/metadata stored in data warehouses that use Storage Use Networks and dealing with security issues of handling this data.

INFO-B 530 Foundations of Health Informatics (3 cr.) This course will introduce the foundation of health informatics. It will review how information sciences and computer technology can be applied to enhance research and practice in healthcare. The basic principles of informatics that govern communication systems, clinical decisions, information retrieval, telemedicine, bioinformatics and evidence based medicine will be explored.

INFO-B 535 Clinical Information Systems (3 cr.) Clinical Information Systems includes: human computer interface and systems design; healthcare decision support and clinical guidelines; system selection; organizational issues

in system integration; project management for information technology change; system evaluation; regulatory policies; impact of the Internet; economic impacts of e-health; distributed healthcare information technologies and future trends.

INFO-B 551 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 9 hours.

INFO-I 575 Informatics Research Design (3 cr.) Full spectrum of research concepts, designs, and methodologies used in informatics research, from quantitative to qualitative research; from deterministic, hypothesis-driven experimental designs to a posteriori discovery through data mining. Philosophical foundations to practical applications. Provides the conceptual framework in which the informatics graduate student may develop their own research agenda.

INFO-B 578 Data Analysis for Clinical Administrative Decision Making (3 cr.) P: INFO I575 Focuses on understanding, manipulating, and analyzing quantitative data in nursing and healthcare. Includes use of computer-based systems for data management and statistical analysis. Application and interpretation of multivariate statistical models for decision making.

INFO-B 641 Business of Health Informatics (3 cr.) This class focuses on the economic importance of healthcare information technology adoption for value realization, as a strategic asset, as an investment, and transformation toward integrated decision making. Topics covered include but are not limited to implementation of Decision Support System, barcode tracking, Electronic Health Records, pay-for-performance incentives for e-prescribing.

INFO-B 643 Natural Language Processing and Text Mining for Biomedical Records and Reports (3 cr.) This course familiarizes students with applications of Natural Language Processing and text mining in health care. While the course provides a short introduction to commonly used algorithms, techniques and software, the focus is on existing health care applications including clinical records and narratives, biomedical literature and claims processing.

INFO-B 691 Thesis/Project in Health Informatics (1-6 cr.) The student prepares and presents a thesis or project in the area of health informatics. The product is substantial, typically multi-chapter paper or carefully designed and evaluated application, based on well-planned research or scholarly project. Details are worked out between the student and sponsoring faculty member.

INFO-B 581 Health Informatics Standards and Terminologies (3 cr.) Health information standards specify representation of health information for the purpose of communication between information systems. Standards not only standardize data formats, but also the conceptualizations underlying the data structures. The design process of data standards, domain analysis, conceptualization, modeling, and the methods and tools commonly used are explored.

INFO-B 642 Clinical Decision Support Systems (3 cr.) This course provides an overview of the background and state-of-the-art Clinical Decision Support Systems (CDSS). Topics include: the design principles behind clinical decision support systems, mathematical foundations of the knowledge-based systems and pattern recognition systems, clinical vocabularies, legal and ethical issues, patient centered clinical decision support systems, and the applications of clinical decision support systems in clinical practice.

INFO-B 668 Seminar in Health Informatics II (3 cr.) This course provides graduate students with knowledge on a wide range of current topics in health informatics from faculty and professionals engaged in cutting edge research and practice. Students connect with innovative faculty while learning through a combination of lectures, practicums, and discussions. The topics and presenters will be different each semester.

INFO-B 582 Health Information Exchange (3 cr.) This course describes the drivers and challenges, the data and services of electronic health information exchange (HIE). The five focus areas of HIE are reviewed relative to strategies and actions: Aligning Incentives; Engaging Consumers; Improving Population Health; Managing Privacy, Security and Confidentiality; and, Transforming Care Delivery.

INFO-B 583 Security and Privacy Policies and Regulations for Health Care (3 cr.) This course discusses privacy and security regulations for health care information transactions including policy, procedures, guidelines, security architectures, risk assessments, disaster recovery, and business continuity. Particular attention is given to the Health Insurance Portability and Accountability Act (HIPAA) and the Health Information Technology for Economic and Clinical Health (HITECH) Act.

INFO-B 584 Practicum in Health Information Technology (3 cr.) This course provides an opportunity for the learner to synthesize all previous coursework and to demonstrate beginning competency in Health Information Technology (HIT) applications. The course employs an application focus in which the learner demonstrates comprehension, critical thinking, and problem-solving abilities within the context of a real-world environment.

INFO-B 605 Social Foundations of Informatics (3 cr.) Topics include the economics of information businesses and information societies, legal and regulatory factors that shape information and information technology use, the relationship between organization cultures and their use of information and information technology, and ownership of intellectual property.

INFO-I 590 Topics in Informatics (3 cr.) Variable topic. Emphasis is on new developments and research in informatics. Can be repeated with different topics, subject to approval of the Dean.

INFO-I 690 Topics in Informatics (3 cr.) Variable topic. Course is intended for Ph.D. students in the School of Informatics. Can be repeated with different topics, subject to approval of the dean.

INFO-I 699 Independent Study in Informatics (1-3 cr.) Independent readings and research for Ph.D. students under the direction of a faculty member, culminating in

a written report. May be repeated for a maximum of 12 credit hours.

INFO-I 790 Informatics Research Rotation (3 cr.) Work with faculty, investigate research opportunities. Can be repeated for a total of 6 credit hours.

INFO-I 890 Thesis Readings and Research (1-12 cr.) Research under the direction of a member of the graduate faculty leading to a Ph.D. dissertation. Can be repeated for credit for a total of 30 credit hours.

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INFO-I 600 Professionalism and Pedagogy in Informatics (3 cr.) This course introduces students to topics and skills necessary for entering careers in industry or the academy. Topics covered include career planning, curriculum development, effective teaching, research ethics, scholarly and trade publishing, grantsmanship, and intellectual property consideration.

INFO-G 599 Thesis Research (0 cr.) Master's students who have enrolled in 30 or more hours of graduate course work applicable to the degree and who have completed all other requirements of the degree except the thesis of final project of performance may enroll in G599. Requires section authorization.

INFO-B 531 Seminar in Health Informatics (1-3 cr.) Variable topic. Emphasis is on advanced topics and research in health informatics.

INFO-B 667 Seminar in Health Informatics I (3 cr.) This course provides graduate students with advanced knowledge on a wide range of technical and analytical topics in health informatics. The course involves a combination of lectures, practicums, and discussions to engage students in the various aspects of an informatisist's role. The topics and presenters will be different each semester.

INFO-H 559 MEDIA AND TECHNOLOGY ENTREPRENEURSHIP (3 cr.) This course is intended for students who are interested in starting their own company or who anticipate joining a start-up company. It will provide students with a solid foundation on a variety of legal and business matters that need to be considered when starting a new company, such as selecting a business structure (sole proprietorship, partnership, corporation, etc.), financing and credit, drafting business plans, preparing appropriate paperwork such as articles of incorporation and bylaws, tax implications, marketing and public relations, bankruptcy and other pitfalls, insurance, planning for growth, resources for entrepreneurs, contracts, real and personal property, shareholder and governance issues and working with professionals such as attorneys, accountants and insurance agents.

INFO-H 611 Mathematical and Logical Foundations of Informatics (3 cr.) An introduction to mathematical methods for information modeling, analysis, and manipulation. The topics include proof methods in mathematics, models or computation, counting techniques and discrete probability, optimization, statistical inference and core advanced topics that include, but are not limited to, Markov chains and random walks, random graphs, and Fourier analysis.

Informatics

INFO-I 501 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.

INFO-B 505 Informatics Project Management (3 cr.) This course introduces standard project management concepts and capabilities, in the context of innovative and creative knowledge-work projects involving computers. These are targeted as a common ground for all members of a successful team, not only for the Project Manager. Through lecture, reading, discussion, computer lab exercises, and projects, students will become more proficient with basic project management terminology, techniques and technologies. Students will apply industry-standard project management in a framework of productive team dynamics, consumer frame of reference, and organizational change and optionally continuing to professional certification.

INFO-B 510 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.

INFO-B 512 Scientific and Clinical Data Management (3 cr.) Management and mining of data generated in scientific laboratories and clinical trials for data mining and knowledge discovery requires robust solutions that include knowledge discovery techniques and databases, extraction of data/metadata stored in data warehouses that use Storage Use Networks and dealing with security issues of handling this data.

INFO-B 530 Foundations of Health Informatics (3 cr.) This course will introduce the foundation of health informatics. It will review how information sciences and computer technology can be applied to enhance research and practice in healthcare. The basic principles of informatics that govern communication systems, clinical decisions, information retrieval, telemedicine, bioinformatics and evidence based medicine will be explored.

INFO-B 535 Clinical Information Systems (3 cr.) Clinical Information Systems includes: human computer interface and systems design; healthcare decision support and clinical guidelines; system selection; organizational issues in system integration; project management for information technology change; system evaluation; regulatory policies; impact of the Internet; economic impacts of e-health; distributed healthcare information technologies and future trends.

INFO-B 551 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 9 hours.

INFO-I 575 Informatics Research Design (3 cr.) Full spectrum of research concepts, designs, and methodologies used in informatics research, from quantitative to qualitative research; from deterministic, hypothesis-driven experimental designs to a posteriori discovery through data mining. Philosophical foundations to practical applications. Provides the conceptual framework in which the informatics graduate student may develop their own research agenda.

INFO-B 578 Data Analysis for Clinical Administrative Decision Making (3 cr.) P: INFO I575 Focuses on understanding, manipulating, and analyzing quantitative data in nursing and healthcare. Includes use of computer-based systems for data management and statistical analysis. Application and interpretation of multivariate statistical models for decision making.

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INFO-H 611 Mathematical and Logical Foundations of Informatics (3 cr.) An introduction to mathematical methods for information modeling, analysis, and manipulation. The topics include proof methods in mathematics, models or computation, counting techniques and discrete probability, optimization, statistical inference and core advanced topics that include, but are not limited to, Markov chains and random walks, random graphs, and Fourier analysis.

INFO-B 509 Fundamentals of Clinical Care for Health Informaticians (3 cr.) Fundamentals of Clinical Care for Health Informaticians is an introduction to the concepts, principles, problems, and practices that define the U.S. healthcare system. Topics include health and health status, elements of the healthcare delivery system, healthcare facilities and professions, healthcare financing and regulation, ethics in healthcare and overarching policy issues.

This course enables health informatics students who do not have medical backgrounds to work within the U.S. healthcare system and communicate with clinicians and providers by developing a fundamental understanding of the healthcare system, processes for delivering healthcare, clinical decision-making, and basic principles of evidence-based practice.

INFO-B 513 The Design, Implementation, and Evaluation of Electronic Health Record Systems (3 cr.) Students learn how to design, implement, and evaluate electronic health record (EHR) system and how to use technology to support their data acquisition, storage, reuse, interoperability, exchange, and analysis. They also evaluate their legal, ethical, and regulatory implications and learn how to build teams to manage their implementation in healthcare organizations.

INFO-B 536 Computational Methods for Biomedical Informatics (3 cr.) Course covers algorithm design, algorithm analysis, and complexity analysis and their applications in biomedical informatics.

INFO-B 537 Health Literacy (3 cr.) Course examines health literacy, its role in a multicultural society, and its impact on patient care. Students learn how to increase health literacy so that patients better understand their health issues. The course also examines communication problems between healthcare providers and patients and how to improve health communication.

INFO-B 543 Professional Practicum in Health Information Management I (1-6 cr.) Course provides professional practice experience. Students complete the project-based practicum under the direction of the assigned site supervisor. The student develops a project and presentation for the site. The student conducts all necessary research and applies project management tools and skills in completing the project.

INFO-B 544 Professional Practicum in Health Information Management II (1-6 cr.) Course provides professional practice experience. Students complete the project-based practicum under the direction of the assigned site supervisor. The student develops a project and presentation for the site. The student conducts all necessary research and applies project management tools and skills in completing the project.

INFO-B 626 Human Factors Engineering for Health Informatics (3 cr.) Students review and critique traditional and emerging human factors engineering approaches, concepts, and methods and apply them to contemporary health informatics problems. Class activities include discussions and interactive peer review of articles, presentations, and original research proposals.

INFO-B 644 Consumer Health Informatics (3 cr.) This is a consumer health informatics course in which we learn about how technologies are used to deliver healthcare to the public.

INFO-I 595 Professional Internship (1-6 cr.) An experiential learning course where students apply classroom theory and learning in degree-related work

experience under the supervision of a mentoring supervisor and course instructor.

Health Information Management

HIM-M 110 Computer Concepts for Health Information (3 cr.) Course provides an overview of applications for the health and medical professionals. Topics include: audit trails, generating, quantifying and analyzing medical reports, word processing, computer hardware, medical software, copyright and fair usage. Students retrieve and present medical data.

HIM-M 200 Database Design for Health Information Administration (3 cr.) Introduction to database design with an emphasis on managing data in the health information environment. Topics and concepts include creating data table relationships and normalization. Utilizing Microsoft Access to create user forms and reports. Students will be required to create a large group project.

HIM-M 425 Quantitative Analysis of Health Information (3 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.

HIM-M 322 Hospital Organization and Management (3 cr.) Orientation to hospital departments hospital organization; inter- and intra-relationships of hospital and community agencies.

HIM-M 325 Health Care Information Requirements and Standards I (3 cr.) Course outlines the essential documents/data content required for maintaining legal health records using paper and electronic media. Federal, state and local law, accreditation standards and regulatory requirements for maintaining patient data examined. Documentation in acute care, psychiatric and other healthcare settings. Students begin to explore the health information management professions.

HIM-M 330 Medical Terminology (3 cr.) The purpose of this course is to further develop a student's understanding and use of medical terminology. There is a focus on spelling and pronunciation, abbreviations, analyzing words based on their root, prefix or suffix as well as identifying common mistakes within medical terminology.

HIM-M 350 Medical Science for Health Information I (3 cr.) This course will cover pathophysiology and pharmacology associated with the body systems.

HIM-M 475 Health information Technology (3 cr.) Introduction to health information standards that have been developed for the electronic health record and information interoperability and standards in development. Emphasis on understanding healthcare organization networks, intranets, the role of the Internet in patient data access, differences between clinical and administrative information systems used in healthcare organizations and the management and maintenance of those systems.

HIM-M 400 Health Information Storage and Retrieval (3 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).

HIM-M 420 Health Care Planning and Information Systems (3 cr.) Understanding the design of systems, research various vendors, present information so that a selection of information system can be recommended. This course will also address systems planning; systems selection process; clinical and business applications of computing in healthcare; resolving organization information issues.

HIM-M 345 Healthcare Law, Ethics, and Information Release (3 cr.) Course covers legal and ethical concepts in medicine and healthcare as applied to physicians, healthcare workers, hospitals, and other institutions. It focuses on confidentiality and privacy in the release of information and the privacy and security of electronic healthcare transactions and code sets under the Health Insurance Portability and Accountability Act.

HIM-M 351 Medical Science for Health Information II (3 cr.) P: HIM-M 350. This course is a continuation of HIM-M 350. Course will cover pathophysiology and pharmacology associated with the body systems.

HIM-M 358 CPT Coding (3 cr.) P: HIM-M 355. 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.

HIM-M 361 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.

HIM-M 462 Health Care Quality Improvement (2 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.

HIM-M 470 Health Care Reimbursement Systems (3 cr.) P: HIM-M 355, HIM-M 455. 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.

HIM-M 490 RHIA Exam Preparation (1 cr.) This course reviews technical and administrative aspects of domain topics required to pass of the Registered Health Information Administrator (RHIA) examination. (Students enrolled in this course are expected to take the RHIA exam concurrently.)

HIM-M 499 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.

HIM-M 120 Data Organization and Presentation in the Healthcare Environment (3 cr.) Students will

study and apply problem solving, decision analysis and data presentation techniques used in healthcare data representation for both internal and external users. ICD and CPT classification systems will be modeled and analyzed utilizing spreadsheets.

HIM-M 220 Healthcare Decision Support (3 cr.) This course provides an overview of essential information technology tools necessary for quantitative and qualitative decision making in a healthcare environment. Students will learn effective methods to analyze patient data including ICD and CPT classification systems as they relate to decision processes in a healthcare environment.

HIM-M 270 Foundations and Principles of Health Information Management (2 cr.) Course focuses on the administration of foundational principles of management within a health information department. Students will gain an understanding of the language of quantitative methods as well as the processes that are required for health information managers to function in a healthcare environment which demands competency in the areas of profit margins, management of financial resources and complex reimbursement processes.

HIM-M 275 Effective Communication for the Healthcare Environment (3 cr.) Course is designed to develop effective interaction among internal and external customers in a healthcare environment. Emphasis is placed on professional communications with superiors, peers and subordinates in all areas of healthcare. Topics include: policy creation, HIM job descriptions, information technology proposal requests, e-mail etiquette and presentation skills.

HIM-M 326 Laboratory Enrichment for Healthcare Information Requirements and Standards I (1 cr.) This course consists of exercises that reinforce the lectures in HIA-M 325. Students explore up-to-date Web resources used in the healthcare field as well as perform database searches. Students engage in laboratory exercises that consist of evaluating health records for completeness, regulatory compliance and documentation.

HIM-M 327 Healthcare Information Requirements and Standards II (3 cr.) This course is a continuation of HIA-M 325 and includes the ongoing review of health record documentation, in particular secondary data bases such as cancer registry, long term care and other healthcare settings. Healthcare information resources, both in print and on the World Wide Web are researched and examined extensively.

HIM-M 328 Laboratory Enrichment for Healthcare Information Requirements and Standards II (1 cr.) P: HIM-M 325. This course consists of exercises that reinforce the lectures in HIA-M 327. Students explore Web resources used in the healthcare field and perform extensive database searches.

HIM-M 356 Laboratory Enrichment for ICD-9-CM Coding (1 cr.) This course is a laboratory for HIA-M 355 that provides hands-on experience in assigning ICD-9-CM codes. Actual patient records are used for coding practice which focuses on correct code assignment and sequencing of codes to follow ethical coding guidelines. Students will also gain hands-on experience with electronic health records and coding software used in the HIM industry.

HIM-M 443 Professional Practicum in Health Information Management I (1-8 cr.) This course is designed to provide professional practice experience in an approved clinical site under the direction of an HIA faculty member and an onsite clinical instructor. Students also receive didactic and practicum experience in the classroom. Emphasis on clinical science, health information management, business administration and information systems.

HIM-M 444 Professional Practicum in Health Information Management II (1-8 cr.) P: HIM-M 443. This course is a continuation of HIM-M 443 and includes professionally supervised experience in an approved clinical site as well as practicum experience in the classroom.

HIM-M 359 Clinical in Health Information Administration (1 cr.) P: HIM-M 355. This course is a laboratory for HIM-M 355 that provides hands-on experience in assigning CPT codes. Actual patient records are used for coding practice which focuses on correct code assignment and sequencing of codes to follow ethical coding guidelines. Students will also gain hands-on experience with electronic health records and coding software used in the HIM industry.

HIM-M 457 Practicum in Medical Coding (4 cr.) Course is designed for students completing the Certificate in Medical Coding. Students will participate in a supervised laboratory practicum focusing on the coding of complex medical records using both the ICD and CPT coding systems. Onsite observations related to coding function in approved clinical settings are included in the course content.

HIM-M 355 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.

HIM-M 370 Health information Management (3 cr.) This course will focus on human resources management in a Health information Department. Work scheduling, work flow and work design will be discussed. Other issues in managing an HIM department will be addressed such as education and training, establishing productivity standards, developing a budget and managing contracts.

HIM-M 108 Introduction to Health Information Management (3 cr.) Course introduces the health information management profession and healthcare delivery systems. Topics include healthcare settings, the patient record, electronic health records (EHRs), data collection standards, legal aspects of health information, coding, and reimbursement. Students gain hands-on experience with a virtual EHR and examine the impact of EHRs on healthcare.

INFO-B 405 Social Foundations of Biomedical Informatics (3 cr.) Course introduces the economics of information businesses and societies. It examines how the use of information and information technology

is influenced by laws and regulations, the ownership of intellectual property, and organizational culture.

INFO-B 413 The Design, Implementation, and Evaluation of Electronic Health Record Systems (3 cr.) Students learn how to design, implement, and evaluate electronic health record (EHR) system and how to use technology to support their data acquisition, storage, reuse, interoperability, exchange, and analysis. They also evaluate their legal, ethical, and regulatory implications and learn how to build teams to manage their implementation in healthcare organizations.

INFO-B 430 Introduction to Health Informatics (3 cr.) Course introduces the foundations of health informatics. It reviews how information science and computer technology can be applied to enhance research and practice in healthcare. The basic principles of informatics that govern communication systems, clinical decisions, information retrieval, telemedicine, bioinformatics and evidence-based medicine will be explored.

INFO-B 435 Clinical Information Systems (3 cr.) Course covers human-computer interface and systems design, healthcare decision support and clinical guidelines, system selection, organizational issues in system integration, project management for information technology change, system evaluation, regulatory policies, impact of the Internet, economic impacts of e-health, distributed healthcare information technologies, and future trends.

INFO-B 441 Business of Health Informatics (3 cr.) Course examines the economic impact of the adoption of healthcare information technology. Students explore its role as a strategic asset and analyze its return on investment to make a case for investment. Topics include decision support system, barcode tracking, electronic health records, and pay-for-performance incentives.

INFO-B 442 Clinical Decision Supports Systems (3 cr.) Course examines clinical decision support systems (CDSS), both the current state of the art and their historical development. Topics include the application of CDSS to clinical practice, patient-centered CDSS, clinical vocabularies, legal and ethical issues, and mathematical foundations of the knowledge-based and pattern recognition systems.

INFO-B 473 Application Programming for Biomedical Data Analysis (3 cr.) Course covers Perl, R, and SQL programming for analyzing biomedical datasets. It includes Unix system administration, MySQL database management, and the R statistical package. Students learn which computational approach to take in developing translational applications to solve biomedical problems.

INFO-B 481 Health Information Standards and Terminologies (3 cr.) Health information standards specify representation of health information for communication between information systems. Standards not only standardize data formats, but also the conceptualizations underlying the data structures. The design process of data standards, domain analysis, conceptualization, modeling, and the methods and tools commonly used are explored.

INFO-B 482 Health Information Exchange (3 cr.) Course introduces health information exchange (HIE), the electronic transfer of administrative and clinical information among healthcare organizations. Students examine strategic, organizational, legal, technical, and sociopolitical aspects of HIE initiatives in the U.S. and abroad, including their impact on healthcare quality, safety, efficiency, and cost.

INFO-B 483 Security and Privacy Policies and Regulations for Healthcare (3 cr.) Course discusses privacy and security regulations for healthcare information transactions including policy, procedures, guidelines, security architectures, risk assessments, disaster recovery, and business continuity. Particular attention is given to the Health Insurance Portability and Accountability Act (HIPAA) and the Health Information Technology for Economic and Clinical Health (HITECH) Act.

Human-Centered Computing

INFO-H 503 Social Impact of Information Technologies (3 cr.) An overview of important social, legal, and ethical issues raised by information technology.

INFO-H 504 Social Dimensions of Science Informatics (3 cr.) Course will examine ethical, legal, and social issues surrounding contemporary research and practice in science informatics. Topics include the nature of science and technology, the ramifications of recent advances in science informatics, and relevant science policy and research ethics. General knowledge of science informatics is assumed.

INFO-H 506 Globalization and Information (3 cr.) Explores the processes that promote and impede movement of human action and informational activities to the most general levels, e.g., the level of the world as a whole. Surveys diverse theories of globalization to identify the best approaches for professional informatics career planning and making information globally accessible.

INFO-B 505 Informatics Project Management (3 cr.) This course introduces standard project management concepts and capabilities, in the context of innovative and creative knowledge-work projects involving computers. These are targeted as a common ground for all members of a successful team, not only for the Project Manager. Through lecture, reading, discussion, computer lab exercises, and projects, students will become more proficient with basic project management terminology, techniques and technologies. Students will apply industry-standard project management in a framework of productive team dynamics, consumer frame of reference, and organizational change and optionally continuing to professional certification.

INFO-H 525 Organizational Informatics and Economics Security (3 cr.) Organizational process embed implicit and explicit decisions and information control. Security technologies and implementations make explicit organizational choices that determine individual autonomy within an organization. Security implementations allocate risk, determine authority over processes, make explicit relationships in overlapping hierarchies, and determine trust extended to organizational participants.

INFO-H 534 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.

INFO-H 538 Introduction to Cryptography (3 cr.) Introduction to the foundational primitives of cryptography and implementations. A primary goal of this course will be to understand the security definitions for each primitive and how they are used in cryptographic protocols. The ethics of insecure or on-the-fly protocol design will be discussed.

INFO-H 539 Cryptographic Protocols (3 cr.) The class teaches a basic understanding of computer security by looking at how things go wrong, and how people abuse the system. The focus of the class is on how computer systems are attacked, and once this is understood it is possible to propose ways to make the system secure.

INFO-H 540 Data Mining for Security (3 cr.) The objective of this course is to provide an understanding of the impact of data mining in security with a particular focus on intrusion detection. There will be an introduction to data mining where data mining techniques including association rules, clustering and classification are described. Security basics will be presented, focusing on topics such as authentication and access control that are relevant to data mining. This seminar course will explore recent research work in this area and intrusion detection.

INFO-H 559 MEDIA AND TECHNOLOGY ENTREPRENEURSHIP (3 cr.) This course is intended for students who are interested in starting their own company or who anticipate joining a start-up company. It will provide students with a solid foundation on a variety of legal and business matters that need to be considered when starting a new company, such as selecting a business structure (sole proprietorship, partnership, corporation, etc.), financing and credit, drafting business plans, preparing appropriate paperwork such as articles of incorporation and bylaws, tax implications, marketing and public relations, bankruptcy and other pitfalls, insurance, planning for growth, resources for entrepreneurs, contracts, real and personal property, shareholder and governance issues and working with professionals such as attorneys, accountants and insurance agents.

INFO-H 554 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 9 hours.

INFO-H 563 Psychology of Human Computer Interaction (3 cr.) Covers the psychological and behavioral science of human computer interaction, including cognitive architecture, memory, problem-solving, mental models, perception, action, and language. Emphasis is placed on developing an understanding of the interaction between human and machine systems and how these processes impact the design and testing of interactive technologies.

INFO-H 564 Prototyping for Interactive Systems (3 cr.) The course covers methodologies for designing and prototyping graphic user interfaces, including rapid (paper) and dynamic (interactive) prototypes. Principles of design research and visual communication are discussed in the context of interaction design, cognition and user behavior, as well as usability testing techniques for concept validation.

INFO-I 575 Informatics Research Design (3 cr.) Full spectrum of research concepts, designs, and methodologies used in informatics research, from quantitative to qualitative research; from deterministic, hypothesis-driven experimental designs to a posteriori discovery through data mining. Philosophical foundations to practical applications. Provides the conceptual framework in which the informatics graduate student may develop their own research agenda.

INFO-I 590 Topics in Informatics (3 cr.) Variable topic. Emphasis is on new developments and research in informatics. Can be repeated with different topics, subject to approval of the Dean.

INFO-I 600 Professionalism and Pedagogy in Informatics (3 cr.) Course will introduce students to topics and skills necessary for entering careers in industry or the academy. Topics covered will include career planning, curriculum development, effective teaching, research ethics, scholarly and trade publiching, grantsmanship, and intellectual property consideration.

INFO-H 604 Human Computer Interaction Design Theory (3 cr.) The course will explore, analyze, and criticize underlying assumptions and the rational rationale behind some of the most influential theoretical attempts in HC and related fields. The purpose of the course is to make students aware of how theories can influence practice and to develop critical thinking around the role, purpose, and function of theories.

INFO-I 605 Social Foundations of Informatics (3 cr.) Topics include the economics of information businesses and information societies, legal and regulatory factors that shape information and information technology use, the relationship between organization cultures and their use of information and information technology, and ownership of intellectual property.

INFO-H 611 Mathematical and Logical Foundations of Informatics (3 cr.) An introduction to mathematical methods for information modeling, analysis, and manipulation. The topics include proof methods in mathematics, models or computation, counting techniques and discrete probability, optimization, statistical inference and core advanced topics that include, but are not limited to, Markov chains and random walks, random graphs, and Fourier analysis.

INFO-H 624 Advanced Seminar I–Human-Computer Interaction (3 cr.) P: Advanced graduate standing or consent of instructor. Introduces students to major historical, contemporary, and emerging theories, methods, techniques, technologies, and applications in the field of human-computer interaction. Students will explore relevant and influential research, results, and application. Students will design an independent research program in relation to their individual research fields and personal interests.

INFO-H 634 Advanced Seminar II – Human Computer Interaction (3 cr.) P: Advanced graduate standing or consent of instructor. Introduces students to major historical, contemporary, and emerging theories, methods, techniques, technologies, and applications in the field

of human-computer interaction. Students will explore relevant and influential research, results, and applications. Students will develop an understanding of leading research approaches and paradigms, and will design an independent research program in relation to their individual research fields and personal interests.

INFO-H 651 The Ethnography of Informatics (3 cr.) Introduces ethnography as a social science methodology and way of knowing with which to study information and its social contexts. Places ethnography in relation to other research methodologies relevant to the production of the informatics knowledge base. Trains students in the use of a broad range of ethnographic techniques relevant to the study of automated information technology in use. Designed to be open to students from other programs with sufficient methodological and substantive background.

INFO-H 690 Topics in Informatics (3 cr.) Variable topic. Emphasis on new developments and research in informatics. Course is intended for Ph.D. students in the School of Informatics. Can be repeated with different topics, subject to approval of the dean.

INFO-H 694 Thesis/Project in Human-Computer Interaction (1-6 cr.) The student prepares and presents a thesis or project in an area of human-computer interaction. The product is substantial, typically multi-chapter paper, or a carefully designed and evaluated application, based on well-planned research or scholarly project. Details are worked out between the student and sponsoring faculty member.

INFO-H 698 Research in Informatics (1-12 cr.) Research under the direction of a member of the graduate faculty that is not dissertation related. Can be repeated for credit for a total of 30 credit hours.

INFO-I 699 Independent Study in Informatics (1-3 cr.) Independent readings and research for Ph.D. students under the direction of a faculty member, culminating in a written report. May be repeated for a maximum of 12 credit hours.

INFO-I 790 Informatics Research Rotation (3 cr.) Work with faculty, investigate research opportunities. Can be repeated for a total of 6 credit hours.

INFO-I 890 Thesis Readings and Research (1-12 cr.) Research under the direction of a member of the graduate faculty leading to a Ph.D. dissertation. Can be repeated for credit for a total of 30 credit hours.

INFO-H 680 Human-Computer Interaction Professional Practice I (3 cr.) P: INFO H541, H561, H543, H563, H564 This course represents Part One of a two-part course series, which fulfills the final HCI MS project requirement. Part One should showcase the accumulative knowledge of the student in the areas of product design and development. Students will explore relevant and applied research concepts, while considering various HCI design approaches. Final outcomes will include the completion of the first half of the final project, i.e., the completion of a final product.

INFO-H 681 Human Computer Interaction Professional Practice II (3 cr.) P: INFO H680 This course represents part two of a two-part course series, which fulfills the final HCI MS project requirement. The project will showcase the accumlative knowledge of the student in the areas of product assessment and documentation. Final outcomes will include the completion of the second half of the final project, i.e. product testing and analysis and writing of the paper.

INFO-I 501 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.

INFO-H 541 Interaction Design Practice (3 cr.) Human-computer interaction design (HCID) describes the way a person or group accomplishes tasks with a computer: what the individual or group does and how the computer responds; what the computer does and how the individual or group responds. Sometimes known as 'interface design,' HCID becomes increasingly important as computing intelligence and connectivity spread ubiquitously to home, work, and play environments. This course will be organized around a collection of readings and several design projects concerned with applying human-computer interaction principles to the design, selection, and evaluation of interactive systems.

INFO-H 543 Interaction Design Methods (3 cr.) Students will learn basic concepts and methods for usability studies and evaluation of interactive systems as well as apply those methods to actual system design evaluations. This course is not only for understanding the basics and traditional approaches in this area, but also for exploring new ways of evaluating the usability of state-of-the-art technology-based systems such as systems in ubiquitous computing, CSCW, tangible and social computing areas.

INFO-H 561 Meaning and Form in HCI (3 cr.) As a continuation of HCI1 (H541), students will learn methodologies and principles for two types of core activities in human-computer interaction design: a) requirements analysis, contextual inquiry and ethnography as applied to the design of interactive systems in the social context? b) conceptual design for the modeling of the interactive structure of web, hypermedia and software applications. Weekly readings on the text books will be integrated with academic and professional articles and online media.

INFO-G 599 Thesis Research (0 cr.) Master's students who have enrolled in 30 or more hours of graduate course work applicable to the degree and who have completed all other requirements of the degree except the thesis of final project of performance may enroll in G599. Requires section authorization.

INFO-H 500 Fundamental Comp Concepts Info (3 cr.) An introduction to fundamental principles of computer concepts for Informatics study, including an overview of computer architecture, computer algorithms, fundamentals of operating systems, data structure, file organization and database concepts.

INFO-H 502 Human-Centered Research Methods in Informatics (3 cr.) This course surveys a broad range of research methods employed in Informatics, exploring their meta-theoretical underpinnings and exemplifying their application to specific research questions. This course is intended for students in Informatics graduate

programs, especially PhD students, who need a grounding in research methods.

INFO-H 536 Foundational Mathematics of Cybersecurity (3 cr.) Students will learn mathematical tools necessary to understand modern cyber security. The course will cover introductory mathematical material from a number of disparate fields, including probability theory, computational theory, complexity theory, group theory, and information theory.

INFO-H 537 Legal and Social Informatics of Security (3 cr.) This is a case-based course on privacy and security in social contexts. Cases will particularly address the specific designs of technologies (e.g., P3P, PICS) and discuss how different technically feasible design choices would result in distinct regulatory regimes, business strategies, or support different forms of social interaction. This course will focus on specific security and privacy technologies as socio-technical systems.

INFO-H 628 Advanced Seminar I in Compex Systems (3 cr.) Introduces students to major historical contemporary and emerging theories, methods, and techniques in the field of complex systems. Students will examine and explore relevant and influential research, results and applications. Students will develop an understanding of leading research approaches and paradigms, and will design an independent research program in relation to their individual research fields and personal interests. The course will focus on the theory of complex systems, systems science and artificial life.

INFO-H 628 Advanced Seminar II in Compex Systems (3 cr.) Introduces students to major historical contemporary and emerging theories, methods, and techniques in the field of complex systems. Students will examine and explore relevant and influential research, results and applications. Students will develop an understanding of leading research approaches and paradigms, and will design an independent research program in relation to their individual research fields and personal interests. The course will be an exposition of "the science at the edge" and the forefront of research to complex systems.

INFO-H 515 Introduction to Analytics (3 cr.) This course applies statistical learning methods for data mining and inferential and predictive analytics to informatics-related fields. The course also introduces techniques for exploring and visualizing data, assessing model accuracy, and weighing the merits of different methods for a given real-world application. This course provides an essential toolset for transforming large, complex informatics datasets into actionable knowledge. This course applies statistical learning methods for data mining and inferential and predictive analytics to informatics-related fields. Supervised learning approaches include linear regression, logistic regression, linear discriminant analysis, resampling and shrinkage methods, splines and local regression, decision trees, bagging, random forests, boosting, and support vector machines. Unsupervised learning approaches include principal components analysis and k-means clustering. The course also covers techniques for exploring and visualizing data, assessing model accuracy, and weighing the merits of different methods for a given real-world application. This course is an essential toolset for transforming large, complex informatics datasets into actionable knowledge.

INFO-H 516 Applied Cloud Computing for Data Intensive Sciences (3 cr.) Course covers data science concepts, techniques, and tools to support big data analytics, including cloud computing, parallel algorithms, nonrelational databases, and high-level language support. The course applies the MapReduce programming model and virtual-machine utility computing environments to data-driven discovery and scalable data processing for scientific applications.

INFO-H 517 Visualization Design, Analysis, and Evaluation (3 cr.) This is an introductory course in design and evaluation of interactive visualizations for data analysis. Topics include human visual perception, visualization design, interaction techniques, and evaluation methods. Students develop projects to create their own web-based visualizations and develop competence to undertake independent research in visualization and visual analytics.

INFO-H 565 Collaborative and Social Computing (3 cr.) This is a seminar course in which students will engage with seminal research in collaborative and social computing through a series of genealogical threads linking 'big ideas' in the social sciences to the ways in which they have been appropriated in collaborative and social computing research. Through their synthesis of the course readings, students will connect these big ideas to the design and use of seminal 'historic' and contemporary social and computing technologies.

INFO-H 566 Experience Design for Ubiquitous Computing (3 cr.) An introduction to research topics in ubiquitous and pervasive computing, including sensors, ambient displays, tangibles, middleware, mobility, and location and context awareness. These topics are explored from a user-centered design perspective, focusing on how a situated and embedded model of computing affects requirements gathering, interaction design, prototyping, and evaluation techniques. Students gain expertise with contemporary ubiquitous and pervasive computing technologies and learning to incorporate them into a user-centered research and design process.

NEWM-N 595 Internship in Media Arts and Technology (1-6 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.

Informatics

INFO-I 100 First Year Experience (1 cr.) This course introduces specific survival skills for success in college and beyond, while reconciling personal learning skills with instructor-based teaching styles. Master the art of inquiry and elevate your sense of integrity while sharpening your personal edge by exploring critical thinking, project management and current/future job market trends. Required by all informatics and media arts and science majors.

INFO-I 101 Introduction to Informatics (4 cr.) Problem solving with information technology; introductions to information representation, relational databases, system design, propositional logic, cutting-edge technologies: CPU, operation systems, networks, laboratory emphasizing information technology including web page design, word processing, databases, using tools available on campus.

INFO-I 201 Mathematical Foundations of Informatics (4 cr.) 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. Cross listed with COGS-Q 250. Credit given for either INFO-I 201 or COGS-Q 250.

INFO-I 202 Social Informatics (3 cr.) Introduction to key social research perspectives and literatures on the use of information and communication technologies. Discusses current topics such as information ethics, relevant legal frameworks, popular and controversial uses of technology (e.g. peer-to-peer file sharing), digital divides, etc. Outlines research methodologies for social informatics.

INFO-I 210 Information Infrastructure I (4 cr.) The software architecture of information systems. Basic concepts of systems and applications programming.

INFO-I 211 Information Infrastructure II (4 cr.) P: INFO-I 210. The systems architecture of distributed applications. Advanced programming, including an introduction to the programming of graphical systems.

INFO-I 300 Human-Computer Interaction (3 cr.) P: INFO-I 270. An intermediate course that teaches students how to assess the usability of software through quantitative and qualitative methods, including conducting task analyses, usability studies, heuristic inspections, interviews, surveys, and focus groups. The course also introduces students to the tool and techniques for designing and testing user interfaces based on a human-centered methodology.

INFO-I 303 Organizational Informatics (3 cr.) 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 redefining role of information technology, the changing character of work life and organizational practices, sociotechnical structures, and the rise and transformation of information-based industries. Credit given for either INFO-I 303 or SPEA-V 369.

INFO-I 308 Information Representation (3 cr.) The basic structure of information representation in digital information systems. It covers three modules: web development, relational databases, and XML technologies. Through this course, students are able to develop web pages that are able to interact with the backend servers; represent relational databases in the ER model, query the data using the formal query language SQL; and use XML technologies to store and display data.

INFO-I 310 Multimedia Arts and Technology (3 cr.) This course studies how the paradigm shift to a digital world will affect humanity. The course will consider the evolution of media arts and its underlying principles of communications. Students will study application development paradigms in current practice. Readings, lectures, class discussions, and research papers.

INFO-I 320 Distributed Systems and Collaborative Computing (3 cr.) P: INFO-I 211. 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.

INFO-I 330 Legal and Social Informatics of Security (3 cr.) This course will examine that set of ethical and legal problems most tightly bound to the issues of information control. The interaction and technology changes, but the core issues have remained: privacy; intellectual property; Internet law; concepts of jurisdiction; speech anonymity versus accountability; and ethical decision-making in the network environment.

INFO-I 350 Foundations in Legal Informatics (3 cr.) This course examines the basic concepts of the design, evaluation and use of technology in the study and practice of law. The course provides an overview of the application of a variety of emerging informatics and new media technologies to the field of law. Will cover technology for law office management, legal research, litigation support, document management, imaging and animations, case management, and electronic court filing.

INFO-I 391 Internship in Informatics Professional Practice (1-3 cr.) P: Approval of the 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. May be repeated for a maximum of three credit hours.

INFO-I 399 Current Topics in Informatics (1-3 cr.) Variable topic. Emphasis is on new developments and research in informatics. Can be repeated twice with different topic.

INFO-I 400 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.

INFO-I 421 Applications of Data Mining (3 cr.) P: INFO-I 211. This course explores the use of data mining techniques in different settings, including business and scientific domains. The emphasis will be on using techniques, instead of developing new techniques or algorithms. Students will select, prepare, visualize, analyze, and present data that leads to the discovery of novel and usable information.

INFO-I 433 Protocol Design and Analysis (3 cr.) Covers the fundamentals of computer security by looking at how things can go wrong, how people can abuse the system, and ways to make the system secure. Students will gain a basic overview of existing security problems and be introduced to methods for addressing such problems. Should be taken by anyone designing, selecting, or using applications in which security or privacy plays a role.

INFO-I 445 Competitive Intelligence for Informatics I (3 cr.) This course will focus on the basic principles, techniques and methods of competitive analysis, the types of competitive analysis systems and their applications, traditional and new sources of information about competitors and industries, the nature of business information and its lifecycle, the ethical issues of competitive analysis and the application of competitive intelligence to real-world scenarios.

INFO-I 453 Computer and Information Ethics (3 cr.) P: Sophomore standing Ethical and professionalization issues that arise in the context of designing and using networked information technologies and information resources. Examines frameworks for making ethical decisions, emergent technologies and their ethical implications, information/computer professionalism. Topics include privacy, intellectual property, cybercrime, games, social justice, and codes of professional ethics.

INFO-I 470 Litigation Support Systems and Courtroom Presentations (3 cr.) Provide students with an opportunity to use specialized software that is available for organizing, managing, retrieving, and presenting documents and evidence in a legal matter. Students will gain hands-on experience with software tools and learn what is effective and allowable from a technical, legal and ethical standpoint.

INFO-I 490 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.

INFO-I 491 Capstone Project Internship (1-6 cr.) P: Consent of instructor. Students culminate their course studies through practical application of concepts and practices working in industry. Course requires prior authorization and approval of internship through the Career Services Office. Required coursework is completed via Oncourse.

INFO-I 492 Senior Thesis (3 cr.) P: Consent of instructor. 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.

INFO-I 493 Senior Thesis (3 cr.) P: Consent of instructor. The senior student prepares and presents a thesis: a substantial, typically multichapter paper based on a well-planned research or scholarly project, as determined by the student and a sponsoring faculty member.

INFO-I 494 Design and Development of an Information System (3 cr.) P: Consent of instructor. 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).

INFO-I 495 Design and Development of an Information System (3 cr.) P: Consent of instructor. 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).

INFO-I 499 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.

INFO-Y 395 Career Development for Informatics Majors (1 cr.) Develops skills and knowledge that enable the student to successfully pursue the career search both at the time of graduation and later as the student progresses through their career. The course covers techniques and strategies which make the job search more efficient and effective.

INFO-I 270 Introduction to Human-Computer Interaction Principles and Practices (3 cr.) Students learn the fundamental principles and practices of human-computer interaction (HCI) and evaluation. Specific focus is given to the introductory knowledge of HCI methods, tools, and techniques for designing and evaluating user interfaces through the use of low and high fidelity prototypes for the Web and software.

INFO-I 275 Introduction to Human-Computer Interaction Theory (3 cr.) Students will learn the fundamental theories of human-computer interaction (HCI) and user-centered design. This course is both a survey of HCI research and an introduction to the psychological, behavioral, and other social science knowledge and techniques relevant to the design of interactive and ubiquitous computing systems.

INFO-I 410 Electronic Discovery (3 cr.) This course will cover the legal, ethical, financial, logistical, procedural and technological considerations of electronic discovery and its implications for lawyers and their clients. It will highlight recently revised federal and state rules, new state and federal legislation and recent court cases that impact electronic discovery policies and processes. We will also consider electronic discovery from the point of view of a corporation that has to prepare for--and then respond to--requests for the production of digital evidence.

INFO-I 480 Experience Design and Evaluation of Ubiquitous Computing (3 cr.) The course focuses on ubiquitous computing and related interface/system design, and user-experience issues. Applications include interactive systems which support natural/gesture/touch-based interactions on devices such as mobile, extra-small-and-large displays, and other non-traditional pervasive technologies. Projects include interaction and evaluative techniques: field observation, contextual inquiry, ethnography, survey/interviews, and cognitive walkthrough.

INFO-I 465 Informatics for Social Change (3 cr.) This course focuses on the theory and practice of service learning at IUPUI. Students will apply the knowledge of their expertise area in a service project for the local or global community. Projects will be completed through students' current and developing new media production, information technology, and client-based research skills.

NEWM-N 220 Media Applications I (3 cr.) P: NEWM-N 101 or INFO-I 101. Introduces concepts and skills related to the design of interactive multimedia applications for the Web, the desktop, and mobile devices. Within the context of industry-standard application design tools, students use markup tags and scripting to create applications that emphasize graphics, animation, sounds, and interactivity.

NEWM-N 320 Media Applications II (3 cr.) P: NEWM-N 221. Introduces intermediate concepts and skills related to the design of interactive multimedia applications for the Web, the desktop, and mobile devices. Within the context of industry-standard application design tools, students use information modeling, markup tags, and scripting to create applications that emphasize graphics, animation, sounds, and interactivity.

NEWM-N 299 Directed Study (2 cr.) 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.

INFO-I 305 Introduction to Research in Informatics (3 cr.) P: Sophomore standing. This course presents a broad overview of research philosophy, designs and methods. Its focus is on social science research methods and the content is specifically tailored to reflect the rapidly emerging field of informatics. The course will include major methods that are the core of contemporary approaches to research in informatics.

INFO-I 402 Informatics Project Management (3 cr.) P: Sophomore standing. This course will focus on project management in an Informatics setting. Students will become conversant in the tools and techniques of project management, such as project selection methods, work breakdown structures, network diagrams, critical path analysis, critical chain scheduling, cost estimates, earned value management, motivation theory and team building.

INFO-I 425 Applying Web Services in Information Systems (3 cr.) P: INFO-I 211 and INFO-I 308. This course examines how cloud computing and service-oriented architecture contribute to solutions for Informatics problems in areas such as business, health care, and life sciences. Students will develop an understanding of why, when, and how organizations utilize Web services to manage data, as well as the skills to design, implement, and deploy Web services applications.

INFO-I 112 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.

INFO-I 130 Introduction to Cybersecurity (1 cr.) P: or C: INFO-I 101 This course introduces students to Cybersecurity. The course will primarily focus on introduction to three core areas (technical aspects of security, organizational aspects of security, and legal aspects of security). Through examples of security problems in real life, this course will illuminate fundamental ideas and concepts of information security.

INFO-I 230 Analytical Foundations of Security (3 cr.) P: INOF-I 130. This course will allow students to re-evaluate and conceptualize material learned in discrete courses to consider the topics from the perspective of security. For example, computer system basics such as hardware (CPU, memory, ...) and software are reconsidered from the perspective of how their interactions create vulnerabilities. Vulnerabilities that combine standard hardware and software configurations will be examined, as these illuminate both security and computer networks. Operating systems and file systems are examined from the perspective of access control, permissions and availability of system services, etc.

INFO-I 231 Introduction to the Mathematics of Cybersecurity (3 cr.) P: I130 C: I130 Introduces the basic mathematical tools used in modern cybersecurity. Covers mathematical material from a number of disparate fields, including probability theory, analysis of algorithms, complexity theory, number theory, and group theory.

INFO-I 430 Security for Networked Systems (3 cr.) P: INFO-I 211 and INFO-I 308. An extensive survey of network security. Covers threats to information confidentiality, integrity, and availability in different Internet layers, and defense mechanisms which control these threats. Also provides a necessary foundation on network security, such as cryptographic primitives/ protocols, authentication, authorization, and access control technologies. Hands-on experiences through programming assignments and course projects.

INFO-I 441 Interaction Design Practice (3 cr.) Human-computer interaction design (HCID) describes the way a person or group accomplishes tasks with a computer - what the individual or group does and how the computer responds; what the computer does and how the individual or group responds. This course will be organized a collection of readings and three design projects applying human-computer interaction principles to the design, selection, and evaluation of interactive systems.

INFO-I 475 Informatics in Sports (3 cr.) Technology applications are changing the sports world in biomechanics, sports advancement and injury prevention, equipment, entertainment, gaming, and journalism. The approach of this course is to delineate what digital technologies are progressing the sporting field most and changing the way we view athletics.

INFO-I 270 Data Fluency (3 cr.) Pervasive, vast, and growing describe data in today’s environment. This course introduces fundamental skills for extracting from data actionable knowledge. Students create, access, munge, analyze, and visualize data to draw inferences and make predictions. The course uses real datasets from a

variety of disciplines including healthcare, business, and the humanities.

INFO-I 302 Human-Centered Research Methods in Informatics (3 cr.) Course surveys a broad range of research methods employed in Informatics, exploring their meta-theoretical underpinnings and exemplifying their application to specific research questions. This course is intended for Informatics students who need a grounding in research methods.

INFO-B 406 Biomedical Informatics (3 cr.) Course covers the latest biomedical informatics concepts, technologies, policies, and skills, including infrastructure and data management, imageanalytics, visualization, and API design and implementation for healthcare. Students analyze healthcare and biomedical information, infer outcomes from data processing and analysis, and master the tools required for biomedical data analytics.

INFO-I 415 Introduction to Data Analytics for Informatics (3 cr.) Course applies statistical learning methods for data mining and inferential and predictive analytics to informatics-related fields. The course also covers techniques for exploring and visualizing data, assessing model accuracy, and weighing the merits of different methods for a given real-world application. This course is an essential toolset for transforming large, complex informatics datasets into actionable knowledge.

INFO-I 416 Cloud Computing for Data Intensive Sciences (3 cr.) Course covers data science concepts, techniques, and tools to support big data analytics, including cloud computing, parallel algorithms, nonrelational databases, and high-level language support. The course applies the MapReduce programming model and virtual-machine utility computing environments to data-driven discovery and scalable data processing for scientific applications.

INFO-B 436 Computational Methods for Biomedical Informatics (3 cr.) Course covers algorithm design, algorithm analysis, and complexity analysis and their applications in biomedical informatics.

INFO-B 444 Consumer Health Informatics (3 cr.) Course explores how technologies are used to deliver healthcare to the public. Topics include access to patient data and privacy issues, consumer access to clinical information and current research, the design and development of consumer health information resources, health literacy and health information literacy, information quality, and models for information delivery, including the Internet.

INFO-I 459 Media and Technology Entrepreneurship (3 cr.) Course covers legal and business aspects of starting a media or technology company, including selecting the business structure, financing and credit, drafting business plans, articles of incorporation, and bylaws, tax implications, marketing and public relations, shareholders and governance, bankruptcy, insurance, contracts, property, and working with attorneys, accountants, and insurance agents.

INFO-B 474 Next Generation Sequencing Data Analysis (3 cr.) Course covers basic concepts of genomic sequencing datasets from several sequencing platforms, including how the data motivates computational needs and methods for analysis. Students learn how to devise approaches for analyzing massive clinical and biomedical sequencing datasets and for developing sound hypotheses and predictions from them.

INFO-B 429 Machine Learning for Bioinformatics (3 cr.) Course covers machine learning theories and methods and their application to biological sequence analysis, gene expression data analysis, genomics and proteomics data analysis, and other problems in bioinformatics.

Library and Information Science

Masters Level Courses

LIS-S 516 Human-Computer Interaction (3 cr.) Examines the human factors associated with information technology and seeks to provide students with knowledge of the variables likely to influence the perceived usability, and hence the acceptability, of any information technology. In so doing, it will enable students to progress further toward specialist work in the important field of human-computer interaction.

LIS-S 681 The Book 1450 to the Present (3 cr.) A survey of the book from 1450 to the present, with emphasis on the development of the book in the West. Focuses on the physical aspects of the book from the mid-fifteenth through the twentieth centuries, and on some of the many roles of the book in society during this period; also increases awareness of current scholarly trends in the history of the book.

LIS-S 501 Reference (3 cr.) P: or Concurrent S401. This course introduces students to the basic information sources and services among different types of libraries and information centers, including academic, public, special, and school media.

LIS-S 502 Collection Development and Management (3 cr.) Collection Development and Management examines the principles and techniques that guide the development, management, and evaluation of library collections and the selection of materials in various types of libraries. The course provides students with experience in the major phases involved in starting and developing collections of print and non-print materials: the formulation of collection development plans, the selection of materials, and the evaluation and preservation of library collections. It enables students to recognize and respond to challenges and opportunities of special interest to collection developers including changes in the production and distribution of information resources, issues of access and ownership, intellectual freedom, copyright, and resource sharing.

LIS-S 503 Organization and Representation of Knowledge and Information (3 cr.) Introduces students to various disciplines' approaches to the understanding, organization, representation (summarizing), and use of knowledge and information. This survey looks for commonality among the approaches taken in information science, cognitive psychology, semiotics, and artificial intelligence, among others. The goal is to identify criteria for evaluation and improvement of ways to organize and represent information for future retrieval. Information systems currently used in libraries and information centers will be studied as examples.

Emphasis in the course is on concepts and ideas, with appropriate attention to terminology and technology.

LIS-S 504 Cataloging (3 cr.) P: S401. Historical development and principles essential to the understanding of the conceptual foundations of providing bibliographic access and control of materials and information. Discussion and examples in the application of AACR2r will be presented to illustrate and reflect current practice. Emphasis is on monographic publications.

LIS-S 505 Evaluation of Library Sources and Services (3 cr.) P: S502. Examines the applied evaluation of library resources and services, including collections, document delivery, technical services, reference services, and overall library performance. Emphasis is placed on the available methods and methodological issues. The checklist method, availability studies, document delivery tests, use studies, applied bibliometrics, and the use of automation are covered.

LIS-S 506 Introduction to Research (3 cr.) P: S401, completion of 6 credit hours in SLIS (S501 and S502 recommended), or consent of instructor. Introduces the research process, including concepts, design, conduct, and evaluation. Examines the principles and characteristics of approaches and methodologies relevant to research in the field. Examples of data sources and introduction to methods of statistical description and analysis; ethical issues.

LIS-S 511 Database Design (3 cr.) P: S401 or consent of instructor. Concerned with a comprehensive view of the processes involved in developing formal access to information from a user-centered point of view. Considers various database models (such as flat file, hierarchical, and relational), and hypertext (in terms of text, sound, numeric, image, and geographic data). Students will design and implement databases using several commercial database management systems.

LIS-S 517 Web Programming (3 cr.) The main focus of this course is to instruct students to develop and implement dynamic and interactive web applications. In order to do so, students will learn the basics of an open source programming language both through lectures and hands-on exercises in the lab.

LIS-S 519 Evaluation of Information Systems (3 cr.) P: S401. Theoretical and practical exploration of the issues surrounding contemporary information systems. A specific focus will be on evaluating information systems from the user perspective. This evaluation approach will cut across disciplinary frameworks: behavioral, cognitive, and social sciences. The approach will also touch on multiple research methods: online surveys, sense-making, critical incident, and network analysis.

LIS-S 521 Humanities Information (3 cr.) P: S501 or consent of instructor. Introduction to information sources and services in the disciplines of performing arts, music, fine arts, literature, language, philosophy, and religion. In addition, the course addresses information needs and behavior patterns of users seeking these types of information.

LIS-S 522 Social Sciences Information (3 cr.) P: S401 and S501 or consent of instructor. Study of the core information tools in the fields of anthropology, economics, history, political science, psychology, and sociology. Includes key bibliographic databases and electronic network tools. Evaluation of research dealing with information channels in these fields.

LIS-S 523 Science and Technology Information (3 cr.) P: S401 and S501. General materials, reference books, periodicals, government documents, nonbook media in the individual literature of individual disciplines; patents and report literature. Examination of production, publication, distribution, and forms of scientific and technical literature.

LIS-S 524 Adult Readers Advisory (3 cr.) P: S501 and S502. A review and discussion of trends reflected in subject content and use of book and nonbook materials for patrons in secondary school and public libraries in relation to changing young adult and adult needs and the role of libraries in meeting such needs.

LIS-S 525 Government Information (3 cr.) P: S401 and S501. Survey of government information dissemination in all formats and at all levels of government. Consideration of government information policy. Primary emphasis given to U.S. government information but some consideration given to state and local publications in the United States, and those of international organizations.

LIS-S 526 Business Information (3 cr.) P: S401 and S501 or consent of instructor. Introduction to basic business materials. Includes resources, research methods, current developments, automated systems, and databases.

LIS-S 601 Directed Readings (1-4 cr.) P: Consent of instructor. Readings and study in any area of library or information science having an extensive literature. A student may enroll for this course twice in the same semester under different instructors. Normally S601 is completed under the direction of a full-time faculty member. Readings done under S601 shall not duplicate the content of any course now in the curriculum of the School of Library and Information Science. Proposal Form due by March 15th.

LIS-S 532 Information Architecture for the Web (3 cr.) P: S401. Focuses on website development. Students study information architecture as an approach for site organization and design, and learn about product management for complex web development tasks. In lab sessions, students work with markup languages and scripting and develop sites, typically for real clients, as well as local libraries.

LIS-S 533 Online Searching (3 cr.) P: S401 or consent of instructor. Principles, methods, and techniques of advanced online information retrieval (IR). Characteristics of and search strategies for the use of bibliographic, referral, citation, fact, numeric, and full text databases and search systems. Considers standards, use of communications software, front-ends and micro-based IR systems, and creation of in-house databases.

LIS-S 541 Information Policy (3 cr.) Data creation, publication, dissemination, and use occur in a complex social context. Legal and regulatory structures continue to evolve to control these processes. This course explores international and U.S. principles, laws, and regulations affecting the information industry. Focus varies with the topic; for example, copyright of electronic information

sources or transborder data flow. May be repeated for credit when topic varies.

LIS-S 550 Perspectives on Librarianship (3 cr.) Overview of the library as a social institution-historically, currently, and for the future-within social, economic, political, and cultural contexts. Focuses on the institution, the collections and formats, and the users to create an understanding of the role and importance of libraries. S550 provides excellent opportunities to help students explore the library profession.

LIS-S 551 Library Management (3 cr.) Management and administration of all types of libraries. Covers basics of organizational structure, planning, budget management, human resources issues and skills, and an understanding of the manager in the context of the organization.

LIS-S 552 Academic Library Management (3 cr.) Management and administration of academic libraries, including specific material related to organization structure, planning, budget management, human resources issues and skills, and an understanding of the manager in the context of a higher education environment.

LIS-S 553 Public Library Management (3 cr.) Management and administration of public libraries, including specific material related to organization structure, planning, budget management, human resources issues and skills, and an understanding of the manager in the context of a community environment.

LIS-S 554 Library Systems (3 cr.) P: S401. Principles for the design, selection, implementation and management of automated systems of all types in libraries, including systems for technical services processing, reference and user services, and management. Focus is on present and future applications of technology in libraries, their technical features, and their implications for library services and management. When possible, some practical experience with a particular application will be provided.

LIS-S 556 Systems Analysis and Design (3 cr.) P: computer or consent of instructor. This course introduces the basic concepts underlying systems analysis and design, focusing on contextual inquiry/design and data modeling, as well as the application of those analysis techniques in the analysis and design of organizational information systems.

LIS-S 571 Materials for Youth (3 cr.) Evaluation and use of books, magazines, recordings, films, radio and television broadcasts, and other sources of information and recreation.

LIS-S 572 Youth Services (3 cr.) P: S571 or consent of instructor. This course emphasizes the history, philosophy, and description of children and young adult library services. It takes a holistic look at the role of the youth services librarian from planning and evaluation to specific services and programs, and examines the current and future outlook for this type of librarianship. Emphasis is on the public library, but cooperation with appropriate services and programs, such as school media centers, is also discussed.

LIS-S 573 Education of Information Users (3 cr.) P: S401, S501 or S516.
Introduces students to the roles of librarians in adult education in university and college libraries and in public libraries. The course explores information literacy, library instructional models, education and training theories, and practical approaches for optimizing learning opportunities in library-based settings. Information literacy standards from the Association of College and Research Libraries (ACRL) and others are explored and applied to instructional design and practice. S573 also introduces students to outcomes-based planning and evaluation, a process for planning library-based educational programs with outcomes, or specific learning objectives in-mind.

LIS-S 574 Information Inquiry for School Teachers (3 cr.) Information Inquiry for School Teachers (3 cr.; formerly L551) This course is intended to be an opportunity for teachers and future teachers (including school library media specialists as teachers) to practice methods in critically thinking about information/media, and to use the inquiry process as a means to teach their students to be critical reviewers and communicators as well. Application of national and state standards for information literacy K - 12. Offered over the Internet.

LIS-S 580 History of Libraries (3 cr.) Development of libraries and information service from earliest times to the present, with emphasis on the library in relation to social, economic, cultural, and political trends.

LIS-S 581 Archives and Records Management (3 cr.) Introduces basic theories, methods, and significant problems in archives and records management. The course also discusses how archivists are responding to the challenge of managing and preserving electronic records.

LIS-S 582 Preservation (3 cr.) Examines causes of library and archival materials deterioration. Develops conceptual framework and management perspective for preservation programs using technical standards, program development tools, scientific and administrative research reports, and advocacy literature. Explores the new information technologies and media as both preservation tools and challenges.

LIS-S 605 Internship in Library and Information Science (2-6 cr.) P: Permission of faculty advisor. Graded S/F. Supervised internship in an information management environment. Professionals in library and information management mentor each graduate student. Sixty on-site hours must be completed for each credit earned. Students document their experiences through journals, abstracts of related publications, and a final presentation. Normally, at least 18 credits must be completed before enrollment*. Guidelines and placement listings are available on the SLIS website.

LIS-S 621 Audio and Video Sources (3 cr.) P: S401 concurrent or consent of instructor. User-focused approach to decision making in the digital audio and video information environment. Emphasizes collection development in support of user services, including access to remote collections and evaluation of multimedia materials and delivery mechanisms, and issues related to emerging technologies. Scope includes adult and young adult audiences.

LIS-S 622 Resources and Services for People with Disabilities (3 cr.) Access to information is essential for sustained independence of people with disabilities.

This course studies materials, services, and assistive technologies to support this access.

LIS-S 631 Advanced Cataloging (3 cr.) P: S504. Provides extensive background in description and access for electronic and non-book resources.

LIS-S 652 Digital Libraries (3 cr.) This course introduces digital libraries — networked information servers that provide access to multimedia data for local and remote users. Primary emphasis is on developing digital libraries, based on understanding tools for presentation and manipulation of multimedia as well as analysis of user needs.

LIS-S 671 School Media (3 cr.) P: S501, S571, and S574 or concurrent or consent of instructor. Establishes the professional teaching and administrative role of the certified school library media specialist in K-12 settings. Situations are examined that pertain specifically to policy development, budgeting, collection development, instructional design, support staff training, facility design, district supervision, and information networking within the modern school corporation. Students make site visits to leading school information centers, conferences, and media fairs.

LIS-S 602 Directed Research (1-3 cr.) P: Proposal form and consent of instructor and 15 SLIS graduate credit hours completed including S505 or S506. Individual research in a problem in the field of library and information science.

LIS-S 603 Workshop in Library and Information Science (1-3 cr.) Group study of specific problems in the library and information field. Generally includes a hands-on element. No more than 6 hours of S603 credit may be used toward the requirements for any SLIS degree.

LIS-S 654 Law Librarianship (3 cr.) P: S501 or consent of instructor. An introduction to basic legal materials and law librarianship. Primary and secondary resources; indexes; digests and citators; specialized research methods; current developments in automated legal research. History of law libraries in the U.S., their organization and administration. The role of law librarians in law schools and law firms.

LIS-S 672 Seminar on Literature for Youth (3 cr.) P: S571 or consent of instructor. An advanced seminar, addresses such topics as: images of minority groups, societal problems (e.g., poverty and family patterns), or informational needs and materials including access and availability of print, nonprint, and computer resources. May be repeated for credit when topic varies.

LIS-S 650 Library Philanthropy (3 cr.) Introduces the role of private giving in support of libraries. Examines personal and corporate philanthropy and their applicability in libraries and information centers.

LIS-S 640 Seminar in Intellectual Freedom (3 cr.) P: 9 hours of SLIS graduate credit or permission of instructor. Beginning with a history of and alternative philosophical justifications for censorship, the student is introduced to constraints, obligations, and problems relating to intellectual freedom.

LIS-S 604 Topics in Library and Information Science (1-4 cr.) Study of specific topics in librarianship and preservation. May be repeated for credit when topic varies. Same course number used for different courses.

LIS-S 632 Technical Services (3 cr.) C: S553, S551, S552 or consent of instructor
Principles of organization and function of library technical services, including acquisition, cataloging, serials, circulation. Special emphasis on research and development in library systems and technology. Includes file organization, documentation system development, analysis, and evaluation for manual, mechanical, and automated applications.

LIS-S 644 Consumer Health Informatics (3 cr.) P: S401, S501 or consent of instructor. This is a consumer health informatics course in which students will learn about how technologies are used to deliver healthcare to the public.

LIS-S 653 Health Science Librarianship (3 cr.) P: S401, S501or consent of instructor;
Explores the roles of health sciences libraries, librarianship and informationists in academia and hospital libraries, health information technology and information services environments, and in research and administrative teams. This course provides an introduction to the healthcare industry, health sciences schools and education (medicine, nursing, dentistry, public health, pharmacy, allied health and others), and the culture of healthcare in the United States. Student gain extensive experience with popular reference resources, and searching MEDLINE, PubMed, and speciality bibliographic databases in the health sciences. Students will increase their understanding of librarian and informationist roles in information literacy education, evidence based practice, health literacy, and other issues

LIS-S 623 Genealogy and Local History (3 cr.) P: S401, S501, & S502. This course is designed to focus on two specific collection areas: Genealogy Resources and Indiana Resources. Students will work on developing collection policies creating collections with limited funding, and evaluating existing special collections. The class will also look at the pros and cons of several issues (staffing issues, volunteers, integrated collections, circulating/non-circulating, limited resources, material types).

LIS-S 512 Information Systems Design (3 cr.) P: or Concurrent S401. Students identify, design, and implement a significant information design project, such as acquisitions, organization, or search and retrieval for an online public access system. (This is offered in Bloomington only.)

LIS-S 520 INformation Seeking and Use (3 cr.) P: or Concurrent S401. Course introduces students to the concepts of information analysis from a human perspective, focusing particularly on the theoretical models and practical techniques that underpin the field. Sociological and psychological perspectives will be examined in order to develop an approach to the assessment of users' information needs.

LIS-S 557 Marketing for Libraries (3 cr.) P: or Concurrent S401. Application of marketing concepts, techniques, and technologies for all library types. Emphasis on matching library users with services through information, education, persuasion, and partnerships. Topics: planning, audience analysis, needs assessment,

market analysis, goal-setting, message design, public relations, publicity, promotion, advocacy, assessment and evaluation, internal and external communication, and change theory.

LIS-S 575 Public Library Services (3 cr.) P: or Concurrent S401. Provides an overview of the broad range of cultural, educational, and social library services and programming initiatives available for children, adolescents, and adults in public libraries. Teaches community analysis, planning, and evaluation. Emphasizes the collaborative nature of developing and implementing library programs and providing library services.

LIS-S 591 Grant Writing (3 cr.) P: or Concurrent S401. Students collaborate to prepare grant funding proposals, including organizational fact sheet, needs assessment and problem statement; project design and development; logic model; funder identification; budget; time line; and evaluation plan. Each student produces a unique project proposal targeted to a specific funder.

LIS-S 606 Project in Library and Information Science (3 cr.) P: or Concurrent S401. An independent project for a community client enables the student to apply at a professional level skills and knowledge garnered from the MLS program. Projects are situated in the community and benefit a particular organization and population. Students independently design a project and complete a literature review, executing the project in collaboration with a community partner (client) and under the supervision of a faculty advisor. Variable credit from 1–3: Approximately 30–45 hours of effort per credit over a term or semester.

LIS-S 634 Metadata (3 cr.) P: or Concurrent S401. Metadata is essential in designing and developing effective knowledge systems; it facilitates resource discovery, database documentation, and recording digital documents' textual and conceptual histories. This course introduces principles supporting the development and implementation of metadata schemes, focusing on issues of interoperability, internal and external standardization, and evaluation.

LIS-S 641 Computer-Mediated Discourse Analysis (3 cr.) P: or Concurrent S401. Computer-mediated discourse analysis (CMDA), applies theories from linguistic discourse analysis, pragmatics, ethnomethodology, and semiotics in the analysis of discourse -language and language use – in computer-mediated communication. This course provides hands-on experience in applying empirical analytical methods, and in interpreting the results. (This is offered in Bloomington only.)

LIS-S 642 Content Analysis for the Web (3 cr.) P: or Concurrent S401. Application of Content Analysis methods to web documents, interactivity features, and links.

LIS-S 656 Scholarly Communication (3 cr.) P: or Concurrent S401. Course examines scholarly communication systems for the creation, dissemination, and evaluation of scholarly information. It introduces the role of digital technology in the transformation of information, especially from the view of librarianship. Topics include scholarly publishing, peer review, and the open access movement, including achievements, challenges, and current trends.

LIS-S 683 Reference Sources for Rare Books (3 cr.) P: or Concurrent S401. Introduces and evaluates reference sources that are useful in working with rare books an many fields.

LIS-S 685 Electronic Records Management (3 cr.) P: or Concurrent S401. Addresses the major issues and challenges facing the archival/records management professions in their quest to manage electronic records. Students will study and evaluate the impact automation has had on archival theory and practice, analyzing various models and strategies archivists have developed to manage electronic records.

Undergraduate Courses

LIS-S 401 Computer-based Information Tools (3 cr.) Graded S/F. This skills-based course introduces basic applications that will be used throughout the student's course work and beyond. Students' experiences in this course should be seen as a basis for further skill development and learning throughout their careers. The course covers computing platforms, access tools, and management tools. Demonstration of skills will be by a mastery test or an assignment in each unit of the course. S401 does not count toward graduate degree requirements.

LIS-S 222 Social Science Information (3 cr.) An introduction to information sources and services for the social sciences including anthropology, archaeology, cultural studies, economics, geography, history, political science, psychology, and sociology.

LIS-S 223 Genealogy and Local History Resources (3 cr.) Course introduces information tools for family and community history with an emphasis on U.S. genealogical tools, including census and military records. It covers city, county, and state historical resources.

LIS-S 281 Introduction to Archives (3 cr.) Course introduces and compares the various types of archival repositories. The concepts and techniques used to organize, preserve, and make accessible historical materials in various formats are also covered. Students learn technologies to preserve, interconnect, and analyze archival material.

LIS-S 282 Digital Preservation (3 cr.) Course introduces approaches for preserving digitized and born-digital information (text, images, and audiovisual information) for access andreuse. Topics include curation lifecycle for long-term preservation; longevity of digital media; integrity and authenticity of digital materials;formats and technologies for preservation; and establishment of trustworthydigital repositories.

LIS-S 303 Information Organization (3 cr.) Introduction to general and disciplinary approaches to the organization and representation (summarizing) of information, including information science, cognitive psychology, semiotics, and artificial intelligence perspectives. Information systems currently used in digital and physical libraries, databases, and repositories will be studied as examples. Students will identify criteria for improving future retrieval methods.

LIS-S 321 Humanities Information (3 cr.) An introduction to information sources and services in the humanities

with emphasis on the disciplines of performing arts, music, fine arts, literature, linguistics, philosophy, and religion. In addition, the course addresses information needs and behavior patterns of users seeking these types of information.

LIS-S 352 Digital Libraries (3 cr.) Course covers the theory and practice of networked information repositories that provide users access to multimedia data in academic and community settings. Topics include collection definition; digitization processes, archiving, and preservation; metadata, ontologies, classification, and description; accessibility, user behavior, and interaction; management and evaluation; and legal and social issues.

LIS-S 403 Data Policy and Governance (3 cr.) Course surveys data and information ethics and policy, justifying data practices per ethical frameworks. Students examine data-policy concerns governing contextual data flows and the systems on which they rely. Students distinguish the results of data policies and the manner they are used to support particular values.

LIS-S 402 Data Curation and Management (3 cr.) Course introduces concepts of data curation and management with applications. Students explore the characteristics of data and data-curation lifecycle activities, such as the design of data through content-creator management, metadata creation, entry into a database system or a repository, access policies and implementation, and data reuse.

LIS-S 202 Data Organization and Representation (3 cr.) Course introduces approaches for organizing and representing data and information resources. Students learn the principles of data organization, documentation, description, and classification devised to provide access to these resources and methods to evaluate and improve them for future retrieval and reuse.

LIS-S 201 Foundations of Data Studies (3 cr.) Course introduces digital literacies, focusing on data and information literacy in the media, civic engagement, business, informatics, and data science. Students explore the production of data; their roles as data creators and consumers; and the effects of data practices on society. Students apply their acquired skills in real-world situations.

Media Arts and Science

Media Arts and Science

NEWM-N 500 Principles of Multimedia Technology (3 cr.) This course examines issues related to 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 global communities. Topics also include: usability, intellectual property, and a diversity of user markets for new media products.

NEWM-N 501 Foundations of Digital Arts Production (3 cr.) This course examines the production process and management of digital multimedia. Students investigate and produce projects by researching foundations in the use of digital video with special emphasis on production process of storytelling. Skills learned will include: project development and video production. Students will develop presentation skills through research papers.

NEWM-N 502 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.

NEWM-N 503 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.

NEWM-N 504 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.

NEWM-N 595 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.

NEWM-N 506 Media Arts Project or Thesis (1-6 cr.) Students prepare a thesis or project that includes supporting documentation, as well as a final public defense. In either case, students are required to prepare a proposal that is approved by their advisor or committee chair before beginning their research.

NEWM-N 510 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.

NEWM-N 553 Independent Study (1-3 cr.) Research and/or production related to a particular theme or topic in media arts. Course topic, learning outcomes, and a plan

of study must be developed by the student, with guidance from the instructor, prior to registration. Course can be repeated multiple times. Approval by the program advisor is required for registration.

NEWM-N 585 Seminars in Media Arts and Science (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.

INFO-I 605 Social Foundations of Informatics (3 cr.) Topics include the economics of information businesses and information societies, legal and regulatory factors that shape information and information technology use, the relationship between organization cultures and their use of information and information technology, and ownership of intellectual property.

NEWM-N 507 Digital Media for Healthcare (3 cr.) Course examines how healthcare systems employ digital media for marketing, education, communication, and ecommerce. Students research digital media usage in the healthcare industry and work in teams to design and execute an empirical research project culminating in a publication or online interface with digital media elements.

NEWM-N 512 Trends in Media, Informatics and Communications (3 cr.) This seminar course challenges students to define their career paths through the ever-evolving world of media, information and communication technologies. Through class dialogue and independent research, students define and answer in writing their own fundamental questions about how their chosen career path will fulfill personal and societal goals.

NEWM-N 515 Documenting Cultural Heritage: Artifacts and Traditions (3 cr.) This service-learning course engages students in projects on the research and digital documentation of cultural heritage sites and traditions. Students develop content and produce digital media including 3D models and animations, videos, and photographs. Students gain a better understanding of other societies and cultures through this international experience.

NEWM-N 516 Online Video Presentation (3 cr.) Course explores multiple aspects of online video presentation. Students learn how to encode, web-author, and deliver on-demand videos to computers and hand-held devices. Topics include the video delivery process, theories, database support, technologies, technological development, and business models.

NEWM-N 534 Serious Games and Simulations (3 cr.) This course examines the use of serious games, simulations, and virtual worlds in education, healthcare, health education, and the military. Students research and deconstruct successful serious games and simulations and design, implement, and evaluate their own serious game or simulation, devising its learning outcomes and evaluation metrics.

NEWM-N 537 Virtual Worlds Design and Development (3 cr.) Students research factors influencing the design and implementation of online virtual worlds. They use their design knowledge and technical skills to create several small virtual world prototypes to explore potential uses of virtual worlds and effects of networked interaction on their inhabitants.

NEWM-N 540 3D Compositing and Visual Effects (3 cr.) Course covers Hollywood 3D compositing and visual effects production, integrating film footage, 3D modeling, texturing, lighting, camera techniques and matchmoving, compositing, filter layering, color correction, projection mapping, video effects, and green screen. Students research, design, and build environments and create believable, cohesive production shots.

NEWM-N 542 Advanced 3D Character Animation (3 cr.) Course covers the theory and practice of 3D character animation, including development, reference, and acting. It applies advanced rigging principles to animations in industry pipelines for film and computer games. Topics include story development, facial and body dynamics, and motion capture. Students create animations and perform a literature review and peer critique.

NEWM-N 548 3D Prototyping for Medical and Dental Applications (3 cr.) This course covers advanced modeling, sculpting, articulation, and printing of 3D objects for applications in medicine and dentistry. It includes strategies for the collection, evaluation, and editing of data from medicine and dentistry and the creation of prototypes for complete medical and dental applications.

NEWM-N 549 3D Prototyping and Articulation (3 cr.) Course covers advanced 3D organic modeling, sculpting, articulation rigging, animation, rendering, and printing of objects, characters, creatures, and plants. Students create and 3D print fully articulated models while researching and experimenting with strategies for collecting, wrangling, and analyzing datasets and visualizing them both on screen and in physical prototypes.

NEWM-N 560 Advanced Scriptwriting for New Media (3 cr.) Course evaluates the concepts, theories, techniques, and practices of scriptwriting for 3D animation, computer games, interactive stories, and film, including genre, theme, development, character, dialogue, structure, research, formatting, style, and revision. Students research, create, and develop effective, original scripts for digital media.

New Media

NEWM-N 115 Multimedia Authoring Tools (3 cr.) A hands-on introduction to some of the fundamental tools used in industry to produce interactive media-rich Web pages. Case studies of sites that incorporate text, sounds, graphics, animations, and interactivity. Other topics include the design, development, and deployment of a personal Web site.

NEWM-N 175 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.

NEWM-N 180 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.

NEWM-N 190 Topics in Interactive Media (1-3 cr.) Special topics in interactive media, with a focus on exploring concepts at the forefront of media arts.

NEWM-N 199 Directed Study I (1 cr.) This course introduces the new media student to the current job market and will provide instruction on the development of job promotional material. Students will explore various new media careers in business, education, entertainment, science, and other related fields.

NEWM-N 200 Desktop Tools for Digital Media (3 cr.) A hands-on survey of the wide variety of tools used in creating multimedia animation, video, sound, and digital effects.

NEWM-N 201 Design Issues in Digital Media (3 cr.) Exploration of the traditional principles of visual design, as expressed in digital design tools and applied to digital media. Topics include visual literacy, fundamental design elements and design principles, and their expression in various tools for digital design. Hands-on practice with applying design principles in several projects.

NEWM-N 204 Introduction to Interactive Media (3 cr.) 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.

NEWM-N 210 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.

NEWM-N 215 Online Document Development (3 cr.) P: N101, N102 Study of the creation, publication, and management of documents, images, and other media types on the Web. Topics include Web publishing, asset preparation, document types, contemporary content management systems and their use in the organization. Hands-on experience with contemporary systems for content management.

NEWM-N 230 Introduction to Game Design and Development (3 cr.) P: N221 Introduction to designing and developing games, examining the role that games play in daily life, and analyzing the impact of games in popular culture. Additional topics include world creation, game space design, programming 2D games, character and creature design, animation, and playability testing.

NEWM-N 250 Team Building in Technology (3 cr.) P: N202. Practical introduction to working in groups of three or more people. Topics include the interpersonal process, decision-making styles, the creative effort, problem-solving, conflict resolution, leadership, and assessment techniques.

NEWM-N 260 Scriptwriting (3 cr.) P: N202 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.

NEWM-N 265 Sound Composition (3 cr.) 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.

NEWM-N 270 Visual Composition (3 cr.) An introduction to the composition of visual information in regards to new media. Students will develop a visual style through digital and traditional methods to tell stories. Other topics covered include digital photography, framing, shot selection, camera movements, and time-based programs.

NEWM-N 290 Creative Concept Development (3 cr.) Exploration of creativity, ideation, and concept development. Students learn the processes of creative thinking, idea generation and development, and creative problem solving through specific theories, methodologies, and application in multimedia projects.

NEWM-N 295 Career Enrichment Cooperative (3 cr.) P: Junior standing. 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.

NEWM-N 299 Directed Study (2 cr.) 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.

NEWM-N 300 Digital Media Production (3 cr.) P: N101, N102 Hands-on experience in taking a project through the typical product life-cycle, from initial contact to final acceptance. Topics include communicating with a client, cost estimation, product design, implementation, handling change requests, product documentation, acceptance testing, and post-process review.

NEWM-N 311 The Digital Paradigm Shift: Effects in International Cultures and Society (3 cr.) Examination of the digital paradigm shift and its global impact on cultures and societies. A study of major paradigm shifts in reference to culture and society as well as the implications for the future. Readings, lectures, class discussions.

NEWM-N 315 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.

NEWM-N 330 Intermediate Game Design and Development (3 cr.) P: N230 Design and development of 3D games in the context of a 3D game engine. Topics include world creation, game space design, programming,

design and modeling of characters and creatures, environmental animation, and playability testing.

NEWM-N 335 Character Modeling and Animation (3 cr.) P: N230 Intermediate course in designing characters, for a variety of applications. Topics include character modeling, locomotion, facial animation, and lip movement.

NEWM-N 340 Digital Video Production (3 cr.) P: N253 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.

NEWM-N 399 Directed Study III (1 cr.) P: Junior standing or N299 This course applies design and visualization information towards the development of a comprehensive portfolio. The development of the portfolio will provide students with a framework for display of personal growth and achievement. Students will develop a portfolio to be used for future career opportunities.

NEWM-N 400 Imaging and Digital Media Seminar (3 cr.) Variable titled course designed to bring guest speakers from the industry and 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.

NEWM-N 410 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.

NEWM-N 420 Multimedia Project Development (3 cr.) P: (COMM-R 110 and ENG-W 131 and JOUR-J 200) or ENG-132 or TCM 220 and Senior standing. THIS IS A PRE-CAPSTONE COURSE. Project design in new media. Topics include product planning and design, hardware and software selection, cost estimation, timelines, project management tools, feasibility studies, prototyping, and product presentation. Students work individually or in small groups to develop a project plan suitable for a capstone experience.

NEWM-N 440 DV and CGI Digital Effects (3 cr.) P: N 342 and N 343 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.

NEWM-N 450 Usability Principles for New Media Interfaces (3 cr.) P: N285 Examination of principles of human-computer interaction (HCI) and user experience modeling. Study of user-centered design, usability, and usability testing in the context of new media (hypermedia and multimedia). Topics include aesthetics, human factors, and cognitive psychology as related to user interfaces, navigation, and interactivity.

NEWM-N 475 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.

NEWM-N 480 Technology and the Law (3 cr.) Provides students with a solid foundation on legal matters that impact new media and informatics, including intellectual property (copyright, patents, trademark, trade secrets), contracts, licensing, privacy, publicity, global legal issues, and professional ethics.

NEWM-N 485 Seminar in New Media (3 cr.) P: Prerequisite varies by topic. Current trends, problems, best practices, and developments in new media. Students pursue a special interest and share information and experiences 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.

NEWM-N 490 Independent Study (1-6 cr.) Departmental consent required. 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.

NEWM-N 495 Enrichment Internship (3 cr.) P: Junior standing. Completion of 9 credit hours of new media electives at the 300-400 level is required. 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.

NEWM-N 499 Capstone Experience (3 cr.) To be taken during the students' senior year. Departmental consent required. 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.

NEWM-N 102 Digital Media Imagery (3 cr.) A hands-on introduction to the basic tools used in industry for the creation, editing, manipulation, and uses of 2D raster and vector graphics. Other topics include the integration of imagery into a personal Web site.

NEWM-N 202 Digital Storytelling (3 cr.) P: N100 Examination of the principles of storytelling across a range of digital media formats, with attention to techniques for creating story-rich projects. Explores the role of agency, interactivity, story structure, and narrative, as well as the opportunities and challenges raised by emerging interactive and transmedia approaches to story-rich projects.

NEWM-N 220 Media Applications I (3 cr.) P: NEWM N101 or INFO I101 Introduces concepts and skills related to the design of interactive multimedia applications for the Web, the desktop, and mobile devices. Within the context of industry-standard application design tools, students use markup tags and scripting to create applications that emphasize graphics, animation, sounds, and interactivity.

NEWM-N 320 Media Applications II (3 cr.) P: N221 Introduces intermediate concepts and skills related to the design of interactive multimedia applications for the Web, the desktop, and mobile devices. Within the context of industry-standard application design tools, students use information modeling, markup tags, and scripting to create applications that emphasize graphics, animation, sounds, and interactivity.

NEWM-N 238 2D Animation (3 cr.) P: N101 Introduction to traditional techniques for 2D animation, and their application in digital media. An exploration of the 12 principles of animation and how to use them to create effective animations.

NEWM-N 241 Stop Motion Animation (3 cr.) Through lecture and hands-on practice, this class studies the production techniques of stop action animation. Topics include the study of pioneers in the field, evolution from analog to digital techniques, and the building of sets and characters. Students will produce a series of short frame-by-frame digital animations.

NEWM-N 243 Introduction to 3D (3 cr.) An introduction to the concepts and production process of 3D graphics and animation. Students learn basic techniques and theories related to modeling, texturing, lighting, animation, and rendering. Students produce animated graphics and text within the context of various projects.

NEWM-N 253 Introduction to Digital Video (3 cr.) Introduction to video production techniques for digital media. Hardware, software, and technique are explored through lecture and projects. All phases of video production are addressed, from pre-production through production to post-production with a focus on the digital media aspects.

NEWM-N 255 Introduction to Digital Sound (3 cr.) Introduction to role and function of sound in interactive media. Concepts, theory, and practice related to audio, including voice, music, and sound effects. Effective listening skills, and understanding how people listen and comprehend sound. Experience with tools and techniques for recording, editing, and reproduction.

NEWM-N 256 Digital Composition (3 cr.) P: N102 An introduction to digital cameras and the principles of photographic composition for multimedia. Topics include shot selection, framing, camera movements, and time-based effects, as well as the use of photographs in storytelling.

NEWM-N 261 Storyboarding for Multimedia (3 cr.) P: N101, N102 Introduction to story and production planning through traditional and digital techniques. Topics include the development of roughs, storyboards, and animatics as planning devices for digital storytelling and other new media products.

NEWM-N 284 Building Physical Prototypes (3 cr.) An examination of concept formation for multimedia technology, including current, emerging, and future devices and displays. Learn to build physical and digital prototypes to facilitate idea development and presentation. Students research ideas, develop prototypes, evaluate, and present results.

NEWM-N 285 Interactive Design (3 cr.) P: N101 Examination of issues related to interactivity, including the frameworks, models, and theories related to user interaction with new media products. Topics include user modeling, types of user interfaces, and interaction paradigms.

NEWM-N 288 New Media Marketplace Innovation (3 cr.) Through discussion, reading and writing, this course introduces students to the strategies needed to think outside the box and generate innovation in digital products and services, with an emphasis on existing or potential businesses and markets.

NEWM-N 321 ActionScript in 3D (3 cr.) P: N222 Introduces skills for the design and development of interactive 3D applications for the Web and the desktop. Topics include 3D concepts, 3D code libraries, interactivity, system performance issues, and potential applications.

NEWM-N 322 Dynamic Data Applications (3 cr.) P: N222 Examines the techniques used in multimedia applications to communicate with back-end data and information services, and to create applications with run-time access to data, information, and media assets.

NEWM-N 328 Visualizing Information (3 cr.) P: N222 Exploration of techniques for using graphics and sound to present data and information. Topics include data types (including data that is geographical and/or time-varying), presentation techniques, effective use of design elements, and effective use of interactive media.

NEWM-N 262 Sequential Narrative (3 cr.) P: N202 An introduction to the use of panel-to-panel and frame-to-frame sequential storytelling as foundational elements of animation and storytelling. Other topics covered include pre-visualization, storyboards, and character design.

NEWM-N 342 3D Animation (3 cr.) P: N243 Introduction to 3D computer graphic animation for students interested in producing animations for product design, gaming, entertainment, marketing, training, and simulation. Topics include environment design, modeling, motion studies, camera movement, and composition.

NEWM-N 343 3D Modeling (3 cr.) P: N243 Intermediate modeling course, aimed at achieving high-detail, professional quality 3D models for games, film, architecture, science, and other application areas. In-depth use of professional software packages. Possible topics include modeling high-resolution organic characters, modeling foliage and ornate structures, displacement mapping techniques.

NEWM-N 441 3D Production (3 cr.) P: N243, N342 and N343
Team-based course focusing on the creation of high-end, broadcast-quality animations. Team members demonstrate mastery of narrative, modeling, lighting, effects, rendering, and animation skills culminating in a final team project. Other topics include planning, preproduction, production, and postproduction.

NEWM-N 353 Intermediate Video (3 cr.) P: N253 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.

NEWM-N 355 Intermediate Sound (3 cr.) P: N255 Intermediate course in designing soundtracks and sound effects for various media applications. Topics include digital signal processing, digital sound techniques, sound recording using a variety of synthesizers and samplers, editing techniques, file formats and conversion techniques.

NEWM-N 356 LIghting and Field Production (3 cr.) P: N253 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.

NEWM-N 357 Digital Effects (3 cr.) P: N253 Integration of computer-generated imagery and digital effects technique for video production. Students learn 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 media integration.

NEWM-N 385 Seeing Sideways: Experimental Approaches to New Media (3 cr.) In this non-traditional open format course students will explore a variety of methods for fostering creative exploration in new media. Discussion, readings, blogging, and directed exercises lead the student to find individual ways of exploring different areas of new media through a variety of output options.

NEWM-N 413 Advanced Web (3 cr.) P: N315 A survey of advanced issues in Web site design, maintenance, and enhancement. Possible topics include Web analytics, clickstream analysis, ads and other revenue opportunities, payment systems, attracting visitors, and search engine optimization.

NEWM-N 421 Physical Object Interfaces (3 cr.) P: N222 Exploration of the possibilities for interacting with computer applications through physical objects and other tangible media. Introduces the use of several sensor technologies to support interactivity, including cameras, proximity, contact, and RFID. Students design, build, and evaluate applications that address various scenarios.

NEWM-N 422 Advanced Interactive Production (3 cr.) P: N322 A project-based course emphasizing the design, implementation, and evaluation of interactive new media applications. Working individually and in teams, students create multiple products, evaluate the products, and evaluate their own production process.

NEWM-N 131 Game On! A History of Video Games (3 cr.) Course examines ancient and traditional games to inform a history of video games from their humble birth in the 1940's to the present. Students design and evaluate aspects of games to understand the historical development of game designs.

NEWM-N 462 Advanced Sequential Narrative (3 cr.) P: N332 Advanced topics in the creation of sequential narrative using 2D animation. Topics include ideas of pacing, tempo, sequence, and synchronization of graphic and audio elements.

NEWM-N 438 Advanced 2D Animation (3 cr.) P: N238 The creation, development, and production of animation utilizing advanced methods of performance and movement. Possible topics include character and environment design, soundtrack, syncing, backgrounds and animation, and motion principles.

NEWM-N 442 Advanced 3D Animation Techniques (3 cr.) P: N342 Advanced techniques in computer animation, including character development and dynamics. Possible topics include story development, character facial animation and locomotion, dynamics, special effects, composites, fluid effects and particle systems.

NEWM-N 443 Advanced Lighting and Texturing (3 cr.) P: N243 Advanced course in creating 3D objects and environments with specialized texturing and lighting. Possible topics include an examination of state-of-the-art examples, reproduction of results, and production of individual portfolio-quality projects. Possible software includes use of Autodesk Maya, mental ray, Adobe Photoshop and Adobe AfterEffects.

NEWM-N 444 Stereoscopic Production and Display (3 cr.) P: N243 The production and display of stereoscopic imagery for various applications, including games, education, science, virtual reality, and marketing. Topics include human stereoscopic perception, types of stereoscopic displays, evolution of techniques, production issues for various types of stereoscopic media.

NEWM-N 453 Advanced Video (3 cr.) P: N353 Application of technical and critical-thinking skills towards understanding the genre of documentary films. Students review, discuss, and analyze several exemplar films, as well as do the research, planning, production, editing, post-production, and evaluation of a short high-quality documentary.

NEWM-N 455 Advanced Sound Design (3 cr.) Students design, record, and edit sound files, apply effects, and mix several audio projects using state of the art technology. Topics include acoustics, circuits, waveforms, digital signal processing (DSP), and studio design and equipment. Emphasis is on practical techniques for integrating sound with other media.

NEWM-N 100 Foundations of New Media (3 cr.) An exploration of the characteristics of digital media, including interactivity, hypermedia, immersion, and storytelling. Includes an introduction to the practice, theory, and history of new media, from the viewpoint of technology, communication, and culture. There are readings, demonstrations, examples, hands-on projects, and written assignments.

NEWM-N 465 Informatics for Social Change (3 cr.) This course focuses on the theory and practice of service learning at IUPUI. Students will apply the knowledge of their technology expertise area in a service project for the local, state or global community. Projects will be completed through students' current and developing new media production, information technology, and client-based research skills.

NEWM-N 203 Digital Painting (3 cr.) Course introduces digital painting and 2D design in media arts. Students develop a basic understanding of digital software and

hardware, conceptual design standards and practices, techniques used in industry, and visual development for films, games, animation, and comic books.

NEWM-N 132 Game Design Psychology: Theory and Prototyping (3 cr.) Course explores the application of cognitive psychology and theories of learning and motivation to the design and prototyping of games. Students learn how to create games that are fun to play, and evaluate and improve games that may not be, based on psychological concepts, theories, and findings.

NEWM-N 331 Game Testing and Evaluation (3 cr.) Course focuses on the evaluation of the quality of a game in both early and later states. Students will learn usability evaluation techniques and apply them to the evaluation of their own and others games. Recruitment and sampling of the correct, real-world individuals will be required. Additional work will be done to understand the factors that go into making a game playable and enjoyable and how to identify those factors and tweak them to produce better gameplay outcomes.

NEWM-N 333 Introduction to Creature and Character Design (3 cr.) Course will give students a fundamental grasp of creature creation and their underlying narratives, world creation/development, basic design solutions, character, creature, and environmental design choices, an understanding of creature design, and a comprehensive working knowledge of the history, development, and evolution of the creature creation from the dawn of our civilization to the present day.

NEWM-N 337 Virtual World Design and Development (3 cr.) Course explores the state of the art of virtual worlds, social constructions formed within them, and technical details of building the worlds. Topics include procedural world generation, avatar creation, real-time interaction, and client data storage. Students construct a virtual world, either individually or in a group.

NEWM-N 339 Augmented Reality Design and Development (3 cr.) Course covers the design and development of computer games and simulations for augmented and virtual reality. To supplement and simulate the physical world, students learn methods for integrating 3D objects and animations into interactive mobile applications. They also propose new, disruptive applications in entertainment, education, and other industries.

NEWM-N 341 Lighting and Materials (3 cr.) Course focuses on texturing and lighting in creating 3D objects and environments. Topics include an examination of state-of-the-art examples, reproduction of results, and production of individual portfolio-quality projects. Possible software includes use of Autodesk Maya, Mental Ray, Adobe Photoshop, and Adobe AfterEffects.

NEWM-N 345 Organic Modeling and Texturing (3 cr.) Intermediate organic modeling course, aimed at achieving high-detail, professional quality 3D models for games, film, architecture, science, and other application areas. This course will explore using the foundations 3D modeling, Sculpture, and Texture painting to output believable creations.

NEWM-N 354 Directorial Analysis, Production and RAW Workflow (3 cr.) Students screen and analyze the unique visual styles of different directors. They complete preproduction, filming, and postproduction on a scene inspired by a selected film using industry standard software and best practices for RAW workflow and color grading.

NEWM-N 364 Directing Visual Narratives (3 cr.) Course introduces principles of animation, derived from acting techniques, to arouse empathy and appeal for characters. Students experiment with how a character should react to objects, environments, and other characters to convey its thoughts, emotions, personality, and aspirations. Students create expressive poses to visualize an effective performance.

NEWM-N 407 Digital Media for Healthcare (3 cr.) Course examines how healthcare systems employ digital media for marketing, education, communication, and ecommerce. Students work together in teams on the design and execution of a digital media project for healthcare.

NEWM-N 415 Documenting Cultural Heritage: Artifacts and Traditions (3 cr.) This service-learning course engages students in projects on the digital documentation of cultural heritage sites and traditions. Students develop content and produce digital media including 3D models and animations, videos, and photographs. Students gain a better understanding of other societies and cultures through this international experience.

NEWM-N 416 Online Video Presentation (3 cr.) Course explores multiple aspects of online video presentation. Students learn how to encode, web-author, and deliver on-demand videos to computers and hand-held devices. Topics include the video delivery process, theories, database support, technologies, technological development, and business models.

NEWM-N 423 Database Development for Mobile Applications (3 cr.) Course applies the representational state transfer software architecture to the development of mobile applications using a nonrelational database. Students learn how to implement a RESTFUL backend API for securely storing and retrieving data in a NoSQL database via AJAX calls.

NEWM-N 430 Advanced Game Design and Development (3 cr.) Students learn techniques and strategies to develop portfolio-ready 3D games, levels, and environments, from initial concept to full production. This course covers professional game engines and game development software, graphics and sound editors, and 3D animation software, enabling integration of graphics, textures, objects, and audio for effective communication and engagement.

NEWM-N 434 Serious Games and Simulations (3 cr.) Course examines the use of serious games, simulations, and virtual worlds in education, healthcare, health education, and the military. It explores the work of notable game authors and developers. Students design, implement, and evaluate a small-scale serious game or simulation.

NEWM-N 436 Game Production (3 cr.) Course engages students in the design, development, and implementation of a multifaceted, large-scale game, played by the wider community. Students form cross- functional teams,

leveraging on their diverse backgrounds and expertise, to employ of variety of technologies in implementing the massively multiplayer game. Topics include alternate reality and augmented reality.

NEWM-N 445 3D Character Development (3 cr.) An advanced class in working with character development, creation, and implementation for game and film pipelines. This class takes the basics of 3D organic modeling to an advanced level by including character development, modeling, texturing, rigging and basic animation. This course covers advanced modeling techniques used for building three-dimensional character and creatures. Students will explore techniques of character modeling to include the various approaches of figure construction. Other topics covered include research/ planning, marketing, preproduction, production and postproduction.

NEWM-N 446 Digital Cinema (3 cr.) Students work with the latest digital cinema technologies and workflows to create short narrative films. Students develop, script, and storyboard films and then plan and execute shoots. During post-production students employ the latest professional practices to edit, color grade, mix, finish, and author their films for final presentation.

NEWM-N 447 3D Prototyping for Applications in Dentistry (3 cr.) Course covers advanced modeling, sculpting, articulation, and printing of 3D objects from computer-generated images for dental industry applications. It also includes strategies for the collection, evaluation, and editing of dental data and the creation of prototypes for full dental and surgical applications.

NEWM-N 448 3D Prototyping for Application in Medicine (3 cr.) Course covers advanced modeling, sculpting, articulation, and printing of 3D objects from computer-generated images for applications in the medical industry. It also includes strategies for the collection, evaluation, and editing of medical data and the creation of prototypes for complete medical and surgical applications.

NEWM-N 449 3D Prototyping for Visualization and Abstraction (3 cr.) Course incorporates advanced modeling, sculpting, articulation, and printing of 3D printed objects from computer-generated images for both visualization and abstraction. It also includes strategies for the collection, evaluation, and editing of various datasets, and the creation of manipulatives that represent both the abstract and the informative.

NEWM-N 468 Video for Social Change (3 cr.) Students explore theories of documentary filmmaking by screening and writing analyses of seminal documentaries. They also create a documentary about a cause or controversy, or work with a nonprofit client to develop material and produce a finished video.

NEWM-N 460 Advanced Scriptwriting for New Media (3 cr.) Course provides a deeper examination of scriptwriting for 3D animation, computer games, and film, building on previously introduced theories and practices. It focuses on an in-depth analysis of the techniques and processes of scriptwriting, including genre, theme, development, character, dialogue, story structure, formatting, style, and revision.

NEWM-N 456 Digital Cinema (3 cr.) Students work with the latest digital cinema technologies and workflows to create short narrative films. Students develop, script, and storyboard films and then plan and execute shoots. During post-production students employ the latest professional practices to edit, color grade, mix, finish, and author their films for final presentation.

Undergraduate Course Descriptions

Informatics

INFO-I 100 First Year Experience (1 cr.)
This course introduces specific survival skills for success in college and beyond, while reconciling personal learning skills with instructor-based teaching styles. Master the art of inquiry and elevate your sense of integrity while sharpening your personal edge by exploring critical thinking, project management and current/future job market trends. Required by all informatics and media arts and science majors.

INFO-I 101 Introduction to Informatics (4 cr.)
Problem solving with information technology; introductions to information representation, relational databases, system design, propositional logic, cutting-edge technologies: CPU, operation systems, networks, laboratory emphasizing information technology including web page design, word processing, databases, using tools available on campus.

This course is approved for the Analytical Reasoning component of the General Education core.

INFO-I 201 Mathematical Foundations of Informatics (4 cr.) 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. Cross listed with COGS Q250. Credit given for either INFO I201 or COGS Q250.

INFO-I 202 Social Informatics (3 cr.)
Introduction to key social research perspectives and literatures on the use of information and communication technologies. Discusses current topics such as information ethics, relevant legal frameworks, popular and controversial uses of technology (e.g. peer-to-peer file sharing), digital divides, etc. Outlines research methodologies for social informatics.

This course is approved for the Social Sciences component of the General Education core.

INFO-I 210 Information Infrastructure I (4 cr.) The software architecture of information systems. Basic concepts of systems and applications programming.

INFO-I 211 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.

INFO-I 300 Human-Computer Interaction (3 cr.) P: INFO I270 An intermediate course that teaches students how to assess the usability of software through quantitative and qualitative methods, including conducting task analyses, usability studies, heuristic inspections, interviews, surveys, and focus groups. The course also introduces students

to the tool and techniques for designing and testing user interfaces based on a human-centered methodology.

INFO-I 303 Organizational Informatics (3 cr.) 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 redefining role of information technology, the changing character of work life and organizational practices, sociotechnical structures, and the rise and transformation of information-based industries. Credit given for either INFO I303 or SPEA V369.

INFO-I 308 Information Representation (3 cr.) The basic structure of information representation in digital information systems. It covers three modules: web development, relational databases, and XML technologies. Through this course, students are able to develop web pages that are able to interact with the backend servers; represent relational databases in the ER model, query the data using the formal query language SQL; and use XML technologies to store and display data.

INFO-I 310 Multimedia Arts and Technology (3 cr.) This course studies how the paradigm shift to a digital world will affect humanity. The course will consider the evolution of media arts and its underlying principles of communications. Students will study application development paradigms in current practice. Readings, lectures, class discussions, and research papers.

INFO-I 320 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.

INFO-I 330 Legal and Social Informatics of Security (3 cr.) This course will examine that set of ethical and legal problems most tightly bound to the issues of information control. The interaction and technology changes, but the core issues have remained: privacy; intellectual property; Internet law; concepts of jurisdiction; speech anonymity versus accountability; and ethical decision-making in the network environment.

INFO-I 350 Foundations in Legal Informatics (3 cr.) This course examines the basic concepts of the design, evaluation and use of technology in the study and practice of law. The course provides an overview of the application of a variety of emerging informatics and new media technologies to the field of law. Will cover technology for law office management, legal research, litigation support, document management, imaging and animations, case management, and electronic court filing.

INFO-I 391 Internship in Informatics Professional Practice (1-3 cr.) P: Approval of the 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. May be repeated for a maximum of three credit hours.

INFO-I 399 Current Topics in Informatics (1-3 cr.) Variable topic. Emphasis is on new developments and research in informatics. Can be repeated twice with different topic.

INFO-I 400 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.

INFO-I 421 Applications of Data Mining (3 cr.) P: INFO-I 211 This course explores the use of data mining techniques in different settings, including business and scientific domains. The emphasis will be on using techniques, instead of developing new techniques or algorithms. Students will select, prepare, visualize, analyze, and present data that leads to the discovery of novel and usable information.

INFO-I 433 Protocol Design and Analysis (3 cr.) Covers the fundamentals of computer security by looking at how things can go wrong, how people can abuse the system, and ways to make the system secure. Students will gain a basic overview of existing security problems and be introduced to methods for addressing such problems. Should be taken by anyone designing, selecting, or using applications in which security or privacy plays a role.

INFO-I 445 Competitive Intelligence for Informatics I (3 cr.) This course will focus on the basic principles, techniques and methods of competitive analysis, the types of competitive analysis systems and their applications, traditional and new sources of information about competitors and industries, the nature of business information and its lifecycle, the ethical issues of competitive analysis and the application of competitive intelligence to real-world scenarios.

INFO-I 453 Computer and Information Ethics (3 cr.) P: Sophomore standing Ethical and professionalization issues that arise in the context of designing and using networked information technologies and information resources. Examines frameworks for making ethical decisions, emergent technologies and their ethical implications, information/computer professionalism. Topics include privacy, intellectual property, cybercrime, games, social justice, and codes of professional ethics.

INFO-I 470 Litigation Support Systems and Courtroom Presentations (3 cr.) Provide students with an opportunity to use specialized software that is available for organizing, managing, retrieving, and presenting documents and evidence in a legal matter. Students will gain hands-on experience with software tools and learn what is effective and allowable from a technical, legal and ethical standpoint.

INFO-I 490 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.

INFO-I 491 Capstone Project Internship (1-6 cr.) P: Consent of instructor Students culminate their course studies through practical application of concepts and practices working in industry. Course requires prior authorization and approval of internship through the

Career Services Office. Required coursework is completed via Oncourse.

INFO-I 492 Senior Thesis (3 cr.) P: Consent of instructor 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.

INFO-I 493 Senior Thesis (3 cr.) P: Consent of instructor The senior student prepares and presents a thesis: a substantial, typically multichapter paper based on a well-planned research or scholarly project, as determined by the student and a sponsoring faculty member.

INFO-I 494 Design and Development of an Information System (3 cr.) P: Consent of instructor 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).

INFO-I 495 Design and Development of an Information System (3 cr.) P: Consent of instructor 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).

INFO-I 499 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.

INFO-Y 395 Career Development for Informatics Majors (1 cr.) Develops skills and knowledge that enable the student to successfully pursue the career search both at the time of graduation and later as the student progresses through their career. The course covers techniques and strategies which make the job search more efficient and effective.

INFO-I 270 Introduction to Human-Computer Interaction Principles and Practices (3 cr.) Students learn the fundamental principles and practices of human-computer interaction (HCI) and evaluation. Specific focus is given to the introductory knowledge of HCI methods, tools, and techniques for designing and evaluating user interfaces through the use of low and high fidelity prototypes for the Web and software.

This course is approved for the Social Sciences component of the General Education core.

INFO-I 275 Introduction to Human-Computer Interaction Theory (3 cr.) Students will learn the fundamental theories of human-computer interaction (HCI) and user-centered design. This course is both a survey of HCI research and an introduction to the psychological, behavioral, and other social science knowledge and techniques relevant to the design of interactive and ubiquitous computing systems.

This course is approved for the Social Sciences component of the General Education core.

INFO-I 410 Electronic Discovery (3 cr.) This course will cover the legal, ethical, financial, logistical, procedural and technological considerations of electronic discovery and its implications for lawyers and their clients. It will highlight recently revised federal and state rules, new state and federal legislation and recent court cases that impact electronic discovery policies and processes. We will also consider electronic discovery from the point of view of a corporation that has to prepare for – and then respond to – requests for the production of digital evidence.

INFO-I 480 Experience Design and Evaluation of Ubiquitous Computing (3 cr.) The course focuses on ubiquitous computing and related interface/system design, and user-experience issues. Applications include interactive systems which support natural/gesture/touch-based interactions on devices such as mobile, extra-small-and-large displays, and other non-traditional pervasive technologies. Projects include interaction and evaluative techniques: field observation, contextual inquiry, ethnography, survey/interviews, and cognitive walkthrough.

INFO-I 465 Informatics for Social Change (3 cr.) This course focuses on the theory and practice of service learning at IUPUI. Students will apply the knowledge of their expertise area in a service project for the local or global community. Projects will be completed through students' current and developing new media production, information technology, and client-based research skills.

NEWM-N 220 Media Applications I (3 cr.) P: NEWM N101 or INFO I101 Introduces concepts and skills related to the design of interactive multimedia applications for the Web, the desktop, and mobile devices. Within the context of industry-standard application design tools, students use markup tags and scripting to create applications that emphasize graphics, animation, sounds, and interactivity.

NEWM-N 320 Media Applications II (3 cr.) P: NEWM N221 Introduces intermediate concepts and skills related to the design of interactive multimedia applications for the Web, the desktop, and mobile devices. Within the context of industry-standard application design tools, students use information modeling, markup tags, and scripting to create applications that emphasize graphics, animation, sounds, and interactivity.

NEWM-N 299 Directed Study (2 cr.) 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.

INFO-I 305 Introduction to Research in Informatics (3 cr.) P: Sophomore standing This course presents a broad overview of research philosophy, designs and

methods. Its focus is on social science research methods and the content is specifically tailored to reflect the rapidly emerging field of informatics. The course will include major methods that are the core of contemporary approaches to research in informatics.

INFO-I 402 Informatics Project Management (3 cr.) P: Sophomore standing This course will focus on project management in an Informatics setting. Students will become conversant in the tools and techniques of project management, such as project selection methods, work breakdown structures, network diagrams, critical path analysis, critical chain scheduling, cost estimates, earned value management, motivation theory and team building.

INFO-I 425 Applying Web Services in Information Systems (3 cr.) P: INFO I211 and INFO I308 This course examines how cloud computing and service-oriented architecture contribute to solutions for Informatics problems in areas such as business, health care, and life sciences. Students will develop an understanding of why, when, and how organizations utilize Web services to manage data, as well as the skills to design, implement, and deploy Web services applications.

INFO-I 112 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.

INFO-I 130 Introduction to Cybersecurity (1 cr.) P: I101 C: I101 This course introduces students to Cybersecurity. The course will primarily focus on introduction to three core areas (technical aspects of security, organizational aspects of security, and legal aspects of security). Through examples of security problems in real life, this course will illuminate fundamental ideas and concepts of information security.

INFO-I 230 Analytical Foundations of Security (3 cr.) P: I130 This course will allow students to re-evaluate and conceptualize material learned in discrete courses to consider the topics from the perspective of security. For example, computer system basics such as hardware (CPU, memory, ...) and software are reconsidered from the perspective of how their interactions create vulnerabilities. Vulnerabilities that combine standard hardware and software configurations will be examined, as these illuminate both security and computer networks. Operating systems and file systems are examined from the perspective of access control, permissions and availability of system services, etc.

INFO-I 231 Introduction to the Mathematics of Cybersecurity (3 cr.) P: I130 C: I130 Introduces the basic mathematical tools used in modern cybersecurity. Covers mathematical material from a number of disparate fields, including probability theory, analysis of algorithms, complexity theory, number theory, and group theory.

INFO-I 430 Security for Networked Systems (3 cr.) P: INFO I211 and INFO I308 An extensive survey of network security. Covers threats to information confidentiality, integrity, and availability in different Internet layers, and defense mechanisms which control these threats. Also provides a necessary foundation on network security, such as cryptographic primitives/ protocols, authentication, authorization, and access control technologies. Hands-on experiences through programming assignments and course projects.

INFO-I 441 Interaction Design Practice (3 cr.) Human-computer interaction design (HCID) describes the way a person or group accomplishes tasks with a computer - what the individual or group does and how the computer responds; what the computer does and how the individual or group responds. This course will be organized a collection of readings and three design projects applying human-computer interaction principles to the design, selection, and evaluation of interactive systems.

INFO-I 475 Informatics in Sports (3 cr.) Technology applications are changing the sports world in biomechanics, sports advancement and injury prevention, equipment, entertainment, gaming, and journalism. The approach of this course is to delineate what digital technologies are progressing the sporting field most and changing the way we view athletics.

New Media

NEWM-N 115 Multimedia Authoring Tools (3 cr.) A hands-on introduction to some of the fundamental tools used in industry to produce interactive media-rich Web pages. Case studies of sites that incorporate text, sounds, graphics, animations, and interactivity. Other topics include the design, development, and deployment of a personal Web site.

NEWM-N 175 Digital Media I: Vector Imaging (3 cr.) P: N 101. 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.

NEWM-N 180 Digital Media II: Raster Imaging (3 cr.) P: N 101. 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.

NEWM-N 190 Topics in Interactive Media (1-3 cr.) Special topics in interactive media, with a focus on exploring concepts at the forefront of media arts.

NEWM-N 199 Directed Study I (1 cr.) This course introduces the new media student to the current job market and will provide instruction on the development of job promotional material. Students will explore various new media careers in business, education, entertainment, science, and other related fields.

NEWM-N 200 Desktop Tools for Digital Media (3 cr.) A hands-on survey of the wide variety of tools used in creating multimedia animation, video, sound, and digital effects.

NEWM-N 201 Design Issues in Digital Media (3 cr.) Exploration of the traditional principles of visual design, as expressed in digital design tools and applied to digital media. Topics include visual literacy, fundamental design elements and design principles, and their expression in various tools for digital design. Hands-on practice with

applying design principles in several projects. This course is approved for the Arts and Humanities component of the General Education core.

NEWM-N 204 Introduction to Interactive Media (3 cr.) 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.

NEWM-N 210 Introduction to Digital Sound (3 cr.) P: N 101. 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.

NEWM-N 215 Online Document Development (3 cr.) P: N101, N102 Study of the creation, publication, and management of documents, images, and other media types on the Web. Topics include Web publishing, asset preparation, document types, contemporary content management systems and their use in the organization. Hands-on experience with contemporary systems for content management.

NEWM-N 230 Introduction to Game Design and Development (3 cr.) P: N221 Introduction to designing and developing games, examining the role that games play in daily life, and analyzing the impact of games in popular culture. Additional topics include world creation, game space design, programming 2D games, character and creature design, animation, and playability testing.

NEWM-N 250 Team Building in Technology (3 cr.) P: N202. Practical introduction to working in groups of three or more people. Topics include the interpersonal process, decision-making styles, the creative effort, problem-solving, conflict resolution, leadership, and assessment techniques.

NEWM-N 260 Scriptwriting (3 cr.) P: N202 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.

NEWM-N 265 Sound Composition (3 cr.) 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.

NEWM-N 270 Visual Composition (3 cr.) An introduction to the composition of visual information in regards to new media. Students will develop a visual style through digital and traditional methods to tell stories. Other topics covered include digital photography, framing, shot selection, camera movements, and time-based programs.

NEWM-N 290 Creative Concept Development (3 cr.) Exploration of creativity, ideation, and concept development. Students learn the processes of creative thinking, idea generation and development, and creative problem solving through specific theories, methodologies, and application in multimedia projects.

NEWM-N 295 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.

NEWM-N 299 Directed Study (2 cr.) 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.

NEWM-N 300 Digital Media Production (3 cr.) P: N101, N102 Hands-on experience in taking a project through the typical product life-cycle, from initial contact to final acceptance. Topics include communicating with a client, cost estimation, product design, implementation, handling change requests, product documentation, acceptance testing, and post-process review.

NEWM-N 311 The Digital Paradigm Shift: Effects in International Cultures and Society (3 cr.) Examination of the digital paradigm shift and its global impact on cultures and societies. A study of major paradigm shifts in reference to culture and society as well as the implications for the future. Readings, lectures, class discussions.

NEWM-N 315 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.

NEWM-N 330 Intermediate Game Design and Development (3 cr.) P: N230 Design and development of 3D games in the context of a 3D game engine. Topics include world creation, game space design, programming, design and modeling of characters and creatures, environmental animation, and playability testing.

NEWM-N 335 Character Modeling and Animation (3 cr.) P: N230 Intermediate course in designing characters, for a variety of applications. Topics include character modeling, locomotion, facial animation, and lip movement.

NEWM-N 340 Digital Video Production (3 cr.) P: N253 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.

NEWM-N 399 Directed Study III (1 cr.) P: Junior standing or N299 This course applies design and visualization information towards the development of a comprehensive portfolio. The development of the portfolio will provide students with a framework for display of personal growth

and achievement. Students will develop a portfolio to be used for future career opportunities.

NEWM-N 400 Imaging and Digital Media Seminar (3 cr.) Variable titled course designed to bring guest speakers from the industry and 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.

NEWM-N 410 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.

NEWM-N 420 Multimedia Project Development (3 cr.) P: (COMM-R 110 and ENG-W 131 and JOUR-J 200) or ENG-132 or TCM 220 and Senior standing. THIS IS A PRE-CAPSTONE COURSE. Project design in new media. Topics include product planning and design, hardware and software selection, cost estimation, timelines, project management tools, feasibility studies, prototyping, and product presentation. Students work individually or in small groups to develop a project plan suitable for a capstone experience.

NEWM-N 440 DV and CGI Digital Effects (3 cr.) P: N 342 and N 343 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.

NEWM-N 450 Usability Principles for New Media Interfaces (3 cr.) P: N285 Examination of principles of human-computer interaction (HCI) and user experience modeling. Study of user-centered design, usability, and usability testing in the context of new media (hypermedia and multimedia). Topics include aesthetics, human factors, and cognitive psychology as related to user interfaces, navigation, and interactivity.

NEWM-N 475 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.

NEWM-N 480 Technology and the Law (3 cr.) Provides students with a solid foundation on legal matters that impact new media and informatics, including intellectual property (copyright, patents, trademark, trade secrets), contracts, licensing, privacy, publicity, global legal issues, and professional ethics.

NEWM-N 485 Seminar in New Media (3 cr.) P: Prerequisite varies by topic. Current trends, problems, best practices, and developments in new media. Students pursue a special interest and share information and experiences 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.

NEWM-N 490 Independent Study (1-6 cr.) Departmental consent required. 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.

NEWM-N 495 Enrichment Internship (3 cr.) P: Junior standing. Completion of 9 credit hours of new media electives at the 300-400 level is required. 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.

NEWM-N 499 Capstone Experience (3 cr.) To be taken during the students' senior year. Departmental consent required. 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.

NEWM-N 102 Digital Media Imagery (3 cr.) A hands-on introduction to the basic tools used in industry for the creation, editing, manipulation, and uses of 2D raster and vector graphics. Other topics include the integration of imagery into a personal Web site.

NEWM-N 202 Digital Storytelling (3 cr.) P: NEWM-N 100. Examination of the principles of storytelling across a range of digital media formats, with attention to techniques for creating story-rich projects. Explores the role of agency, interactivity, story structure, and narrative, as well as the opportunities and challenges raised by emerging interactive and transmedia approaches to story-rich projects.

NEWM-N 220 INTRODUCTION TO MEDIA APPLICATION DEVELOPMENT (3 cr.) P: NEWM N101 or INFO I101 Introduces concepts and skills related to the design of interactive multimedia applications for the Web, the desktop, and mobile devices. Within the context of industry-standard application design tools, students use markup tags and scripting to create applications that emphasize graphics, animation, sounds, and interactivity.

NEWM-N 320 Media Applications II (3 cr.) P: N221 Introduces intermediate concepts and skills related to the design of interactive multimedia applications for the Web, the desktop, and mobile devices. Within the context of industry-standard application design tools, students use information modeling, markup tags, and scripting to create applications that emphasize graphics, animation, sounds, and interactivity.

NEWM-N 238 2D Animation (3 cr.) P: N101 Introduction to traditional techniques for 2D animation, and their application in digital media. An exploration of the 12 principles of animation and how to use them to create effective animations.

NEWM-N 241 Stop Motion Animation (3 cr.) Through lecture and hands-on practice, this class studies the production techniques of stop action animation. Topics include the study of pioneers in the field, evolution from

analog to digital techniques, and the building of sets and characters. Students will produce a series of short frame-by-frame digital animations.

NEWM-N 243 Introduction to 3D (3 cr.) An introduction to the concepts and production process of 3D graphics and animation. Students learn basic techniques and theories related to modeling, texturing, lighting, animation, and rendering. Students produce animated graphics and text within the context of various projects.

NEWM-N 253 Introduction to Digital Video (3 cr.) Introduction to video production techniques for digital media. Hardware, software, and technique are explored through lecture and projects. All phases of video production are addressed, from pre-production through production to post-production with a focus on the digital media aspects.

NEWM-N 255 Introduction to Digital Sound (3 cr.) Introduction to role and function of sound in interactive media. Concepts, theory, and practice related to audio, including voice, music, and sound effects. Effective listening skills, and understanding how people listen and comprehend sound. Experience with tools and techniques for recording, editing, and reproduction.

NEWM-N 256 Digital Composition (3 cr.) P: N102 An introduction to digital cameras and the principles of photographic composition for multimedia. Topics include shot selection, framing, camera movements, and time-based effects, as well as the use of photographs in storytelling.

NEWM-N 261 Storyboarding for Multimedia (3 cr.) P: N101, N102 Introduction to story and production planning through traditional and digital techniques. Topics include the development of roughs, storyboards, and animatics as planning devices for digital storytelling and other new media products.

NEWM-N 284 Building Physical Prototypes (3 cr.) An examination of concept formation for multimedia technology, including current, emerging, and future devices and displays. Learn to build physical and digital prototypes to facilitate idea development and presentation. Students research ideas, develop prototypes, evaluate, and present results.

NEWM-N 285 Interactive Design (3 cr.) P: N101 Examination of issues related to interactivity, including the frameworks, models, and theories related to user interaction with new media products. Topics include user modeling, types of user interfaces, and interaction paradigms.

NEWM-N 288 New Media Marketplace Innovation (3 cr.) Through discussion, reading and writing, this course introduces students to the strategies needed to think outside the box and generate innovation in digital products and services, with an emphasis on existing or potential businesses and markets.

NEWM-N 423 DATABASE DEVELOPMENT FOR MOBILE APPLICATIONS (3 cr.) P: N222 This course applies the representational state transfer software architecture to the development of mobile applications using a nonrelational database. Students learn how to implement a RESTFUL backend API for securely storing and retrieving data in a NoSQL database via AJAX calls.

NEWM-N 322 Dynamic Data Applications (3 cr.) P: N222 Examines the techniques used in multimedia applications to communicate with back-end data and information services, and to create applications with run-time access to data, information, and media assets.

NEWM-N 328 Visualizing Information (3 cr.) P: N222 Exploration of techniques for using graphics and sound to present data and information. Topics include data types (including data that is geographical and/or time-varying), presentation techniques, effective use of design elements, and effective use of interactive media.

NEWM-N 262 Sequential Narrative (3 cr.) P: N202 An introduction to the use of panel-to-panel and frame-to-frame sequential storytelling as foundational elements of animation and storytelling. Other topics covered include pre-visualization, storyboards, and character design.

NEWM-N 342 3D Animation (3 cr.) P: N243 Introduction to 3D computer graphic animation for students interested in producing animations for product design, gaming, entertainment, marketing, training, and simulation. Topics include environment design, modeling, motion studies, camera movement, and composition.

NEWM-N 343 3D Modeling (3 cr.) P: N243 Intermediate modeling course, aimed at achieving high-detail, professional quality 3D models for games, film, architecture, science, and other application areas. In-depth use of professional software packages. Possible topics include modeling high-resolution organic characters, modeling foliage and ornate structures, displacement mapping techniques.

NEWM-N 441 3D Production (3 cr.) P: N243, N342 and N343
Team-based course focusing on the creation of high-end, broadcast-quality animations. Team members demonstrate mastery of narrative, modeling, lighting, effects, rendering, and animation skills culminating in a final team project. Other topics include planning, preproduction, production, and postproduction.

NEWM-N 353 Intermediate Video (3 cr.) P: N253 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.

NEWM-N 355 Intermediate Sound (3 cr.) P: N255 Intermediate course in designing soundtracks and sound effects for various media applications. Topics include digital signal processing, digital sound techniques, sound recording using a variety of synthesizers and samplers, editing techniques, file formats and conversion techniques.

NEWM-N 356 LIghting and Field Production (3 cr.) P: N253 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.

NEWM-N 357 Digital Effects (3 cr.) P: N253 Integration of computer-generated imagery and digital effects technique for video production. Students learn 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 media integration.

NEWM-N 385 Seeing Sideways: Experimental Approaches to New Media (3 cr.) In this non-traditional open format course students will explore a variety of methods for fostering creative exploration in new media. Discussion, readings, blogging, and directed exercises lead the student to find individual ways of exploring different areas of new media through a variety of output options.

NEWM-N 413 Advanced Web (3 cr.) P: N315 A survey of advanced issues in Web site design, maintenance, and enhancement. Possible topics include Web analytics, clickstream analysis, ads and other revenue opportunities, payment systems, attracting visitors, and search engine optimization.

NEWM-N 421 Physical Object Interfaces (3 cr.) P: N222 Exploration of the possibilities for interacting with computer applications through physical objects and other tangible media. Introduces the use of several sensor technologies to support interactivity, including cameras, proximity, contact, and RFID. Students design, build, and evaluate applications that address various scenarios.

NEWM-N 422 Advanced Interactive Production (3 cr.) P: N322 A project-based course emphasizing the design, implementation, and evaluation of interactive new media applications. Working individually and in teams, students create multiple products, evaluate the products, and evaluate their own production process.

NEWM-N 431 Game On! (3 cr.) An exploration of the evolution, concepts, and impact of video games. Examines the role of games in popular culture, as well as the impact on contemporary notions of interactivity, learning, and storytelling. Includes discussion of console and online games, casual games, Alternate Reality Games, serious games, and others.

NEWM-N 462 Advanced Sequential Narrative (3 cr.) P: N332 Advanced topics in the creation of sequential narrative using 2D animation. Topics include ideas of pacing, tempo, sequence, and synchronization of graphic and audio elements.

NEWM-N 438 Advanced 2D Animation (3 cr.) P: N238 The creation, development, and production of animation utilizing advanced methods of performance and movement. Possible topics include character and environment design, soundtrack, syncing, backgrounds and animation, and motion principles.

NEWM-N 442 Advanced 3D Animation Techniques (3 cr.) P: N342 Advanced techniques in computer animation, including character development and dynamics. Possible topics include story development, character facial animation and locomotion, dynamics, special effects, composites, fluid effects and particle systems.

NEWM-N 341 LIGHTING AND MATERIALS (3 cr.) P: N243 This course focuses on texturing and lighting in creating 3D objects and environments. Topics include an examination of state-of-the-art examples, reproduction of results, and production of individual portfolio-quality projects. Possible software includes use of Autodesk Maya, Mental Ray, Adobe Photoshop, and Adobe AfterEffects.

NEWM-N 444 Stereoscopic Production and Display (3 cr.) P: N243 The production and display of stereoscopic imagery for various applications, including games, education, science, virtual reality, and marketing. Topics include human stereoscopic perception, types of stereoscopic displays, evolution of techniques, production issues for various types of stereoscopic media.

NEWM-N 453 Advanced Video (3 cr.) P: N353 Application of technical and critical-thinking skills towards understanding the genre of documentary films. Students review, discuss, and analyze several exemplar films, as well as do the research, planning, production, editing, post-production, and evaluation of a short high-quality documentary.

NEWM-N 455 Advanced Sound Design (3 cr.) Students design, record, and edit sound files, apply effects, and mix several audio projects using state of the art technology. Topics include acoustics, circuits, waveforms, digital signal processing (DSP), and studio design and equipment. Emphasis is on practical techniques for integrating sound with other media.

NEWM-N 100 Foundations of New Media (3 cr.) An exploration of the characteristics of digital media, including interactivity, hypermedia, immersion, and storytelling. Includes an introduction to the practice, theory, and history of new media, from the viewpoint of technology, communication, and culture. There are readings, demonstrations, examples, hands-on projects, and written assignments. This course is approved for the Arts and Humanities component of the General Education core.

NEWM-N 465 Informatics for Social Change (3 cr.) This course focuses on the theory and practice of service learning at IUPUI. Students will apply the knowledge of their technology expertise area in a service project for the local, state or global community. Projects will be completed through students' current and developing new media production, information technology, and client-based research skills.

Health Information Management

HIM-M 110 Computer Concepts for Health Information (3 cr.) Course provides an overview of applications for the health and medical professionals. Topics include: audit trails, generating, quantifying and analyzing medical reports, word processing, computer hardware, medical software, copyright and fair usage. Students retrieve and present medical data.

HIM-M 200 Database Design for Health Information Administration (3 cr.) Introduction to database design with an emphasis on managing data in the health information environment. Topics and concepts include creating data table relationships and normalization. Utilizing Microsoft Access to create user forms and reports. Students will be required to create a large group project.

HIM-M 425 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.

HIM-M 322 Hospital Organization and Management (3 cr.) Orientation to hospital departments hospital organization; inter- and intra-relationships of hospital and community agencies.

HIM-M 325 Health Care Information Requirements and Standards I (3 cr.) Course outlines the essential documents/data content required for maintaining legal health records using paper and electronic media. Federal, state and local law, accreditation standards and regulatory requirements for maintaining patient data examined. Documentation in acute care, psychiatric and other healthcare settings. Students begin to explore the health information management professions.

HIM-M 330 Medical Terminology (3 cr.) The purpose of this course is to further develop a student's understanding and use of medical terminology. There is a focus on spelling and pronunciation, abbreviations, analyzing words based on their root, prefix or suffix as well as identifying common mistakes within medical terminology.

HIM-M 350 Medical Science for Health Information I (3 cr.) This course will cover pathophysiology and pharmacology associated with the body systems.

HIM-M 475 Health information Technology (3 cr.) Introduction to health information standards that have been developed for the electronic health record and information interoperability and standards in development. Emphasis on understanding healthcare organization networks, intranets, the role of the Internet in patient data access, differences between clinical and administrative information systems used in healthcare organizations and the management and maintenance of those systems.

HIM-M 400 Health Information Storage and Retrieval (3 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).

HIM-M 420 Health Care Planning and Information Systems (3 cr.) Understanding the design of systems, research various vendors, present information so that a selection of information system can be recommended. This course will also address systems planning; systems selection process; clinical and business applications of computing in healthcare; resolving organization information issues.

HIM-M 345 Medicine and the Law (1-2 cr.) Presentation of concepts of law in medical, and/or health related areas as applied to the physician, hospital, health institutions, health information and individual health workers.

HIM-M 351 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.

HIM-M 358 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.

HIM-M 361 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.

HIM-M 462 Health Care Quality Improvement (2 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.

HIM-M 470 Health Care Reimbursement Systems (3 cr.) P: M355,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.

HIM-M 490 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.

HIM-M 499 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.

HIM-M 120 Data Organization and Presentation in the Healthcare Environment (3 cr.) Students will study and apply problem solving, decision analysis and data presentation techniques used in healthcare data representation for both internal and external users. ICD and CPT classification systems will be modeled and analyzed utilizing spreadsheets.

HIM-M 220 Healthcare Decision Support (3 cr.) This course provides an overview of essential information technology tools necessary for quantitative and qualitative decision making in a healthcare environment. Students will learn effective methods to analyze patient data including ICD and CPT classification systems as they relate to decision processes in a healthcare environment.

HIM-M 270 Foundations and Principles of Health Information Management (2 cr.) Course focuses on the administration of foundational principles of management within a health information department. Students will gain an understanding of the language of quantitative methods as well as the processes that are required for health information managers to function in a healthcare environment which demands competency in the areas of profit margins, management of financial resources and complex reimbursement processes.

HIM-M 275 Effective Communication for the Healthcare Environment (3 cr.) Course is designed to

develop effective interaction among internal and external customers in a healthcare environment. Emphasis is placed on professional communications with superiors, peers and subordinates in all areas of healthcare. Topics include: policy creation, HIM job descriptions, information technology proposal requests, e-mail etiquette and presentation skills.

HIM-M 326 Laboratory Enrichment for Healthcare Information Requirements and Standards I (1 cr.) This course consists of exercises that reinforce the lectures in HIA-M 325. Students explore up-to-date Web resources used in the healthcare field as well as perform database searches. Students engage in laboratory exercises that consist of evaluating health records for completeness, regulatory compliance and documentation.

HIM-M 327 Healthcare Information Requirements and Standards II (3 cr.) This course is a continuation of HIA-M 325 and includes the ongoing review of health record documentation, in particular secondary data bases such as cancer registry, long term care and other healthcare settings. Healthcare information resources, both in print and on the World Wide Web are researched and examined extensively.

HIM-M 328 Laboratory Enrichment for Healthcare Information Requirements and Standards II (1 cr.) P: M325 This course consists of exercises that reinforce the lectures in HIA-M 327. Students explore Web resources used in the healthcare field and perform extensive database searches.

HIM-M 356 Laboratory Enrichment for ICD-9-CM Coding (1 cr.) This course is a laboratory for HIA-M 355 that provides hands-on experience in assigning ICD-9-CM codes. Actual patient records are used for coding practice which focuses on correct code assignment and sequencing of codes to follow ethical coding guidelines. Students will also gain hands-on experience with electronic health records and coding software used in the HIM industry.

HIM-M 443 Professional Practicum in Health Information Management I (1-8 cr.) This course is designed to provide professional practice experience in an approved clinical site under the direction of an HIA faculty member and an onsite clinical instructor. Students also receive didactic and practicum experience in the classroom. Emphasis on clinical science, health information management, business administration and information systems.

HIM-M 444 Professional Practicum in Health Information Management II (1-8 cr.) P: M443
This course is a continuation of HIA-M 443 and includes professionally supervised experience in an approved clinical site as well as practicum experience in the classroom.

HIM-M 359 Clinical in Health Information Administration (1 cr.) P: M355 This course is a laboratory for HIA-M 455 that provides hands-on experience in assigning CPT codes. Actual patient records are used for coding practice which focuses on correct code assignment and sequencing of codes to follow ethical coding guidelines. Students will also gain hands-on experience with electronic health records and coding software used in the HIM industry.

HIM-M 457 Practicum in Medical Coding (4 cr.) Course is designed for students completing the Certificate in Medical Coding. Students will participate in a supervised laboratory practicum focusing on the coding of complex medical records using both the ICD and CPT coding systems. Onsite observations related to coding function in approved clinical settings are included in the course content.

HIM-M 355 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.

HIM-M 370 Health information Management (3 cr.) This course will focus on human resources management in a Health information Department. Work scheduling, work flow and work design will be discussed. Other issues in managing an HIM department will be addressed such as education and training, establishing productivity standards, developing a budget and managing contracts.

HIM-M 108 Introduction to Health Information Management (3 cr.)
Course introduces the health information management profession and healthcare delivery systems. Topics include healthcare settings, the patient record, electronic health records (EHRs), data collection standards, legal aspects of health information, coding, and reimbursement. Students gain hands-on experience with a virtual EHR and examine the impact of EHRs on healthcare.

Library and Information Science

SLIS-S 401 Computer-based Information Tools (3 cr.)
Graded S/F. This skills-based course introduces basic applications that will be used throughout the student's course work and beyond. Students' experiences in this course should be seen as a basis for further skill development and learning throughout their careers. The course covers computing platforms, access tools, and management tools. Demonstration of skills will be by a mastery test or an assignment in each unit of the course. S401 does not count toward graduate degree requirements.

General Education Courses

INFO-I 101 Introduction to Informatics (4 cr.)
Problem solving with information technology; introductions to information representation, relational databases, system design, propositional logic, cutting-edge technologies: CPU, operation systems, networks, laboratory emphasizing information technology including web page design, word processing, databases, using tools available on campus.

This course is approved for the Analytical Reasoning component of the General Education core.

NEWM-N 201 Design Issues in Digital Media (3 cr.)
Exploration of the traditional principles of visual design, as expressed in digital design tools and applied to digital media. Topics include visual literacy, fundamental design elements and design principles, and their expression in

various tools for digital design. Hands-on practice with applying design principles in several projects.

This course is approved for the Arts and Humanities component of the General Education core.

INFO-I 202 Social Informatics (3 cr.)
Introduction to key social research perspectives and literatures on the use of information and communication technologies. Discusses current topics such as information ethics, relevant legal frameworks, popular and controversial uses of technology (e.g. peer-to-peer file sharing), digital divides, etc. Outlines research methodologies for social informatics.

This course is approved for the Social Sciences component of the General Education core.

NEWM-N 100 Foundations of New Media (3 cr.)
An exploration of the characteristics of digital media, including interactivity, hypermedia, immersion, and storytelling. Includes an introduction to the practice, theory, and history of new media, from the viewpoint of technology, communication, and culture. There are readings, demonstrations, examples, hands-on projects, and written assignments.

This course is approved for the Arts and Humanities component of the General Education core.

INFO-I 270 Introduction to Human-Computer Interaction Principles and Practices (3 cr.)
Students learn the fundamental principles and practices of human-computer interaction (HCI) and evaluation. Specific focus is given to the introductory knowledge of HCI methods, tools, and techniques for designing and evaluating user interfaces through the use of low and high fidelity prototypes for the Web and software.

This course is approved for the Social Sciences component of the General Education core.

INFO-I 275 Introduction to Human-Computer Interaction Theory (3 cr.)
Students will learn the fundamental theories of human-computer interaction (HCI) and user-centered design. This course is both a survey of HCI research and an introduction to the psychological, behavioral, and other social science knowledge and techniques relevant to the design of interactive and ubiquitous computing systems.

This course is approved for the Social Sciences component of the General Education core.

NEWM-N 102 Digital Media Imagery (3 cr.)
A hands-on introduction to the basic tools used in industry for the creation, editing, manipulation, and uses of 2D raster and vector graphics. Other topics include the integration of imagery into a personal Web site.

This course is approved for the Arts and Humanities component of the General Education core.

NEWM-N 132 Game Design Psychology: Theory and Prototyping (3 cr.)
Course explores the application of cognitive psychology and theories of learning and motivation to the design and prototyping of games. Students learn how to create games that are fun to play, and evaluate and improve games that may not be, based on psychological concepts, theories, and findings.

This course is approved for the Social Sciences component of the General Education core.

HIM-M 200 Database Design for Health Information Management (3 cr.)
An introduction to database design with an emphasis on managing data in the health information environment. Topics include using a relational database system to create tables and relationships, perform normalization, and generate user forms and reports. Students conduct a large group project.

This course is approved for the Analytical Reasoning component of the General Education core.

INFO-I 201 Mathematical Foundations of Informatics (3 cr.)
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. Cross listed with COGS Q250. Credit given for either INFO I201 or COGS Q250.

This course is approved for the Analytical Reasoning, List B, component of the General Education core.

INFO-I 210 Information Infrastructure I (3 cr.)
The software architecture of information systems. Basic concepts of systems and applications programming.

This course is approved for the Analytical Reasoning, List B, component of the General Education core.

INFO-I 223 Data Fluency (3 cr.)
Pervasive, vast, and growing describe data in today's environment. This course introduces fundamental skills for extracting from data actionable knowledge. Students create, access, munge, analyze, and visualize data to draw inferences and make predictions. The course uses real datasets from a variety of disciplines including healthcare, business, and the humanities.

This course is approved for the Analytical Reasoning, List B, component of the General Education core.

NEWM-N 260 Scriptwriting (3 cr.)
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.

This course is approved for the Arts and Humanities component of the General Education core.

NEWM-N 131 Game On! A History of Video Games (3 cr.)
Course examines ancient and traditional games to inform a history of video games from their humble birth in the 1940's to the present. Students design and

evaluate aspects of games to understand the historical development of game designs.

This course is approved for the Arts and Humanities component of the General Education core.