NOTE: The Doctor of Philosophy in Informatics follows the policies described in this Handbook and the University Graduate School Bulletin 2016-2017 (in particular, pages 1-18 found in Appendix B of this Handbook). This Handbook does not substitute for the official University Graduate School (UGS) Bulletin. Always consult the UGS Bulletin for further details and official explanations. For double majoring, see page 10 of the UGS Bulletin.

It is the student’s sole responsibility to fulfill all requirements of the Doctor of Philosophy in Informatics degree as described in this Handbook and the UGS Bulletin. Review these documents each semester and consult with the Informatics Graduate Studies Office for help.

This Handbook contains text from the University Graduate School Bulletin, the University Graduate School Guides, the Office of International Services, Informatics Track Handbooks, and Informatics Ph.D. Handbook. We use this text with their permission, and we appreciate their cooperation.
Introduction
The Ph.D. in Informatics provides a balance among technological, scientific, and social dimensions involved in the development, study, and application of information technology.

Indiana University established the School of Informatics and Computing as a place where innovative multidisciplinary programs could thrive, a program where students can integrate technological skills and science and social science methods across diverse disciplines. Ours is the first Ph.D. program in the United States to carry the label “Informatics,” established in 2005.

Research projects often involve collaborations from several different tracks to develop innovative and sometimes groundbreaking solutions. While students work primarily with a single track, they likely will leverage their expertise to solve problems outside of their own specialty, exploring the broader significance of their work.

Values
All students are expected to abide by the Indiana University’s Code of Student Rights, Responsibilities & Conduct, http://www.indiana.edu/~code/. This applies to scholarship, any role the student may have as an Associate Instructor, relations with colleagues, relations with students, and compliance with academic standards with respect to academic ethics.

In particular, if students are not familiar with the concept and best practices to avoid any hint of plagiarism in American universities, they should become familiar with these standards. The Code provides a series of documents describing the behaviors, ideals, and goals for Indiana University.

Program of Study
Informatics is in the science, technology, engineering, and mathematics (STEM) fields. Students in the doctoral program will explore the connections among technology, theory, social analysis, data analytics, and application domains in a diverse and multidisciplinary curriculum. This curriculum includes core courses; seminars; research rotations; methodology and theory courses; electives in related disciplines; minor courses; and dissertation research courses. We encourage students to pursue internships and related activities.

Length of Program
For students who enter the program with a relevant master’s degree, it will take approximately four years to complete the degree; likewise, for students who enter the program with only a bachelor’s degree, it will take approximately five years to complete the program. By enrolling in less than eight credits per semester, it will take longer to complete the program and may jeopardize funding.
PH.D. IN INFORMATICS – REQUIREMENTS

Ninety credit hours are required to earn a Doctor of Philosophy in Informatics. The program consists of:

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informatics Core</td>
<td>INFO-I 501 and INFO-I 502</td>
<td>6 cr.</td>
</tr>
<tr>
<td>Seminars</td>
<td>INFO-I 609 and INFO-I 709</td>
<td>6 cr.</td>
</tr>
<tr>
<td>Research Rotation</td>
<td>INFO-I 790</td>
<td>6 cr.</td>
</tr>
<tr>
<td>Theory &amp; Methodology</td>
<td></td>
<td>12 cr.</td>
</tr>
<tr>
<td>Minor</td>
<td></td>
<td>6-15 cr.</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>12-30 cr.</td>
</tr>
<tr>
<td>Dissertation Research</td>
<td>INFO-I 890</td>
<td>21-30 cr.</td>
</tr>
<tr>
<td>M.S. Transfer Credits</td>
<td></td>
<td>Up to 30 cr.</td>
</tr>
</tbody>
</table>

NOTE: Appendix A contains each track’s specific requirements.

REQUIREMENTS FOR DOUBLE MAJORS

Students may pursue majors from two departments simultaneously. Each department and their respective deans must approve the double major. There are four general requirements that pertain to double majors. (1) There must be a substantive relationship between the two major fields, particularly with respect to the topic of the student’s dissertation. (2) The student must submit the Application to Change from a Single to a Double Major for the Ph.D. Degree form. (3) Both majors must fulfill all degree requirements. In some instances, it may be possible to count the same work toward requirements in both departments. (4) The student must pass two sets of qualifying examinations.

The student’s advisors from both majors determine the exact course of study and examinations. The entire advisory committee negotiates, with the approval of the respective deans, in any area of substantial overlap in the two programs of study and in the examinations.

Ninety credit hours are required for the Ph.D. degree with a double major. While judicious program planning may permit completion of some double majors within the 90 credit hours, other students may accrue additional hours due to the programs of study required for each major. Double majors have one additional year, for a total of eight years, before they are required to take the qualifying examination.

The Doctor of Philosophy in Informatics for a double major follows the policies described in this Handbook and the University Graduate School Bulletin 2016-2017 (pages 1-18 and in particular page 10 for specific double major requirements). Consult with the Informatics Graduate Studies Office for further details.
RESIDENCY REQUIREMENT
Indiana University Bloomington does not offer any online or distance doctoral programs. All doctoral students must comply with the UGS residency requirement below:

All candidates for graduate degrees (with the exceptions outlined below) must complete at least 30 credit hours of graduate work while enrolled on campuses of Indiana University. Of these hours, at least one semester or two summer sessions of full-time work must be taken in University Graduate School degree-granting units on the Bloomington, Fort Wayne, Indianapolis, South Bend, or Southeast campuses. Candidates for the Ph.D. degree must spend two consecutive semesters during one academic year on the Bloomington or Indianapolis campus.

Students who plan to earn a degree through a degree-granting unit on one Indiana University campus and who plan to take a substantial number of hours on one or more of the other Indiana University campuses in partial fulfillment of degree requirements should have their programs of study approved in advance by the degree-granting unit. The residency requirement must be met on the campus where the degree-granting unit is located.


FULL-TIME STATUS
In order to receive funding from the School, the student must be in full-time status. It is imperative that international students maintain full-time status to remain in visa compliance. For questions about visa compliance, contact the Office of International Services (ois@indiana.edu).

A student must be enrolled in a minimum of eight credits each semester to be considered full-time. Audited courses are not counted in the definition of “full-time study.” However, there are a few exceptions as follows:

- Ph.D. students who hold a Student Academic Appointment (SAA) as an associate instructor or research assistant will be required to enroll for at least 6 hours of credit during each semester they continue to hold an appointment. **Note: By enrolling in less than the required eight credits per semester, it will take longer to complete the program. Additionally, failure to be enrolled in a minimum of 8 credits per semester without the approval of the student’s advisor, track director, and the Informatics Director of Graduate Studies, may result in loss of funding.**

- Ph.D. students whose completed courses and deferred dissertation credits total 90 hours, providing they are working on their dissertation for the completion of the degree, must enroll in at least one hour of dissertation credit each semester.
• Ph.D. students who have already accumulated 90 or more hours of graduate credit and who hold a Student Academic Appointment (SAA) as an associate instructor or research assistant will be required to enroll for at least 6 hours of credit during each semester they continue to hold an appointment.

**PART-TIME STATUS**

The student’s advisor, the track director, and the Informatics Director of Graduate Studies must give approval for a student to be enrolled as a part-time student (less than 8 credits).

**LEAVE OF ABSENCE**

A leave of absence allows Informatics graduate students to deal with unforeseen events that interfere with their academic progress. During a leave, the student is not expected to make progress toward the degree. Although the student may complete coursework from previous terms during a leave, the student may not attend class or use the leave to catch up on current coursework, prepare for exams, or write their dissertation.

To be eligible for a leave, the student must be enrolled full time in an Informatics graduate program and have completed at least one semester (a minimum of nine credits) in the program. The student must be in good academic standing—if they are on academic probation, they are not eligible for a leave.

All leave requests are reviewed and granted on a case-by-case basis and must be approved by the student’s advisor, the track director, and the Informatics Director of Graduate Studies. Contact the Informatics Graduate Studies Office for more information ([inforecd@indiana.edu](mailto:inforecd@indiana.edu)).

**FUNDING**

Any funding awarded to students is detailed in their admission letter. Associate Instructor and Research Assistant awards require students to work at least 20 hours each week on assigned duties or projects. Failure to fulfill the appointment responsibilities may result in termination of funding.

Each academic year that students are funded, they will receive an appointment as an Associate Instructor (AI) or a Research Assistant (RA). These appointments include a 10-month stipend, tuition (up to 12 cr. for fall and spring semesters each and up to 6 cr. for summer semester), health insurance, and a travel award. By having an opportunity to be both an AI and an RA over the course of the student’s time in the program, students can develop skills as an instructor and as a researcher.

The student is expected to spend at least 20 hours each week on assigned duties.
or projects. Students will be required to fulfill their appointment responsibilities of grading finals and other administrative duties through the end of finals week for both the fall and spring semesters. Therefore, the student should plan to leave on or after Saturday, December 16, 2017, and return to campus for the spring semester on or before Sunday, January 7, 2018. Students should plan to leave for the summer break on or after Saturday, May 6, 2018. Contact the Informatics Graduate Studies Office with any questions (infograd@indiana.edu).

**TRAVEL AWARD**
To enhance their academic and professional goals, students will have opportunities to travel in the United States as well as abroad. To help defray expenses, the student will receive a Travel Allowance Award of up to $1,000 during the first two years of study and another $1,000 during the third or fourth years of study.

**PH.D. IN INFORMATICS – TRACK OVERVIEWS**

**APPLIED DATA SCIENCE**
A future track pending final approval of the School of Informatics and Computing’s faculty, Indiana University Bloomington Campus Curriculum Committee and the Indiana University Board of Trustees.

**BIOINFORMATICS**
An interdisciplinary program that focuses on sequence pattern recognition, comparative genomics, structural genomics, fragment assembly in DNA sequencing, systems biology, models of evolution, molecular modeling and drug design.

**COMPLEX NETWORKS AND SYSTEMS**
An interdisciplinary program that focuses on the analysis and modeling of complex techno-social, information, and biological networks. Modeling and simulations of complex systems, epidemics of disease and ideas, self-organization, multi-agent systems, computational biology, nonlinear dynamics for chemical and biological systems, adaptive systems, computational intelligence, and artificial life. Bio-inspired systems such as evolutionary computation, neural networks, social computation, and distributed intelligent systems.

**COMPUTING, CULTURE AND SOCIETY**
An interdisciplinary program that focuses on the relationship between technological innovation and larger social, political, legal, and economic issues. Also, it focuses on gender and technology; gender and Informatics; cultural variation and Informatics; free/libre and open source software; social dimensions of information and communications technology; methodologies for developing an Informatics knowledge base; the ethics of information and Informatics; privacy; file sharing; blogging; and other mechanisms of collaborative ad-hoc filtering.
HUMAN-COMPUTER INTERACTION / DESIGN
HCl/d is an interdisciplinary research program that blends theory, design practice, and empirical social science. It investigates opportunities for intervention within emerging IT domains while contributing back to the development of design theory, methods, and practice. Its internationally recognized faculty are noted for their research on design theory and methods, social computing, sustainability, feminism and gender IT, political economy, experience design, research through design, creativity/innovation, visual thinking, and design pedagogy.

INTELLIGENT AND INTERACTIVE SYSTEMS
An interdisciplinary program that focuses on autonomous robots, motion planning and control, human-robot interaction, culturally-situated robot design, social robotics, computer vision, dynamical systems, human-robot interaction, object and activity recognition, video and image understanding, wearable and ubiquitous computing, large-scale 3D mapping, and evolutionary robotics.

MUSIC INFORMATICS
Digital music libraries, music recognition (audio, optical, time-sequence), modeling musical expression, musical accompaniment systems, computational music analysis, and music information retrieval.

HEALTH INFORMATICS
An interdisciplinary program that focuses on electronic health records, health data exchange, standards and terminology for health data, clinical decision support, consumer health Informatics, technology to enhance patient safety, health application development and implementation, ontologies, mining clinical data, and natural language processing.

SECURITY INFORMATICS
An interdisciplinary program that focuses on the economics of security, user-centered design of security, cryptographic primitive design, security modeling, foundational cryptography, threat assessment and analysis, protocol design, provable security, security heuristics, light-weight cryptography, network security, privacy, security auditing, security and computer forensics.

VIRTUAL HERITAGE
Pending final approval of the Indiana University Bloomington Campus Curriculum Committee and the Indiana University Board of Trustees.

An interdisciplinary program that focuses on information technology has transformed professional practices and methodologies across the various fields (anthropology, archaeology, art history, and architectural history) constituting Cultural Heritage (CH). Digitize three-dimensional objects; apply time-tested principles of art and architectural restoration to digitally restore the object to its original condition; develop and utilize digital tools for analysis of cultural heritage objects; understand and apply the best practices of the profession; and publish 3D state and restoration models in print, video, mobile and augmented reality devices, and on the Internet.
PH.D. MILESTONES, GUIDELINES AND ANNUAL REVIEW

ADMIT ADVISOR
Students admitted to the Ph.D. Program are assigned a program advisor who may be consulted for advice. The Associate Dean of Graduate Studies and the Director of Graduate Studies in Informatics also are available for general consultation. The student may change advisor upon the consent of the new advisor and by filing documentation with the Informatics Graduate Studies Office. The student must inform the existing advisor of the change.

ANNUAL REVIEW - GED
Each academic year, the faculty will evaluate each student’s academic progress in the Informatics program during the Graduate Evaluation Day (GED). This evaluation is intended to help the student be successful in our program. The student will be evaluated in three areas: Milestones to Complete, Noteworthy Accomplishments, and Evaluation Summary. In preparation for the GED, all students are required to submit an Annual Report for the previous academic year. The faculty will review each student’s Annual Report and submit a written evaluation of the student’s academic progress, AI/RA Performance, Research Progress, Service, General Comments, and Recommended Funding. After the GED, students will receive a GED letter letting them know the results of the GED and the faculty evaluations.

ADVISORY COMMITTEE
Within the first year, the student will need to form an advisory committee. The student’s advisory committee should consist of an advisory committee chair and two other faculty members. Once the student has formed an advisory committee, submit the completed Advisory Committee Form to the Graduate Studies Office. The advisory committee will guide the student’s doctoral program as well as oversee and conduct the qualifying exam in the student’s research track. The advisory committee must include: (1) at least two members from the student’s major track and at least one from another track; and (2) at least of two of the committee members must be members of the graduate faculty. The advisory committee members must be approved by the Informatics Director of Graduate Studies and the University Graduate School.

For Double Majors: Within the first year, the student will need to form a double major advisory committee. The double major advisory committee must include at least four faculty members -- two faculty members from each of the majors. The double major advisory committee members must be approved by the Informatics Director of Graduate Studies and the University Graduate School.

TRANSFER OF CREDIT
Doctoral students may transfer up to 30 credits towards their doctoral degree if they entered the program with a relevant master’s degree. In order for a course to transfer, a grade 3.0 or higher must have been earned. To request a credit transfer, fill out the Transfer Credit Request form and submit the completed form to the Informatics Graduate Studies Office.
Once the Transfer of Credit Request has been approved, the transfer credit will appear on the student’s transcript with T (Transfer) noted.

**MINOR**

All Informatics doctoral students are required to complete either a minor within the School or an approved minor outside the School. Internal and external minors should be appropriate to the student’s research as determined by the student’s advisory committee. Some appropriate external minors include biology, chemistry, physics, cognitive science, history and philosophy of science, information science, law, sociology, data science, learning sciences, and inquiry methodology (education). In all cases, the number of hours to be included in the minor is consistent with the requirements of the unit granting the minor.

Once students select a minor, they need to complete the top portion of the Ph.D. in Informatics Doctoral Minor listing the courses they will be taking to fulfill the minor requirements. The completed form needs to be submitted to the Informatics Graduate Studies Office.

After the minor requirements are completed, the student will need to complete the bottom portion of the Ph.D. in Informatics Doctoral Minor and submit the form to the Informatics Graduate Studies Office.

*For more information on available internal minors, see page 28.*

**NOTE** for Individualized Minors: The student’s advisor, the track director, the Informatics Director of Graduate Studies, and the University Graduate School, must approve the individualized minor prior to taking courses.

**NOTE** for Double Majors: If a student is doing a double major/dual degree, there is not a minor requirement.

**QUALIFYING EXAMINATION (QUALS)**

After the student’s coursework is completed, the student should take the quals. The quals are written and oral as prescribed by the student’s advisory committee. Quals can be taken only twice. After the quals, the student needs to fill out and submit the completed Qualifying Exam Form to the Graduate Studies Office. **Students must submit a completed quals form even if they received a conditional pass or did not pass the quals,** Students who do not successfully pass the examination can retake the exam a second time.

After passing the quals, the student must remain continuously enrolled until the degree is conferred beginning the next semester after passing the quals (excluding the summer sessions). Candidacy expires seven (7) years from the date that the student passed the quals. The quals must be passed at least eight (8) months before the date the degree is awarded. Soon after passing the quals, the student should submit the Nomination to Candidacy and the Nomination to Research. By having the University Graduate School approve both the Nomination to Candidacy and the Nomination to Research after passing the quals, it will give students more flexibility in selecting a defense date.
CONTINUOUS ENROLLMENT
Beginning with the first semester (with the exception of summer) after passing the quals, the student must remain continuously enrolled until the degree is awarded.

REVALIDATION OF COURSES
All graduate coursework that a student would like to count towards the degree requirement must be revalidated if the coursework was completed more than (a) five years prior to the awarding of the degree for master’s students, or (b) seven years prior to the passing of the qualifying examination for Ph.D. students.

To revalidate coursework, it must be demonstrated that the knowledge contained in the course(s) remains current by such things as:

1. Passing an examination specifically on the material covered by the course.
2. Passing a more advanced course in the same subject area.
3. Passing a comprehensive examination in which the student demonstrates substantial knowledge of the content of the course.
4. Teaching a comparable course.
5. Publishing scholarly research demonstrating substantial knowledge of the content and fundamental principles of the course.
6. If the qualifying examination is used for the purpose of revalidation, the number of courses to be revalidated by this method should be limited to two in order to avoid compromising the integrity of the qualifying examination process.

Students must use the Request for Revalidation of Coursework. Up to ten course revalidations may be requested on each e-doc. Each course should have its own justification for revalidation.

Students should avoid this tedious process by completing all coursework in a timely fashion. Students who enter the program with graduate coursework that they would like to transfer to the doctoral program and which may need to be revalidated, students should talk with the Informatics Graduate Studies Team as what needs done.

NOMINATION TO CANDIDACY (NTC)
The Nomination to Candidacy verifies the completion of the student’s coursework and the successful completion of the quals. Using one.iu.edu, the student will submit the Nomination to Candidacy. Prior to defending, the University Graduate School must approve the Nomination to Candidacy at least eight (8) months before the student can schedule their defense. Additionally, the Nomination to Candidacy expires seven (7) years from the date that the student passed the quals. Failure to graduate by that date results in dismissal from the program.

For Double Majors: After passing the quals, the student submits a Nomination to Candidacy for the Ph.D. Degree with a Double Major form.
**Nomination of Research (NOR)**

Once the student’s Nomination to Candidacy is approved, the student’s advisory committee will disband and the student will form a research committee and submit a Nomination of Research. The student will also need to submit an abstract of the proposed research. The research committee supervises the dissertation research, conducts the thesis proposal examination, and conducts the Ph.D. thesis defense final examination. The research committee will include: (1) a director who will serve as the chairperson; (2) two or more faculty members from the major department; and (3) one faculty member from each minor. All Research Committee members must be from Indiana University and members of the graduate faculty. The chair and at least half of the research committee must be endorsed to direct doctoral dissertations.

If the student has a committee member who is outside of Indiana University, the student will need to upload the outside committee member’s CV with the Nomination of Research. The outside committee member will need to send an email to informercd@indiana.edu stating that they (1) agree to be on the student’s Research Committee; and (2) understand that they are expected to attend, in person, the actual defense and will have to sign the same abstract and acceptance pages just like all the other members.

At least six (6) months prior to defending, the University Graduate School must approve the Nomination of Research. If the student makes a change to their Nomination of Research Committee, a Ph.D. Research Committee Change e-doc must be submitted and approved by the student’s advisor, the track director, the Informatics Director of Graduate Studies, and the University Graduate School. Changing a committee member does not extend the six-month requirement.

For Double Majors: Once the student’s Nomination to Candidacy is approved, the student’s advisory committee will disband and the student will form a research committee and submit a Nomination of Research Committee for the Double Major Ph.D. The research committee will consist of two chairs (co-chairs), one from each major. If a minor field is involved, a representative must also be present from each minor field.

**Dissertation Research Prospectus: Defense Proposal**

The goals of the Defense Proposal are for students to demonstrate they have a research direction likely to lead to a successful dissertation, and for the Research Committee and academic community to identify issues and provide guidance.

Students should remain in especially close contact with the research committee chair while preparing the dissertation, getting feedback on incremental progress and asking questions whenever they are unsure of what is expected.

When the student is ready to defend, the student will need to submit the Defense Proposal and hold a colloquium at least 30 days prior to the student’s defense. At the colloquium, the student will present their research plan to the research committee. The student’s research committee may require a one- or two-page prospectus of the dissertation research.
At the conclusion of the colloquium, the student’s research committee will give a passing grade, a conditional passing grade, or a failing grade. Each person on the research committee must sign the Defense Proposal form and the student must submit the completed form to the Informatics Graduate Studies Office regardless of the grade awarded.

Below are tips for a successful Defense Proposal:

1. Submit a written proposal, usually 10-20 pages, and provide it to the student’s research committee with sufficient time to review it before the below-mentioned colloquium (usually at least a few weeks).

2. The proposal should have (1) a clear problem statement, (2) a literature review surveying what others have done in the area, identifying the shortcomings and potential research opportunities in the research area, (3) a direction of research that addresses the issues raised and is of suitable scope for a dissertation, (4) a skeleton of what the dissertation will be, and (5) a proposed timeline/work plan through the intended completion date. The timeline can and will change, but the committee will look for an appropriate scope (neither too large nor too small) and a realistic plan.

3. If the committee accepts the written proposal, a public oral presentation (Dissertation Colloquium) will be scheduled.

4. The public colloquium will be scheduled for a one-hour time slot, which includes a 45-minute presentation with question and answer time.

5. Immediately following the public colloquium, the student and research committee will meet to discuss the approval or disapproval of the dissertation proposal.

6. If the Defense Proposal is approved, the student can work with their Research Committee to schedule a Dissertation Defense date and prepare to graduate.

**Dissertation Preparation**

The culmination of the Ph.D. program is the writing of the dissertation, which is required of all doctoral students. The dissertation must be an original contribution to knowledge and of high scholarly merit. The candidate’s research must reveal critical ability and powers of imagination and synthesis. Under the supervision of the student’s advisor, research chair and the research committee, the student will write the dissertation.

There must be a logical connection between all components of the dissertation and must be integrated in a rational and coherent fashion. A collection of unrelated published papers, alone, is not acceptable. It is the responsibility of the student’s research committee to determine the kind and amount of published materials to include in a dissertation.
Dissertation Defense Announcement
The student should complete the Ph.D. Defense Announcement Submission through one.iu.edu once a defense date has been determined. The student’s advisor, the research committee, the Informatics Director of Graduate Studies, and the University Graduate School must approve the announcement at least 30 days before the date of the defense. It is recommend that students submit the defense announcement at least 40-45 days before the defense date to allow time for approvals.

Along with the Dissertation Defense Announcement, students must include a summary. The summary should be informative and contain a brief statement of the principal results and conclusions. Unlike the abstract, the summary should communicate the findings in language and style that the University community at large can understand. The summary should be no less than 150 and no more than 300 words in length.

Ordinarily, the defense takes place at Indiana University. However, under extraordinary circumstances and prior to the defense, the student should request other arrangements. The student’s research committee, the Informatics Director of Graduate Studies, and the University Graduate School must approve these arrangements prior to the defense.

After submitting the Ph.D. Defense Announcement Submission e-doc, track the document to ensure timely approval. Retain the email confirmation containing the document ID.

NOTE: If the announced time and place of the defense must be changed, the student must seek the approval of their advisor, the track director, the Informatics Director of Graduate Studies, the School of Informatics and Computing’s Dean, and the University Graduate School.

Dissertation Defense
All members of a Ph.D. student’s research committee are required to participate in the student’s defense in-person and on-campus.

In the event a research committee member is not able to participate in-person and on-campus, the student must contact the Informatics Graduate Studies Office requesting a dean’s memo to permit the faculty member to participate remotely. The dean’s memo must explain how the committee member is unable to participate in person and how they plan to participate remotely.

Any member of the graduate faculty who wishes to attend the final examination is encouraged to do so. If a faculty member wishes to attend the defense, the faculty member should notify the chairperson of the research committee in advance to ensure there is enough room. With the approval of the research committee and the consent of the candidate, other graduate students may attend the defense of the dissertation; normally such students will act as observers, not as participants.

At the end of the oral defense, the research committee must vote on the outcome of
the examination. Four options are available to the committee.

1. Pass. If the decision to pass is unanimous, the student will submit the dissertation and the signed acceptance page to the University Graduate School. The University Graduate School will approve the dissertation submission and grant the student’s Doctor of Philosophy in Informatics.

2. Conditional pass. The research committee will inform the student what needs to be changed/done to the dissertation in order for the student to receive a pass. Ideally, the research committee will provide the student a specific length of time in which to complete the required changes. Once the student has completed the necessary changes, the process continues as it does for all other passed defenses with the committee signing the acceptance page (and abstract if they have not already) and the student proceeding to complete the degree completion process.

3. Deferred decision.

4. Failure.

If the decision is not unanimous, majority and minority send a written report to the School of Informatics and Computing’s Dean. Within 10 working days, the School of Informatics and Computing’s Dean will investigate and consult with the research committee. Upon completion of the Dean’s investigation, another meeting of the research committee will be held. If a majority votes to pass, the dissertation is approved once received by the University Graduate School with an acceptance page signed by a majority of the members of the research committee.

If the student passes the Defense, their will submit the Final Defense Approval/Doctoral Acceptance Page and signed Abstract to the Informatics Graduate Studies Office.

**Acceptance Page**

After the Defense, the committee must sign the Acceptance Page. This page confirms the committee’s approval and acceptance of the student’s dissertation. The student must submit the original Acceptance Page to the Informatics Graduate Studies Office for processing. For more information about submission methods, go to [http://graduate.indiana.edu/theses-dissertations/submission/index.shtml](http://graduate.indiana.edu/theses-dissertations/submission/index.shtml)

**Dissertation Submission**

The student must submit the Dissertation to the University Graduate School within six (6) months from the date of the defense.

For more information about submission methods, go to [http://graduate.indiana.edu/theses-dissertations/submission/index.shtml](http://graduate.indiana.edu/theses-dissertations/submission/index.shtml). For complete guideline information, see the University Graduate School’s website ([www.graduate.indiana.edu](http://www.graduate.indiana.edu)) section related to Theses & Dissertations.
Each dissertation must include a title page bearing the statement: “Submitted to the faculty of the University Graduate School in partial fulfillment of the requirements for the degree Doctor of Philosophy in the School of Informatics and Computing, Indiana University.” The date of this page should be the month and year when all requirements have been satisfied (which may not necessarily be the month in which the student defended.)

Following the title page is the acceptance page with the statement: “Accepted by the faculty of the University Graduate School, Indiana University, in partial fulfillment of the requirements for the degree Doctor of Philosophy.” The entire research committee must sign the acceptance page. See the online guide for the complete order for the front matter.

The candidate must also submit an abstract of no more than 350 words for the dissertation that the research committee approved and signed. The abstract will appear in ProQuest Dissertations & Thesis Database, managed by ProQuest Dissertation Publishing, Ann Arbor, Michigan.

Any creative work, such as a dissertation, is automatically copyrighted; however, registration with the U.S. Copyright Office provides (various/certain) legal benefits. The cost for registering a work through ProQuest is currently $55. Contact the University Graduate School for details.

Students can submit an electronic version or a traditional unbound paper submission. The School of Informatics and Computing accepts and prefers electronic dissertation submissions.

**Electronic Dissertation Submission**

Electronic dissertation is the preferred submission method for the informatics Department. Upon final approval, the student should submit the dissertation electronically in the form of a .pdf file to ProQuest. A microfilm version will be available for purchase from ProQuest Dissertation Publishing, if requested. There is no longer a fee for those dissertations submitted electronically and opting for Traditional Publishing. Open Access publishing has a fee of $160.00.

**Traditional Unbound Paper Submission**

If students wish to submit via traditional unbound paper method, they must schedule a dissertation review appointment with the Ph.D. recorder in the University Graduate School, once their research committee has approved the final version of the dissertation. In this appointment, the recorder will review an unbound copy of the dissertation for necessary formatting revisions. The student will need to make the requested revisions and submit to the University Graduate School one unbound copy of the dissertation for necessary formatting revisions. The student will need to make the requested revisions and submit to the University Graduate School one unbound copy of the dissertation, in a box suitable for mailing, and one bound copy. The University Graduate School sends the bound copy to the University Library. The student will submit the unbound copy to ProQuest, which will publish the abstract and the dissertation microfilmed for storage in their database. The required fee for
publishing the abstract and microfilming the dissertation is currently $65 for traditional publishing or $160 for Open Access Publishing.

**DEGREE CONFERRAL**
A student’s submission to the University Graduate School the copies of the completed dissertation and abstract as described under Submission of the Dissertation constitutes an application for conferral of the Ph.D. degree.

Notes: (1) a 30-day announcement deadline prior to the defense of the dissertation. Additionally, the 30-day deadline prior to degree conferral are non-overlapping times. Students should keep in mind that the research committees frequently requires revisions and corrections after the defense of the dissertation and these revisions must be made before the dissertation is ready for submission to the University Graduate School.

**GRADUATION**
All graduate students are encouraged to participate in Commencement. Indiana University hosts two university wide commencement events – Winter and Spring. The majority of the students attend the Spring Commencement. Students who finish their degree during the fall can attend the Winter or Spring Commencement. The solemn yet colorful academic pageantry can provide a fitting culmination to a period of intense study and work.

**Indiana University Commencement Event** on Friday, May 4, 2018 at 3:00pm in Simon Skjodt Assembly Hall, 1001 E. 17th Street in Bloomington. In early spring 2018, information will be distributed with instructions on how to register for the Indiana University Commencement Event. Visit [https://commencement.indiana.edu/index.html](https://commencement.indiana.edu/index.html) for detailed information. Be sure to watch for these emails as many of the deadlines are time sensitive.

In addition to Indiana University’s Commencement Event, the School of Informatics and Computing hosts a Celebration Event.

**School of Informatics and Computing Celebration Event** on Thursday, May 3, 2018 at 10:00am-1:00pm or 3:00pm-6:00pm in the Indiana Memorial Union, Alumni Hall. Students must register to attend during one time slot. In early spring 2018, information will be distributed with instructions on how to register for the School of Informatics and Computing Commencement Event. Be sure to watch for these emails as many of the deadlines are time sensitive.
**Milestone Deadlines and Triggers**

- **Advisory Committee:** Submit within the **first year** of enrollment in the program.

- **Nomination to Candidacy:** Must be approved by University of Graduate School at least eight (8) months prior to defending.

- **Passing Quals:** Nomination to Candidacy expires **seven (7) years** from the date that the student passed the quals (eight (8) years if a double major).

- **Continuous Enrollment:** Students must be continuously enrolled the first semester (excluding the summer) after passing the quals.

- **Nomination of Research to Defense:** Must be approved by University of Graduate School at least **six (6) months** prior to defending.

- **Defense Proposal:** Must be approved by the student’s research committee at least thirty (30) days prior to defending.

- **Defense Announcement:** Must be approved by University of Graduate School at least thirty (30) days prior to defending.

- **Dissertation Submission:** Must be submitted to University of Graduate School **within six (6) months** of the student’s defense.

- **INFO-I 890:** Must take a minimum of 21 credits up to a maximum of 30 credits.

- **INFO-G 901:** Once such students have accumulated 90 credit hours in completed course work and deferred dissertation credits, they must enroll for a minimum of 1 hour of graduate credit each semester until the degree is completed. Failure to meet this requirement will automatically terminate the student’s enrollment in the degree program.

  Students who have completed 90 credit hours and all requirements for the Ph.D. are eligible to enroll in INFO-G 901 for a flat fee of $150 per semester. Enrollment in INFO-G 901 is limited to a total of six semesters. These hours do not count toward the required 90 credit hours of course work. (For students not on campus, enrollment may be completed by mail.)

**Note for Summer Graduates:** A candidate who will be graduated in June, July, or August of any year must enroll in a minimum of 1 hour of credit during the summer semester as described above. To enroll in INFO-G 901 during the summer months requires the approval the Informatics Director of Graduate Studies and the Dean of the University Graduate School.

**Funding Deadlines:** varies by student; see the acceptance letter.
The Student’s Guide to the
Ph.D. in Informatics

Note: This guide does not substitute for the official documents, the Doctor of Philosophy in Informatics Handbook and the University Graduate School Bulletin. Always consult these documents for further details and official explanations. The benchmarks and explanations may vary if you double major. Consult with the Graduate Studies Office for further details.

Advisory Committee
During your first year after admission
☑ Submit completed form, Assignment of Advisory Committee, to the Graduate Studies Office (GSO).
Committee must include: (1) at least two members from the student's major area (track) and at least one from another area (track); and (2) at least of two of the committee members must be members of the graduate faculty.

Transfer of Credit
During your first year after admission
☑ Submit completed form, Transfer Credit Request, to the GSO.
Up to 30 MS credits may be transferred. For a course to transfer, a grade 3.0 or higher must have been earned.

Graduation Evaluation Day (GED)
Each year of your program
(annual date to be decided)
☑ Submit appropriate forms to the GSO.
Each year, the Informatics program faculty review and evaluate your academic progress. Following your GED, you will receive a GED letter letting you know the results of the GED and the faculty evaluations.

Minor
During course work
☑ Submit completed form, Doctoral Minor, to the GSO.
All Informatics doctoral students are required to complete either a minor within the School or an approved minor outside the School. Internal and external minors should be appropriate to the student's research as determined by the student's advisory committee.
*Note: Individualized minors must be approved prior to taking courses.

Qualifying Exam
After you complete all course work and within the first three years after admission
☑ Submit completed form, Qualifying Examination Approval, to the GSO.
The qualifying examinations – written and oral – are prescribed by track faculty. Candidacy expires seven (7) years from the date that the student passed the Quals. The Quals must be passed at least eight (8) months before the date the degree is awarded.

Continuing Enrollment
Beginning first semester after passing your quals
☑ Ensure that you are properly enrolled each semester.
After passing the Quals, the student must remain continuously enrolled until the degree is conferred beginning the next semester after passing the Quals (excluding the summer sessions). If you have completed 90 credit hours and all requirements for the Ph.D., you are eligible to enroll in G901 for a flat fee of $150 per semester.

Nomination to Candidacy
After completion of all coursework and successfully passing the qualifying exam, and at least eight (8) months prior to defending
☑ Go to One.IU to complete and submit your Nomination to Candidacy.
You must complete all coursework and pass the qualifying exam prior to submitting your Nomination to Candidacy. You should have no “I” or “R” grades except for I-890. If any courses older than seven years from the passing date of the qualifying exam were used for your course prescription, a memo requesting revalidation of such courses must accompany the Nomination to Candidacy form when it is sent to the University Graduate School (UGS) for approval. Your candidacy expires seven (7) years after the passing date of the oral qualifying exam. Your advisory committee disbands when you are nominated to candidacy.
Nomination of Research
After admission to candidacy status and must be approved at least six (6) months prior to defending
- Go to One.IU to complete and submit the Nomination of Research Committee for the Ph.D.

Dissertation Proposal
After Nomination to Candidacy is approved and at least thirty (30) days prior to your defense
- Set a date and time with faculty and reserve your room. Submit completed form, Ph.D. in Informatics Dissertation Research Prospectus, to the GSO.

Research Compliance
Before dissertation research begins
- See: http://researchadmin.iu.edu/cs.html Approval is given to you by the appropriate committee; provide a copy to the GSO.

Prepare Final Defense of the Dissertation
At least 30 days prior to the scheduled defense of the dissertation
- Set a date and time with faculty and reserve your room. Prepare Defense Announcement (a summary with a maximum of 300 words). Go to One.IU to complete and submit your Defense Announcement.

Defense of the Dissertation
At least 30 days after the announcement is submitted to the UGS
- Present in public meeting and answer questions from your Research Committee. Submit completed form, Final Defense Approval/Doctoral Acceptance, to the GSO.

Submission of the Dissertation
Within six (6) months from the date of the defense
- Fulfill any requirements of your Research Committee and submit your final dissertation using the Doctoral Dissertation Agreement Form. Notify the GSO upon final deposit of your dissertation.

Graduation!
Your graduation date is the last day of the month in which you deposit your final dissertation to UGS. In order to graduate in a particular month, your dissertation must be submitted by no later than the 10th day of that month.
- Go to One.IU to complete and submit your Application for Graduation, to the UGS.
## A guide to completing your degree in Ph.D. in Informatics

### Sample timeline for students entering with a B.S. and a M.S.

<table>
<thead>
<tr>
<th>YEAR ONE</th>
<th>YEAR TWO</th>
<th>YEAR THREE</th>
<th>YEAR FOUR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advisory Committee Form</td>
<td>Minor</td>
<td>Nomination to Candidacy</td>
<td>Prepare Defense of the Dissertation</td>
</tr>
<tr>
<td>Transfer of Credit Form</td>
<td>Complete Coursework</td>
<td>Research Committee</td>
<td>Defense of the Dissertation</td>
</tr>
<tr>
<td></td>
<td>Qualifying Exam</td>
<td></td>
<td>Submission of the Dissertation</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Graduation</td>
</tr>
</tbody>
</table>

### Sample timeline for students entering with a B.S.

<table>
<thead>
<tr>
<th>YEAR ONE</th>
<th>YEAR TWO</th>
<th>YEAR THREE</th>
<th>YEAR FOUR</th>
<th>YEAR FIVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Advisory Committee Form</td>
<td>Working on Coursework</td>
<td>Minor</td>
<td>Nomination to Candidacy</td>
<td>Prepare Defense of the Dissertation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Complete Coursework</td>
<td>Research Committee</td>
<td>Defense of the Dissertation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Qualifying Exam</td>
<td></td>
<td>Submission of the Dissertation</td>
</tr>
<tr>
<td></td>
<td></td>
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<td></td>
<td>Graduation</td>
</tr>
</tbody>
</table>

*Note: This guide does not substitute for the official documents, the Doctor of Philosophy in Informatics Handbook and the University Graduate School Bulletin. Always consult these documents for further details and official explanations. The benchmarks and explanations may vary if you double major. Consult with the Graduate Studies Office for further details.*
REGISTRATION
To help with the registration process, students are given an Informatics Course Planning Checklist and a Course Registration Form. Students meet with their advisor prior to registering to plan courses for the upcoming semester. To actually register, students register for classes using one.iu.edu (a web-based registration service).

Some courses require course permission from the instructor and/or the department prior to enrollment. This information is found in the Schedule of Classes. The link to the Schedule of Classes is located at http://registrar.indiana.edu/calendars/schedule-of-classes.shtml. If the course is listed as requiring permission from the instructor or the department, students must contact via email the instructor and/or the department listed for the course to obtain permission. The email reply must be forwarded to inforecd@indiana.edu.

Once the students have all the approvals required to register for classes, students should complete the Course Registration Form and have their advisor sign it. Once the form is completed, the student sends it to inforecd@indiana.edu. After the Informatics Graduate Studies Office processes the form, students will be notified by email that they can register for classes.

WAITLIST
If a course is shown as full, students should place themselves on the waitlist, which serves as a placeholder in the registration line. When students who enrolled in the course drop, or when the enrollment cap is expanded, students on the waitlist will be admitted into the course in the waitlist order.

COURSE WITHDRAWAL
During the automatic withdrawal period, students who withdraw will be assigned an automatic grade of W (see the Registrar’s Official Calendar for exact dates). After that period, withdrawals are only possible with approval from the Dean, which is normally given only for urgent reasons such as illness. The amount of tuition refund (if any) for a dropped course depends on when the course is dropped.

DROP AND ADD COURSES
Starting two business days after the student registers and continuing through the first week of classes, a system access fee of $8.50 is charged every calendar day the student makes one or more successful adjustments to their schedule.

FALL TERM 2017 REGISTRATION FEES
For delaying and/or changing initial enrollment, various fees are charged. Students are responsible for paying all registration fees.

DEADLINE TO REGISTER – AUGUST 17, 2017
Starting August 18, 2017, a late registration fee is assessed to students who fail to register during their scheduled registration period. The fee begins at $60 for students who register on or after August 18, 2017. The late registration fee increases by $10 on Monday of each successive week thereafter. The maximum late registration fee is $210.
DROP AND ADD COURSES BY AUGUST 27, 2017
Before August 28, 2017, students should use the Drop or Add Classes application in the Student Center of one.iu.edu.

After August 27, 2017 but before the Automatic W period, the student should use the search feature at for the Late Drop/Add application on the one.iu.edu landing page. The student should proceed after choosing the “Late/Drop Add Classes after the first week of classes” application that appears.

LATE SCHEDULE CHANGE FEE – AFTER AUGUST 27, 2017
After August 27, 2017, a fee of $23 is assessed for every course dropped.

REFUNDS
For courses dropped in the first week, the full tuition of the course is refunded. In the second, third, and fourth weeks, refunds are 75%, 50%, and 25%. Later drops receive no refunds.

SPRING TERM 2018* REGISTRATION FEES
*All Spring 2018 dates are tentative as of this 08/2017 publication.

For delaying and/or changing initial enrollment, various fees are charged. Students are responsible for paying all registration fees.

DEADLINE TO REGISTER – JANUARY 4, 2018
Starting January 5, 2018, a fee is assessed to students who fail to register during their scheduled registration period. The fee begins at $60 for students who register on the last Friday before semester classes begin. The late registration fee increases by $10 on Monday of each successive week thereafter. The maximum late registration fee is $210.

DROP AND ADD COURSES BEFORE JANUARY 14, 2018
Before January 15, 2018, students should use the Drop or Add Classes application in the Student Center of one.iu.edu.

After January 14, 2018, but before the Automatic W period, the student should use the search feature at for the Late Drop/Add application on the one.iu.edu landing page. The student should proceed after choosing the “Late/Drop Add Classes after the first week of classes” application that appears.

LATE SCHEDULE CHANGE FEE – AFTER JANUARY 14, 2018
After January 14, 2018, a fee of $23 is assessed for every course dropped.

REFUNDS
For course dropped in the first week, the full tuition of the course is refunded. In the second, third, and fourth weeks, refunds are 75%, 50%, and 25%. Later drops receive no refunds.
HOW TO REGISTER FOR COURSES AND ENROLLMENT SHOPPING CART
To register for classes, a student will need their IU network ID username, passphrase, and DUO to log into one.iu.edu.

How to Register for Classes and Enrollment Shopping Cart
(https://kb.iu.edu/d/anig)
- **Determining whether students have holds on their record**
  (https://kb.iu.edu/d/anig#holds)
- **Viewing class permissions** (https://kb.iu.edu/d/anig#perm)
- **Using the Enrollment Shopping Cart** (https://kb.iu.edu/d/anig#cart)
  - Adding classes (https://kb.iu.edu/d/anig#adding)
  - Registering from the shopping cart
    (https://kb.iu.edu/d/anig#regcart)
- **Using Class Registration** (https://kb.iu.edu/d/anig#regdrop)
  - Registering for classes (https://kb.iu.edu/d/anig#regclass)
  - Dropping a class (https://kb.iu.edu/d/anig#dropclass)
  - Editing classes with variable credit
    (https://kb.iu.edu/d/anig#variable)
  - Swapping classes (https://kb.iu.edu/d/anig#swapping)
- **Viewing class schedule details** (https://kb.iu.edu/d/anig#det)

Additional steps on how to register are available through the UITS Knowledge Base:
http://www.kb.iu.edu/data/anig.html

**BURSAR BILL**
A student’s tuition, fees, and all other charges (i.e. IU Health Center, IU Library, etc.) are billed to the student on their Bursar bill. To pay the Bursar bill, students can mail a personal check, cashier’s check, or money order made payable to Indiana University. Payments are due the 10th of the month. For a list of the Bursar Bill Due Dates go to https://studentcentral.indiana.edu/pay-for-college/pay-bill/due-dates.html.
CURRICULUM OVERVIEW AND COURSE REQUIREMENTS

<table>
<thead>
<tr>
<th>Requirements</th>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Informatics Core</td>
<td>INFO-I 501 and INFO-I 502</td>
<td>6 cr.</td>
</tr>
<tr>
<td>Seminars</td>
<td>INFO-I 609 and INFO-I 709</td>
<td>6 cr.</td>
</tr>
<tr>
<td>Research Rotation</td>
<td>INFO-I 790</td>
<td>6 cr.</td>
</tr>
<tr>
<td>Theory &amp; Methodology</td>
<td></td>
<td>12 cr.</td>
</tr>
<tr>
<td>Minor</td>
<td></td>
<td>6-15 cr.</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>12-30 cr.</td>
</tr>
<tr>
<td>Dissertation Research</td>
<td>INFO-I 890</td>
<td>21-30 cr.</td>
</tr>
<tr>
<td>M.S. Transfer Credits</td>
<td></td>
<td>Up to 30 cr.</td>
</tr>
</tbody>
</table>

IMPORTANT NOTE: Appendix A contains each track’s specific requirements.

GRADUATE CREDIT

Only courses listed in the University Graduate School bulletin or specifically allowed by it may be counted towards the requirements for a degree offered by the University Graduate School. These courses are ordinarily numbered by the 500 level or above. In certain cases, courses at the 300 and 400 level have been specifically approved for graduate credit; all such courses are listed in the University Graduate School bulletin. Normally, these courses require a higher level of performance and significantly more work (such as an increased number of readings, additional papers, extra class sessions, oral class presentations) for the graduate students than for the undergraduates.

Informatics will not cover the cost of electives that do not pertain to earning a Ph.D. in Informatics, more specifically, recreational courses, music lessons, dance lessons, golf lessons, etc. If the student wants to register for this type of an elective, the student must see the Informatics Graduate Studies Office to make alternate payment arrangements for the course.

NOTE: Before enrolling in an undergraduate course, please consult the Informatics Graduate Studies office.

SUBSTITUTIONS AND EXCEPTIONS

All course substitutions and exceptions must be approved by the student’s advisor, the track director, the Informatics Director of Graduate Studies and the University Graduate School prior to taking the course which is a substitution or an exception for any of the program requirements. Students are required to submit a Request for Substitution or Waiver of Program Requirements.

GRADES

An overall B (3.0) average for all Ph.D. courses in Informatics is required. A student whose cumulative grade point average falls below 3.0 for two consecutive semesters
is subject to dismissal from the program.

**ACADEMIC EXPECTATIONS**
All students must (1) maintain a GPA of 3.0 or above; (2) complete Ph.D. milestones in a timely manner; (3) maintain academic integrity; (4) maintain a good academic standing; and (5) conduct themselves consistent with the Indiana University’s Code of Student Rights, Responsibilities, & Conduct, http://www.indiana.edu/~code/. Failure to maintain any of the above requirements will result in the student being placed on academic probation or dismissal from the program. Funding may be in jeopardy as well.

**ACADEMIC PROBATION**
A student will be placed on academic probation if the student’s GPA falls below a 3.0 and/or if a student fails to make satisfactory progress in the program (i.e., not completing Ph.D. milestones in a timely manner). To return to satisfactory progress status, students must bring their GPA cumulative grade point average to 3.0 or higher by the end of the next semester. Failure to do so may result in academic dismissal from the program.

**ENTERING WITH A MASTER’S OR BACHELOR’S DEGREE**

<table>
<thead>
<tr>
<th>Entering with both a BS and Relevant MS Degree</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Years 1 &amp; 2</strong></td>
<td></td>
</tr>
<tr>
<td>Required Coursework</td>
<td>30 cr.</td>
</tr>
<tr>
<td>Students may be able to transfer up to 30 cr. of graduate coursework from their MS degree to the Ph.D. degree. Transfer credits equate to electives.</td>
<td>30 cr.</td>
</tr>
<tr>
<td>Complete 60 cr. of Coursework (including the transfer credits) and take the Quals</td>
<td></td>
</tr>
<tr>
<td><strong>Years 3 &amp; 4</strong></td>
<td></td>
</tr>
<tr>
<td>Candidacy and Research Phase</td>
<td>30 cr.</td>
</tr>
<tr>
<td>Total Credit Needed for Graduation</td>
<td>90 cr.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Entering with a Only a BS Degree</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Years 1-3</strong></td>
<td></td>
</tr>
<tr>
<td>Required Coursework</td>
<td>30 cr.</td>
</tr>
<tr>
<td>Coursework Electives</td>
<td>30 cr.</td>
</tr>
<tr>
<td>Complete Coursework and Take the Quals</td>
<td></td>
</tr>
<tr>
<td><strong>Years 4 &amp; 5</strong></td>
<td></td>
</tr>
</tbody>
</table>
YEARS 1-3: COURSEWORK FOCUS
During the first three years, students work towards completing the required coursework of approximately 60 credits and then taking the quals.

INFORMATICS CORE (6 cr.)
During the first year, students take the Informatics Core. The student’s advisor, the track director and the Informatics Director of Graduate Studies must approve substitutions and exceptions prior to taking the course.

INFO-I 501 Intro to Informatics (3 cr.) (Pending approval of this new course description)
The course deals with the foundations of Informatics as an interdisciplinary field. Key information theories as well as computational thinking and methods will be presented. Applications of Informatics and the field’s relationship with science and society will be discussed.

INFO-I 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.

SEMINARS/COURSES IN TRACK OF STUDY (6 cr.)
Students are required to take a set of two courses within their chosen research track. Course requirements may vary depending on the track. The standard seminar courses are:

INFO-I 609 Advanced Seminar I in Informatics (3 cr.)
Contemporary Informatics approaches and related theories. This Ph.D. seminar will be held as a reading and discussion course, divided into sections. Largely, these courses will be self- and/or group-study oriented with support from faculty.

INFO-I 709 Advanced Seminar II in Informatics (3 cr.)
Topic: Contemporary Informatics approaches and related theories. This Ph.D. seminar is a reading and discussion course, divided into sections. This means that the courses will largely be self- and/or group-study oriented with support from faculty. More advanced readings and discussion than INFO-I 609.
RESEARCH ROTATION (6 CR.)
During the first two to three semesters, each student will enroll in two (3 cr.) research rotations for a maximum of 6 credits. The goal is twofold. First, the goal is to engage in research with the faculty (typically at a beginning level) and to decide if this person is a potential advisor for the student’s dissertation work. The second is to ensure the student has a view of the research track from at least two faculty perspectives. **Note:** The student may not study with the same professor across two research rotations; however, the student may elect to take an independent study (i.e., INFO-I 698) with that professor, as a third research rotation will not count for course credit.

Each student will engage in two semesters of research rotation with different Informatics faculty in their first two years. For a research rotation, a student will spend 10-12 hours a week. Before a research rotation commences, the student and faculty supervisor should mutually decide a topic, research activity, and expected deliverables. The expectation is to have the deliverables completed in one semester.

The supervisor and student will describe the rotation details in the Research Rotation Agreement form signed by the supervisor and student. Send the signed completed agreement to infoi@indiana.edu as an attachment for processing.

As is expected through the normal course of research, the student may encounter difficulties that may make the originally specified activities undoable in one semester (e.g., IRB approval delays, loss of access to data). In such a case, the supervisor and student should develop an alternative plan to guarantee completion of the rotation within the semester. Incomplete grades are discouraged but may be given in cases where students have not fulfilled their agreed upon goals (e.g., deliverables, hours worked) for the rotation over the course of the semester. The grade for a research rotation should not be dependent on factors such as acceptance to an externally peer reviewed conference or journal. Students may choose to continue working with faculty after the rotation to further develop the project or publish the research.

INFO-I 790  Informatics Research Rotation (3 cr.)
Working with faculty to investigate research opportunities. May be repeated for a maximum of 6 credit hours.

THEORY AND METHODOLOGY (12 CR.)
The student must take 12 cr. of theory and methodology. Students will work with their advisor in selecting appropriate courses to fulfill this requirement. Courses may be selected from the entire list of graduate courses offered by the University; however, these should contain theoretical or methodological components. Students may select qualitative methods, quantitative data analysis or advanced statistics, algorithms, computing theory, research development, ethnographic methods, psychology, economics, design, or evaluation courses. The student’s advisor and, if extant, the student’s Track Director can approve substituting classroom courses for research lab experiences.
MINORS (CREDITS VARY BY MINOR – MIN. OF 9 CR.)
All students are required to have an appropriate minor (external or internal) approved by the University Graduate School, the Informatics Director of Graduate Studies, and the student’s advisor. External and internal minors should be appropriate to the student’s research as determined by the student’s advisory committee. Some appropriate minors would include biology, chemistry, physics, cognitive science, computer science, history and philosophy of science, anthropology, statistics, inquiry methodology (in the School of Education), information science, law, sociology, or learning sciences. In all cases, the number of hours to be included in the minor is consistent with the requirements of the unit granting the minor. The average grade point for the minor must be at least a B (3.0) or above and no course grade below a B-(2.7) is counted toward the minor.

The School offers the minors listed below. Please refer to the bulletin regarding the requirements.

Ph.D. Minor in Informatics (9 cr.) (External Minor for non-Informatics students only)
A minor in Informatics requires nine credit hours. The required nine credit hours refer to any three graduate courses suitable for the student’s research, decided by the student’s advisor (in the student’s department) and the Informatics Director of Graduate Studies. Typically, these three graduate courses will include I-501 and two other approved Informatics courses available in the Informatics Ph.D. program. For information about the Informatics minor, contact the Informatics Graduate Studies Office (inforecd@indiana.edu).

Ph.D. Minor in Bioinformatics (12 cr.) (External and Internal Minor)
The core curriculum consists of graduate level courses in informatics. Students may select electives based on personal interests from a broad list of courses in biology, chemistry, computer science, information science, and medical and molecular genetics. The graduate bioinformatics courses in the School of Informatics and Computing assume a minimal knowledge of cell and molecular biology. That level of understanding could be gained with at least six (6) undergraduate credit hours in molecular biology, genetics, or evolution. However, undergraduate credits do not count towards a Ph.D. degree unless specifically listed in the University Graduate Bulletin without the notation “Not for graduate credit.”

The core curriculum consists of graduate level courses in Informatics. Students select electives based on personal interests from a broad list of courses in biology, chemistry, computer science, information science, and medical and molecular genetics. The graduate Bioinformatics courses in the School of Informatics and Computing assume a minimal knowledge of cell and molecular biology. That level of understanding could be gained with at least six undergraduate credit hours in molecular biology, genetics, or evolution. For information about the Bioinformatics minor, contact the Informatics Graduate Studies Office (inforecd@indiana.edu).
NOTE: Undergraduate credits do not count towards a Ph.D. degree unless specifically listed in the University Graduate Bulletin as a course that may be taken for graduate credit. Before enrolling in an undergraduate course, please consult the Informatics Graduate Studies office.

Ph.D. Minor in Complex Systems (9 cr.) (External and Internal Minor)
A minor in Complex Systems requires nine credit hours. Both I-609 and I-709 are required. The student may choose among the following courses to obtain the degree:

- INFO-I 609 Advanced Ph.D. Seminar in Complex Systems (3 cr.) (Required)
- INFO-I 709 Advanced Ph.D. Seminar in Complex Systems II (3 cr.) (Required)
- INFO-I 585 Biologically inspired Computing (3 cr.)
- INFO-I 586 Artificial Life as an Approach to Artificial Intelligence (3 cr.)
- INFO-I 601 Introduction to Complex Systems (3 cr.)
- INFO-I 690 Mathematical Methods for Complex Systems (3 cr.)

In consultation with both the Complex Systems Track Director and the student’s advisor, additional classes can be counted toward the degree. For information about the Complex Systems minor, contact the Informatics Graduate Studies Office (inforecd@indiana.edu).

Ph.D. Minor in Computer Science (9 cr.) (External and Internal Minor)
A minor in Computer Science requires nine credits. The student must select a minimum of nine credit hours at the 500 level or above as follows:

- CSCI-A-500-level courses and 400-level courses are excluded (with these exceptions: CSCI-A 595, CSCI-B 401, CSCI-B 403, CSCI-P 423, CSCI-P 436, CSCI-P 438, CSCI-B 441, CSCI-P 442, and CSCI-B 443) are approved for graduate credit toward the Ph.D. minor.
- CSCI-A 593, CSCI-A 594, and any two courses totaling 6 credit hours or more from the list: CSCI-A 595, CSCI-A 596, plus the computer science courses meeting the requirements of the first option.

For information about the Computer Science minor, contact the Computer Science Graduate Studies Office (soicccsgr@indiana.edu).

Ph.D. Minor in Data Science (12 cr.) (External and Internal Minor)
The minor in Data Science consists of four courses (12 credit hours) of graduate coursework in data science or related topics. The required 12 credit hours refer to any four courses suitable for the student’s research, selected by the student, the student’s advisor and the Director of Data Science Academic Programs. For information about the Data Science minor, contact the Data Science Graduate Studies Office (dataasci@indiana.edu).
**Ph.D. Minor in Human-Computer Interaction (12 cr.) (External and Internal Minor)**
The Human-Computer Interaction (HCI) minor requires 12 credit hours. Students must take at least one 3-credit hour introductory HCI graduate course from the following list:

- INFO-I 541 Interaction Design Practice (3 cr.)
- INFO I-542 Foundations of HCI (3 cr.)
- ILS-Z-515 Information Architecture (3 cr.)

Additionally, students must take nine (9) credits from outside of the student’s home department. These nine credits may be taken from one or more departments, so long as they are not the student’s home department.

The student’s HCI advisor and the Director of Graduate Studies must approve all topical seminar classes. A minimum of B (3.0) is required in each course that is to count toward the minor. For information about the HCI Minor, contact the Informatics Graduate Studies Office (infoecd@indiana.edu).

**Ph.D. Minor in Music Informatics (9 cr.) (External and Internal Minor)**
A minor in Music Informatics requires nine (9) credit hours, selected from among the following courses:

- INFO-I 545 Music Information, Search, and Retrieval (3 cr.)
- INFO I-546 Music Information Processing: Symbolic (3 cr.)
- INFO-I 547 Music Information Processing: Audio (3 cr.)
- INFO-I 548 Music Information Processing: Audio (3 cr.)

For information about the Music Informatics Minor, contact the Informatics Graduate Studies Office (infoecd@indiana.edu).

**Ph.D. Minor in Security Informatics (9 cr.) (External and Internal Minor)**
A minor in Security Informatics requires 9 credit hours, selected from among the following courses:

- INFO-I 533 Protocol Analysis and Design (3 cr.)
- INFO-I 537 Social Information Security (3 cr.)
- INFO-I 599 Malware (3 cr.)
- INFO-I 536 Cryptography (3 cr.)
- INFO-I 525 Economics of Security (3 cr.)

In consultation with both the Security Informatics Track Director and advisor, CS-649 (Networking Security) and CS-649 (Trusted Computing) may be substituted for any two of the courses. For information about the Security Informatics minor, contact the Informatics Graduate Studies Office (infoecd@indiana.edu).
Ph.D. Individualized Minor (12 cr. or more in two or more programs) (External and Internal Minor administered by the University Graduate School)

In addition to the eight minors that Informatics offers, the University Graduate School offers an individualized minor. The University Graduate School must approve an individualized minor, which the Bulletin does not specifically list, prior to enrolling in any courses that are to fulfill the individualized minor requirements.

The student must complete the Request for Individualized Minor form in https://one.iu.edu prior to taking any course. Then the University Graduate School must approve the individualized minor, the requirements (i.e. minimum accepted grades) and the examination procedure (if any). The name of the individualized minor cannot be a name of a minor that already exists.

NOTE: Upon approval of the Individualized Minor form, the student is eligible to take the approved courses. If a student wants to “substitute” a course with a non-approved course, the student will need to submit a substitution request prior to taking the course. Therefore, in the “Coursework used to satisfy the minor” section of the Request for Individualized Minor form, students should include additional possible courses to fulfill the individualized minor requirement.

The student needs to provide a rationale for taking the courses indicated. The courses should form a package leading to a goal relevant to the student’s research.

Students must have the individualized approved by their advisor, the student’s track director, the Informatics Director of Graduate Studies, and the University Graduate School prior to taking these classes.

List of Declared Minors that Informatics Ph.D. Students Have Earned

<table>
<thead>
<tr>
<th>Minor</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>African Studies</td>
<td>1</td>
</tr>
<tr>
<td>Anthropology</td>
<td>1</td>
</tr>
<tr>
<td>Biophysics</td>
<td>1</td>
</tr>
<tr>
<td>Cognitive Science</td>
<td>3</td>
</tr>
<tr>
<td>College Pedagogy</td>
<td>1</td>
</tr>
<tr>
<td>Communication and Culture</td>
<td>2</td>
</tr>
<tr>
<td>Computer Science</td>
<td>17</td>
</tr>
<tr>
<td>Entrepreneurship-Business</td>
<td>1</td>
</tr>
<tr>
<td>Evolutionary Biology</td>
<td>1</td>
</tr>
<tr>
<td>Genetics</td>
<td>2</td>
</tr>
<tr>
<td>Gerontology</td>
<td>1</td>
</tr>
<tr>
<td>Human Computer Interaction</td>
<td>2</td>
</tr>
<tr>
<td>Individualized Minor - Informatics</td>
<td>2</td>
</tr>
<tr>
<td>Information &amp; Library Science</td>
<td>2</td>
</tr>
<tr>
<td>Inquiry Methodology - Education</td>
<td>3</td>
</tr>
<tr>
<td>Internal Minor - Complex Systems</td>
<td>3</td>
</tr>
<tr>
<td>Physics</td>
<td>1</td>
</tr>
<tr>
<td>Public Management - SPEA</td>
<td>2</td>
</tr>
<tr>
<td>SocialInformatics - ILS</td>
<td>1</td>
</tr>
<tr>
<td>Sociology</td>
<td>1</td>
</tr>
<tr>
<td>Statistical Science</td>
<td>5</td>
</tr>
<tr>
<td>Statistics</td>
<td>3</td>
</tr>
</tbody>
</table>
**ELECTIVES (12 – 30 cr.)**

It is possible to substitute research lab experience for classroom courses upon approval of the student’s advisor and the advisory committee.

---

**YEARS 2-5: CANDIDACY AND RESEARCH PHASE**

Upon completion of the coursework and passing the quals, the student will turn his/her attention to the candidacy and research phase. After passing the quals, the student must stay continuously enrolled until the University Graduate School confers the degree.

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**INFO-I 890 READINGS & RESEARCH (MINIMUM 21 CR. & MAXIMUM 30 CR.)**

Research under the direction of a member of the graduate faculty leading to a Ph.D. dissertation. A student can take a maximum 30 credits of INFO-I 890.

---

**INFO-G 901 ADVANCED RESEARCH (MAXIMUM OF 6 SEMESTERS ALLOWED)**

After fulfilling all the course requirements and earning 90 credits, a student can enroll in INFO-G 901 Advanced Research if a student needs more time to finish the degree. INFO-G 901 is a six credit-hour course. A student can take INFO-G 901 a maximum of six times. It requires the permission of the student’s advisor, the track director, and the Informatics Director of Graduate Studies. A Ph.D. degree does not include INFO-G 901 credits.

INFO-G 901 is offered only in the fall and spring. If students defend prior to June 1 and plan to graduate during the summer semester (June, July, or August), they must enroll in Summer INFO-G 901 in order to remain continuously enrolled. Summer INFO-G 901 requires the additional approval of the School Dean as well as the approval of the University Graduate School Dean. The cost of INFO-G 901 is a flat-rate fee of $150 (subject to change) each time the student enrolls. The School does not cover the cost of INFO-G 901 unless the grant specifies it. If a student holds a Student Academic Appointment, they are required to be enrolled in class full-time.

To be eligible to enroll in INFO-G 901, the student must have completed:
- 90 cr. or more of graduate coursework which is applicable to the degree
- All degree requirements fulfilled except for the dissertation

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**TRANSFER CREDIT (MAXIMUM OF 30 CR. OF GRADUATE WORK TRANSFERRED)**

Students may be able to transfer up to 30 credits towards the student’s doctoral degree if they entered the program with a master’s degree. In order for a course to transfer, a grade of 3.0 or higher must have been earned. To request a credit transfer, fill out the Transfer Credit Request form and submit the completed form to the Informatics Graduate Studies Office. Once the Transfer of Credit Request has been approved, the transfer credit will appear on the student’s transcript with T (Transfer) noted.
Ph.D. in Informatics Coursework Checklist

Student’s Name: ____________________________________________________________ IUID: ____________________________________________

Student’s Email Address: _____________________________________________________ Track: __________________________

______ Handbook Year Following _____ Coursework Completed Date of Completed Coursework: ____________________________

YEARS 1-3: COURSEWORK FOCUS: During years 1-3, students work towards completing the required coursework of approximately 60 credits and then taking the Quals.

The Informatics Core (6 credits)

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Instructor</th>
<th>Semester Taken</th>
<th># Credits</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-501</td>
<td>Intro to Informatics</td>
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<tr>
<td>I-502</td>
<td>Human-Centered Research Methods in Informatics</td>
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</tbody>
</table>

Seminars/Courses in Area of Study (6 credits)

Each student is required to take a set of two courses from within his/her chosen track of study.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Instructor</th>
<th>Semester Taken</th>
<th># Credits</th>
<th>Grade</th>
</tr>
</thead>
</table>

Advanced Seminar I

Advanced Seminar II

Research Group Rotations (6 credits)

Each student is required to complete two (3 cr.) one semester research rotations. A third rotation will not count for course credit.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Instructor</th>
<th>Recv’d Research Rotation Agreement</th>
<th>Semester Taken</th>
<th># Credits</th>
<th>Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>I-790</td>
<td>Informatics Research</td>
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<tr>
<td>I-790</td>
<td>Informatics Research</td>
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</tbody>
</table>

Theory and Methodology Courses that are appropriate for informatics (12 credits)

_____ Foreign Language Required for Virtual Heritage Students. Three credits must be taken in one of the following languages, taken at the level of 300 or above: German, French, Italian, Spanish, or, with the approval of the Advisor, another foreign language pertinent to the student’s minor and can fulfill 3 credits of the Theory and Methodology Course Requirement.

_____ Student passed the proficiency exam in their chosen language in lieu of coursework.

Language: ____________________________________ Date of Proficiency Exam: ____________________________

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Instructor</th>
<th>Semester Taken</th>
<th># Credits</th>
<th>Grade</th>
</tr>
</thead>
</table>

Minor (6-15 credits)     Declared Minor ________________________________

An internal and external minor approved by UGS and the School will satisfy this requirement.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Instructor</th>
<th>Semester Taken</th>
<th># Credits</th>
<th>Grade</th>
</tr>
</thead>
</table>

Rev. 07/21/2017
Electives (from 12-30 credits)
Research lab experience may be substituted for classroom courses upon approval of the student’s advisor and committee.

YEARS 3-5: CANDIDACY AND RESEARCH PHASE: Upon completion of the coursework and passing the Quals, the student will begin the candidacy and research phase. After passing the Quals, you must stay continuously enrolled until the degree has been conferred.

INFO-I-890 (minimum of 21 credits and a maximum of 30 credits)

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Instructor</th>
<th>Semester Taken</th>
<th># Credits</th>
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Requirements (Note: 90 credits are needed to complete the degree) | # of Credits Taken
---|---
Informatics Core (6 cr.)
Seminars (6 cr.)
Research Rotation (6 cr.)
Theory & Methodology (12 cr.)
Minor (6 – 15 cr.)
Electives (12 – 30 cr.)
INFO-I-890 (21 – 30 cr.)
Transfer Credit (up to 30 cr.)
Total Number of Credits Taken as of
**Credit of Transfer:** Master’s degree credit (for student’s who enter the program with both a BS and a MS degree)

- A maximum of 30 hours of credit from master’s degree programs may be transferred for those courses in which a grade of B (3.0) or higher was earned.
- Coursework that is older than seven (7) years old must be revalidated and approved by UGS.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Credit Applied to What Requirement Section</th>
<th>Semester Taken</th>
<th>IU Course # Transferred as</th>
<th># Credits</th>
<th>Grade</th>
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</table>

Total Number of Transfer Credits:________

The courses below do not count towards the required 90 credits for the degree.

**INFO-G-901** (can be taken a maximum of 6 times) **INFO-G-901** does not count towards the required 90 credits to graduate.

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Instructor</th>
<th>Semester Taken</th>
<th># Credits</th>
<th>Grade</th>
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</table>

**Additional INFO-I-890 to Remain Continuously Enrolled until Degree is Conferred** (maximum of 6 additional credits) after exhausting maximum 30 credits of INFO-I-890 and after taking **INFO-G-901** a maximum of six (6) times

<table>
<thead>
<tr>
<th>Course No.</th>
<th>Course Name</th>
<th>Instructor</th>
<th>Semester Taken</th>
<th># Credits</th>
<th>Grade</th>
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</table>
RESOURCES

GRADUATE INFORMATICS STUDENT ASSOCIATION (GISA)
GISA is a professional and social organization that serves as the representative body for Informatics doctoral students. GISA focuses on institutional changes and social events. For more information, contact GISA at GISA@indiana.edu.

CAREER SERVICES
Career Services provides opportunities and resources that will empower students to define their career goals, develop professional life skills, obtain related experience, and realize their career potential. To schedule an appointment with a School of Informatics and Computing’s career services specialist, email soiccareers@soic.indiana.edu.

VETERAN AFFAIRS (VA) BENEFITS
Veterans Support Services is here to meet the needs of Indiana University students who are veterans, service members, or children or spouses of disabled veterans. Veterans who wish to use their VA benefits to pay their educational expenses should make contact with the Office of the Registrar as soon as possible, as well as review the necessary steps for securing VA benefits via the following link: www.veterans.indiana.edu. Students should contact the Office of the Registrar Veterans Representative at 812-856-0035. For general questions and answers on Veterans' benefits, visit these sites:

- U.S. Department of Veterans Affairs Education Service
- Indiana Department of Veteran Affairs
- Veteran’s Affairs Vocational Rehabilitation and Employment

COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS)
For information about the Counseling and Psychological Services (CAPS) for students, go to: http://healthcenter.indiana.edu/counseling/.

DISABILITY SERVICES FOR STUDENTS (DSS)
The Disability Services for Students Office (DSS) can approve accommodations and support services for a student who has a disability. For information about support services or accommodations available to students with disabilities and for the procedures to be followed by students and instructors, go to: https://studentaffairs.indiana.edu/disability-services-students/.

INFORMATICS GRADUATE STUDIES OFFICE (GSO)
The Informatics GSO team seeks to enhance the Informatics graduate student’s experience by providing information, resources and network opportunities. They provide administrative services to graduate students, faculty, and staff by (1) being responsive to their needs; (2) adhering to university and school policies and procedures; and (3) administering Informatics degree audits, posting grades, and awarding graduate degrees.

The Informatics GSO will encourage students to complete their academic program in
a timely manner. If there are questions, email (infoecd@indiana.edu) or drop by the Informatics Graduate Studies’ offices in Informatics West, Rooms 231, 233 and 235.

**CPT and OPT for International Students**
All international students are required to have authorization from the Office of International Services (OIS) before starting work, training, internships, etc. Working without proper authorization is a violation of the student’s legal status and will result in the termination of the student’s Student and Exchange Visitor Information System (SEVIS) record.

**CPT and OPT Tips**
- Requests for CPT and OPT must be completed in sequence.
- The approval process often takes several weeks and it cannot be rushed. Allow plenty of time for approval.
- When asked for an advisor’s name, use Beverly Diekhoﬀ, the Informatics Graduate Records Coordinator.
- When asked for an email address, use infoecd@indiana.edu.
- On all email correspondence regarding CPT and OPT, copy infoecd@indiana.edu.
- Employment, internships, etc. must not begin until the date authorized in the I-20 issued by OIS.

**Curricular Practical Training for F-1 Students**
International students who have an F-1 visa and have a practical training opportunity that will provide the student with practical experience in their field of study before the student graduates, such as an internship may be eligible for a type of authorization called Curricular Practical Training (CPT). This information was taken from https://ois.indiana.edu/living-working/employment/f1/curricular.html. For more information on CPT, contact the Office of International Services at ois@indiana.edu.

**Note:** Students must fill out the iStart forms. List Beverly Diekhoﬀ as the advisor and her email address as infoecd@indiana.edu. By using infoecd@indiana.edu anyone in the Informatics Graduate Studies Office can help with the iStart request.

**Optional Practical Training for F-1 Students**
International students who have an F-1 visa and will be completing a program of study, the student may be eligible for 12 months of Optional Practical Training (OPT). OPT allows students to gain practical training and experience related to the student’s major field of study. This information was taken from https://ois.indiana.edu/living-working/employment/f1/optional/index.html. For more information on OPT, contact the Office of International Services at ois@indiana.edu.

**Note:** Students must fill out the iStart forms. List Beverly Diekhoﬀ as the advisor and her email address as infoecd@indiana.edu. By using infoecd@indiana.edu anyone in the Informatics Graduate Studies Office can help with the iStart request.
**SCIENCE, TECHNOLOGY, ENGINEERING OR A MATHEMATICS (STEM)**  
Informatics is in the science, technology, engineering or a mathematics (STEM) field. Informatics international students are eligible for a STEM OPT Extension. For more information about the STEM OPT Extension and a list of qualifying STEM majors, go to [https://ois.iu.edu/living-working/employment/f1/optional/stem-opt.html](https://ois.iu.edu/living-working/employment/f1/optional/stem-opt.html).

**INFORMATICS DIRECTOR OF GRADUATE STUDIES 2009-2018**

**Marty Siegel**  
Informatics West, Room 211  
Telephone: (812) 856-1103  
E-Mail: msiegel@indiana.edu

**PROGRAM TRACK DIRECTORS 2017-2018**

**Bioinformatics**  
**Volker Brendel**  
Simon Hall, Room 205C  
Telephone: (812) 855-7074  
E-Mail: vbrendel@indiana.edu

**Complex Networks and Systems**  
**Luis Rocha**  
Informatics East, Room 301  
Telephone: (812) 856-1832  
E-Mail: rocha@indiana.edu

**Computation, Culture and Society**  
**Christena Nippert-Eng**  
Informatics West, Room 201A  
E-Mail: cnippert@indiana.edu

**Computing, Culture and Society**  
**Jeffrey Bardzell**  
Informatics West, Room 303  
Telephone: (812) 856-1850  
E-Mail: jbardzel@indiana.edu

**Human Computer Interaction**  
**Selma Šabanović**  
Informatics East, Room 265  
Telephone: (812) 856-0386  
Email: selmas@indiana.edu

**Music Informatics**  
**Christopher Raphael**  
Informatics West, Room 315  
Telephone: (812) 856-1849  
E-Mail: craphael@indiana.edu

**Health Informatics**  
**Kay Connelly**  
Informatics East, Room 260  
Telephone: (812) 855-0739  
Email: connelly@indiana.edu

**Security Informatics**  
**Steve Myers**  
Lindley Hall, Room 330F  
Telephone: (812) 855-1860  
E-Mail: samyers@indiana.edu

**Virtual Heritage**  
**Bernard Frischer**  
321 N. Woodlawn Avenue  
Email: bfrische@indiana.edu
**Informatics Staff Roster 2017-2018**

**Cheryl Engel**  
Director of Informatics Graduate Student Services  
Informatics West, Room 231  
Telephone: (812) 856-3960  
E-Mail: infograd@indiana.edu

**Carrie Stemen**  
Graduate Records & Admissions Coordinator, Informatics  
Informatics West, Room 235  
Telephone: (812) 856-1406  
Email: infograd@indiana.edu

**Beverly Diekhoff**  
Graduate Records Coordinator, Informatics  
Informatics West, Room 233  
Telephone: (812) 856-1802  
Email: inforecd@indiana.edu

**Important Contacts**

**Student Employee Questions**  
soicpay@indiana.edu

**Career Services Questions**  
soicjobs@indiana.edu

**AI Assignment Questions**  
aiassign@indiana.edu  
soicait@indiana.edu

**Technology/Building Access Questions**  
soichelp@indiana.edu

**Office of International Services**  
ois@indiana.edu
APPENDIX A

TRACK DESCRIPTIONS
BIOINFORMATICS
Track Director: Volker P. Brendel

1 SUMMARY
The Bioinformatics track is for students who wish to train in the interface of informatics, computer science, life sciences, chemistry, and statistics in the pursuit of biological and medical research questions.

2 PRIMARY TRACK FACULTY
Volker Brendel: Computational genomics; plant genomics; social insect genomics. http://brendelgroup.org/
Matthew Hahn: Genome-scale studies of organismal function and evolution. http://www.indiana.edu/~hahnlab/
Haixu Tang: Computational mass spectrometry; mobile genetic elements; genome privacy; bacterial genomics and metagenomics. http://www.informatics.indiana.edu/hatang/
Yuzhen Ye: Computational metagenomics; protein bioinformatics; biological pathway reconstruction/analysis. http://homes.soic.indiana.edu/yye/lab/

3 REQUIRED COURSES
In addition to the Informatics-wide requirements for INFO I501 and INFO I502 as well as two research rotations, students in the Bioinformatics Track need to take the two bioinformatics core classes INFO I519 and INFO I529 and the seminar classes INFO I609 and INFO I708. All required courses provided by faculty in the Bioinformatics Track, including I609 and I709, are open to students from other tracks and programs.

I519 – FUNDAMENTAL MODELS AND ALGORITHMS IN BIOINFORMATICS
Most recent offerings:
http://brendelgroup.org/teaching/i519F16.php
http://homes.soic.indiana.edu/yye/lab/teaching/fall2015-i519/

Motivation
Biology has become one of the primary application domains of computer science and informatics approaches. The term "Bioinformatics" covers a wide spectrum of data management and processing associated with large-scale, high-throughput biological data generation. This class will focus on biomolecular sequence data (DNA and protein) that underpin much of modern biology, including for example genetics; ecology, evolution, and population biology; and structural biology. Applications in medicine and biotechnology are changing our societies and world. Many of the data analysis problems in the field have been mapped to tractable mathematical models amenable to algorithmic solutions. This course covers fundamental models and algorithms in bioinformatics, with emphasis on the general principles involved in the modeling and algorithmic approaches.

Aims
This course seeks to provide students with a solid foundation for understanding models and algorithms in bioinformatics and to impart the basic practical skills to work on bioinformatics projects.

I529 – ADVANCED MODELS AND ALGORITHMS IN BIOINFORMATICS
Most recent offerings:
http://darwin.informatics.indiana.edu/coll/courses/i529-16/
http://homes.soic.indiana.edu/classes/spring2015/info/i529-cenksahi/

**Motivation**
Machine learning techniques have been successful in analyzing biological data because of their capabilities in handling randomness and uncertainty of data noise and in generalization. In this class, we will learn basics about probabilistic models and machine learning techniques. We will focus on probabilistic models (Markov models, Hidden Markov models, and Bayesian networks) for biological sequence analysis and systems biology.

**Aims**
Students will be instructed to write scripts (Python and PHP preferable) and/or programs that make use of the current implementation of sophisticated algorithms, such as HMM, BN, DBN, etc., to solve biological problems.

**I609 – BIOINFORMATICS ADVANCED SEMINAR I**
This course is taught each Fall semester and meets with I592.
Most recent offerings: new class

**Motivation**
Like for other scientific fields, Bioinformatics research frontiers are discussed in recent peer-reviewed journal and conference articles. This course covers current topics, primarily outside the students’ primary research areas, to expose students to a wide range of problems and approaches as well as best practices for reviewing current literature.

**Aims**
This course is designed to train students to critically read and evaluate current bioinformatics literature. Emphasis is placed on assessment of proper controls and reproducibility in computational studies.

**I709 – BIOINFORMATICS ADVANCED SEMINAR II**
This course is taught every Spring semester.
Most recent offerings: new class

**Motivation**
The IU Center for Bioinformatics Research hosts several internationally renowned seminar speakers every year. This course is built around our Spring term visitor. Students will read the speakers’ recent papers in advance of the talks, meet with the speakers, and discuss the topic and visit afterwards.

**Aims**
This course is designed to expose students to cutting-edge research and the most prominent avenues of scientific discussion. Students will learn how to prepare for visiting speakers, how to interact with them to greatest mutual benefit, and how to absorb successful presentation practices.

4 **OPTIONAL COURSES**
In addition to required courses, faculty in the track offer courses that provide more targeted training in specific areas:

**INFO I590 - Topics in Informatics: SNP Discovery and Population Genetics**
(Instructor: Matthew Hahn). This class provides an introduction to studies of molecular variation in the genomic era. Topics range from the basic bioinformatics tools needed to find SNPs (single nucleotide polymorphisms) in genome databases to inferring natural selection from large sequencing projects. Weekly assignments lead up to a final project involving the analysis of large genomic datasets.

**BIOL L531 - Cyberinfrastructure-enabled Computational Genome Science Laboratory** (Instructor: Volker Brendel). This class is a hands-on, working-group style
class covering data processing and analysis of "Next Generation Sequence" data. Topics encompass the entire range of genome analysis, from de novo genome assembly, genome re-sequencing, transcript assembly, transcript mapping, and genome annotation to annotation visualization and evaluation and comparative genomics. Students will have access to high-performance computing resources at IU and national cyberinfrastructure portals for biological research. The course experience will culminate with a term project that encourages participants to explore topics of their specific interest in greater depth or to progress with their own research work.

**BIOL L533 - Evolution of Genes and Genomes** (Instructor: Michal Lynch). This class covers a large array of current topics in molecular evolution, including the origin of life, genome and organismal complexity, rates and patterns of nucleotide substitutions, molecular phylogenetics, the origin of novel genes, and the evolution of introns and transcriptional regulation.

**BIOL L534 - Evolution of Proteins and Cells** (Instructor: Michal Lynch). This class is focused on the mechanisms of evolution at the cellular level. Equal time will be given to prokaryotes and eukaryotes. Some emphasis will necessarily be placed on population-genetic mechanisms, as these define the paths by which evolution occurs; ideas and observations from cell biology and biophysics will be integrated throughout. Generally, the class is attended by students from diverse backgrounds, not all in biology, so an attempt will be made to keep the presentation at a level that can be understood by all, with an emphasize on tying different areas of science together in productive ways.

**CSCI B555 – Machine Learning** (Instructor: Predrag Radivojac). This course reviews theory and practice of constructing algorithms that learn functions and choose optimal decisions from data and knowledge. Topics include: mathematical/probabilistic foundations, MAP classification/regression, linear and logistic regression, neural networks, support vector machines, Bayesian networks, tree models, committee machines, kernel functions, EM, density estimation, accuracy estimation, normalization, model selection.

**CSCI B565 – Data Mining** (Instructor: Mehmet Dalkilic). This class covers algorithmic and practical aspects of discovering patterns and relationships in large databases. The course also provides hands-on experience in data analysis, clustering, and prediction. Topics include: data preprocessing and exploration, data warehousing, association rule mining, classification and regression, clustering, anomaly detection, human factors, and social issues in data mining.

5 **Qualifying Exam**

Written and oral examination topics are selected by the program committee based on subjects covered in the student’s earlier coursework. Generally, students choose one computational area (from machine learning, data mining, or algorithms) and one biological area (from molecular, structural, or evolutionary biology) to narrow the scope of examination, and then textbooks and literature used in the appropriate courses and specific research areas of the candidate are assigned for study. The typical written examination takes half a day each for the computational and biological components. In addition, the required breadth examination will similarly cover a student-chosen other area of Informatics, as covered in the candidate’s course work, and evaluated by the candidate’s outside member of their program committee.

6 **Dissertation Proposal and Thesis**

The Ph.D. candidate submits a thesis proposal to their thesis committee a couple of weeks before their Dissertation Proposal meeting. The candidate will give an open presentation about his/her thesis research topic at the meeting, followed by a closed meeting with their committee in which the candidate will answer questions and receive feedback from committee members. A draft of the dissertation thesis should be submitted to the thesis committee one month before the Dissertation Defense. If the
candidate passed the defense, their thesis will need to be revised to incorporate the comments from the committee members.

7 **Typical Minors**
Biology, Computer Science, or Statistics.

8 **Sample Dissertation Titles**

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wyatt Clark</td>
<td>Understanding protein function through statistical inference and evolutionary analysis</td>
</tr>
<tr>
<td>Fuxiao Xin</td>
<td>Methods for predicting functional residues in protein structures and understanding molecular mechanisms of disease</td>
</tr>
<tr>
<td>Chuan-Yih Yu</td>
<td>Algorithms for automated identification and quantification of glycans and glycopeptides</td>
</tr>
<tr>
<td>Yongan Zhao</td>
<td>Privacy-preserving sharing and analysis on human genomic data</td>
</tr>
</tbody>
</table>

9 **Sample Coursework**
Students typically take the INFO I501/I502 and BIO Track I519/I529 classes as well as the research rotations in their first two semesters. The required seminar courses and additional credit requirements are covered in years two and three, augmenting the student's own research (mentored by their advisor).

10 **Some Metrics for Bioinformatics Graduates**
Recent graduates have pursued either careers in industry or post-doctoral academic appointments, e.g.: Wyatt Clark (Yale University), Yong Li (Dow AgroSciences), Amrita Mohan (OSI Pharmaceuticals), Vikas Pejaver (University of Washington), Fuxiao Xin (GE Global Research), Chuan-Yih Yu (MD Anderson Cancer Center), Yongan Zhao (Seven Bridges Inc).
COMPLEX SYSTEMS
Track Director: Luis M. Rocha

1 SUMMARY
The Complex Systems track, with its unique interdisciplinary values, offers a training opportunity to explore the connections among theoretical, technological, biological, and social implications of complex systems in a diverse and multidisciplinary research-oriented curriculum. The study of complex systems is focused on discovering and understanding how the myriad parts of a system—which could be the Internet, the human brain, a language, a power grid, or an ecosystem—interact with each other and determine the macroscopic behavior of the system itself. This strongly interdisciplinary field has exciting implications for computer science, physics, math, biology, and cognitive and social sciences. Faculty at the associated Center for Complex Networks and Systems Research (CNetS: http://cnets.indiana.edu/) are investigating complex systems in action, from determining how a particular YouTube video suddenly goes viral to developing models that can accurately predict the spread of contagious diseases. Our students come from around the world and have a variety of educational backgrounds. What they share is a desire to widen their theoretical, computational, and technical skills—and, from the earliest days of the program, to engage in research projects ranging from Web mining to modeling biochemical regulation.

2 PRIMARY TRACK FACULTY
Yong-Yeol Ahn: Structure and dynamics of complex systems, such as society and living organisms, using massive datasets. Hierarchical & modular structure in social and biological networks, the analysis of metabolic networks, and the social media.
Randall Beer: Cognitive science, computational and theoretical biology. Understanding how coordinated behavior arises from the dynamical interaction of an animal’s nervous system, its body and its environment. Evolution and analysis of dynamical “nervous systems” for model agents, neuromechanical modeling of animals, biologically-inspired robotics, and dynamical systems approaches to behavior and cognition.
Johan Bollen: Computational social science, social media analytics, informetrics, and digital libraries. Meme diffusion, markets and sentiment, metrics from usage data, science of science.
David Crandall: computer vision, visual object recognition and scene understanding, analyzing and modeling large amounts of uncertain data, notably in mining data from the web and from online social networking sites.
Simon DeDeo: Computation and cognition in large-scale biological and social systems, human cognition, biological computation, animal behavior and digital humanities.
Santo Fortunato: Network science, computational social science and science of science; Director of the Center for Complex Networks and Systems Research (CNetS).
Filippo Menczer: Web science, social media, social networks, social computing, Web search and data mining, distributed and intelligent Web applications, and modeling of complex information networks.
Filippo Radicchi: Complex Networks and Systems, Data Science, Science of Science, Sport Analytics.
Luis Rocha: complex systems, computational biology, artificial life, embodied cognition and bio-inspired computing, dynamics in complex networks, text and literature mining, evolutionary systems, adaptive search and recommendation, and biosemiotics.
Peter Todd: Simple heuristics for decision making, structure of information in environments, evolution of behavior, information foraging, emergence of environment
structure through interactions of populations of agents following simple behavioral rules, artificial life approaches to music, making decisions about food and eating, and cognition of consumption.

3 REQUIRED COURSES
All required courses provided by faculty in complex systems tracks, including I609 and I709, are open to and welcome students from other tracks and programs.

I601 – INTRODUCTION TO COMPLEX SYSTEMS
Note: This course is waved if students demonstrate familiarity with complex systems (e.g. M.S. in related field). It is taught every two years to guarantee sufficient quorum. It alternates with I585 (http://www.informatics.indiana.edu/rocha/i-bic/) which students can take instead of I601.
Most Recent offering: http://homes.soic.indiana.edu/classes/fall2013/info/i601-filiradi/advertisement.pdf
Motivation
Nature is complex. Biological, social, economic, technological and information systems are all composed of many interacting agents giving rise to macroscopic complex features. Complexity science is the novel interdisciplinary research field devoted to the understanding of the roots of complex phenomenology observable in nature, and to developing a common theoretical framework able to explain the astonishing similarity between complex real systems of so different origin.

Aims
This course aims at providing an introduction to complex systems and networks. The course will touch several topics of traditional and current research in complexity science. Students will learn mathematical and statistical concepts of the science of complexity, and, by being exposed to a great deal of real examples, they will learn how to measure and characterize complex features in natural systems. These notions and analytic tools are increasingly in demand to approach complex problems in many different disciplines including biology, data and sport analytics, social science, informatics, neuroscience, and economics.

I609 – COMPLEX SYSTEMS ADVANCED SEMINAR I
This course is taught once every two years alternating with I709, to obtain a sufficient quorum of students. Majority of students from Complex Systems track, but students from other tracks and programs frequently take this seminar.
Most Recent offering: http://www.informatics.indiana.edu/rocha/icx1/
Motivation
A complex system is any system featuring a large number of interacting components (agents, processes, etc.) whose aggregate activity is nonlinear (not derivable from the summations of the activity of individual components) and typically exhibits hierarchical self-organization under selective pressures. This definition applies to systems from a wide array of scientific disciplines. Indeed, the sciences of complexity are necessarily based on interdisciplinary research. Almost all interesting processes in nature are highly cross linked. In many systems, however, we can distinguish a set of fundamental building blocks, which interact nonlinearly to form compound structures or functions with an identity that requires more explanatory devices than those used to explain the building blocks. This process of emergence of the need for new, complementary, modes of description is known as hierarchical self-organization, and systems that observe this characteristic are defined as complex. Examples of these systems are gene networks that direct developmental processes, immune networks that preserve the identity of organisms, social insect colonies, neural networks in the brain that produce intelligence and consciousness, ecological networks, social networks comprised of transportation, utilities, and telecommunication systems, as well as economies. The field of complex systems studies the general characteristics of all these systems. Its goal is to identify and
model the laws and behaviors common to various classes of complex systems.

Aims
This seminar is designed to present and discuss the history, methodology and impact of complex systems; we cover key literature as well as recent advances in the field.

Evaluation
Students are expected to read and annotate the materials presented, as well as present several of the key readings. Students will also work on a term paper.

Syllabus
- Part I: History of the Field
  a. Cybernetics and the Informational Turn
  b. Systems Science, Prediction, and Limits
  c. Self-Organizing Systems
  d. Second-Order Cybernetics
  e. Organization of Complex Systems
- Part II: Current Research
  a. Towards a practice of Complex Systems
  b. Evolutionary Systems
  c. Information and Complexity
  d. Neo-Cybernetics themes

Readings from Spring 2014
Listed at: http://www.infomatics.indiana.edu/rocha/icx1/index.html#materials

I709 – COMPLEX SYSTEMS ADVANCED SEMINAR II
This course is taught once every two years alternating with I609, to obtain a sufficient quorum of students. Majority of students from Complex Systems track, but students from other tracks and programs frequently take this seminar.
Most Recent offering: http://yongyeol.com/courses/2013S-I709/

Motivation
Complex systems are the systems that contain many sub-parts that interact with each other. Thanks to the structure and dynamics of interactions, fascinating and unpredictable phenomena emerge. Many natural and artificial systems that fascinate us (e.g. cells, brains, societies) are complex systems. Because complex systems exist all over the places, the study of complex systems is inherently interdisciplinary. In this course, we will try to find the answers to the following questions: What are the complex systems around us? What characterizes the complex systems approach? What are the fundamentals of complex systems approach? How has it been applied to other fields? What are the frontiers of the research? We will explore fascinating papers ranging from the fundamental theory to the various applications, along with individual research project.

Aims
- To be able to think like a complex systems researcher.
- To be able to apply complex systems approaches to your research.
- To finish a small research project about complex systems.

Evaluation
Paper Review (20%): a short review of the papers is due by the midnight before the class

Paper Presentation: Assigned moderators make a brief (~ 5 minutes) presentation about the premises and the results of the paper.

Project proposal: A two to four page document that contains project title, motivation, relevant prior work, approach, plan, proposal presentation.

Proposal Presentation: 20 slides, 1–5 presentation.

Progress report: draft of the final paper, with preliminary results.

Final project paper (40%): full research paper (~10 pages) with all the details.
**Final presentation (20%)**: 10 minute presentation.

**Participation (20%)**

**Syllabus**
- Schooling Flocks and Crowds
- Traffic and Panic
- Collective Behavior and Social Segregation
- Emergence of Network Communities
- Threshold Model and Information Diffusion
- Social Contagion and Virality
- Economic Complexity
- Networks of Genes, Proteins, Diseases, and Drugs
- Evolution: Cost Optimization in Brain
- Evolution of Cooperation
- 1/f Noise and Music
- Fractal
- Self-Organized Criticality
- Power-Law
- Common Patterns of Nature
- Allometric Scaling
- Cities
- Boolean Networks
- Robustness of Regulatory Networks
- Control
- Homophily and Influence
- Laws of Mobility
- Virtual Worlds
- Stochastic Resonance
- Data

**Readings From Spring 2013**

**I690 Mathematical Methods for Complex Systems**

**Note:** This course is waved if students demonstrate sufficient mathematical prior training (e.g. M.S. in related field). It is taught every two years to guarantee sufficient quorum.

Most Recent offering: [https://sites.google.com/site/aflammin/teaching/i690](https://sites.google.com/site/aflammin/teaching/i690)

**Motivation**
Complexity deals with the structural, behavioral, and organizational properties that emerge from the unsupervised local interactions of a multitude of elementary units. During this course we will study the mathematical and computational techniques that have been developed to describe and understand such properties. In doing so we will always discuss the math/algoricmic side in the context of specific examples; We will touch upon a number of important and fascinating sub-areas: linearity and non-linearity, chaos, self-similarity, stochastic processes, self-organization and network theory.

**Aims**
To provide students with a technical (mathematical, computational) background to describe, model and reason in quantitative terms about Complex Systems.

**Evaluation**
Students are required to simulate a number of “model-system”. Some (minimal) programming skills are therefore required. Some college-level background in calculus, probability and linear algebra is also required. If these requirements are not met, a preliminary conversation with the instructor is appreciated.
Syllabus
Part 0: The Art of Modeling
- The role of abstraction
- Deterministic vs Random
- Microscopic vs Macroscopic
- Order and Disorder
Part 1: Deterministic systems with few degrees of freedom
- Continuous dynamical systems
- Linearization and stability
- Phase space and qualitative analysis
- Elements of bifurcation theory
- The role of non-linearity
- Recurrence equations
- Bifurcation, period doubling – the case of the logistic map
- Routes to chaos
- Universality and the renormalization group
Part 1B: Randomness - the basic
- Poisson process
- Random walks
- Multiplicative processes
- Branching processes
- Markov processes
Part 2: From microscopic to macroscopic
- From random walk to the diffusion equation
- From Langevin to Fokker-Plank equation
- Collective Phenomena
  a. Cellular Automata.
  b. Mean field techniques, their limits and extensions.
  c. Precursor of organization: emergence of long-range interactions in space and time.
  d. Self-Organized Criticality.
  e. The emergence of structure and order.
  f. Information and Entropy.
  g. Beyond Gaussian statistics – power laws, their significance and possible causes.
- Networks
  Small-world and scale-free networks.
  Generative models.
  Processes on “non-uniform” networks (e.g. traffic, epidemics, search, failures).

Readings

4 Optional Courses
In addition to required courses, faculty in the track offer courses that provide more targeted training is specific areas.
1585 – *Biologically-inspired computing* – Rocha:
http://informatics.indiana.edu/rocha/ibic
I590 - *Topics in Informatics*:
- **Performance Analytics** – Radicchi
- **Data Visualization** – Ahn - [http://yongyeol.com/courses/2013F-I400/](http://yongyeol.com/courses/2013F-I400/)
- **Collective Intelligence** – Bollen - [http://www.informatics.indiana.edu/jbollen/CI/](http://www.informatics.indiana.edu/jbollen/CI/)

CSCI-B 657 - *Computer Vision* - Crandall


5 **Qualifying Exam**
Written and oral examinations decided by program committee based on bibliography from 1609, 1709 and specific research interests of candidate. Typical written exam: three papers or one-week take home exam.

6 **Typical Minors**
Cognitive Science, Statistics, Biophysics,

7 **Sample Dissertation Titles**

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mourao, Marcio</td>
<td>Reconstructing the Mechanisms and the Dynamical Behavior Complex Biochemical Pathways</td>
</tr>
<tr>
<td>Conover, Michael</td>
<td>Digital Democracy: The Structure and Dynamics of Political Communication in a Large Scale Social Media Stream</td>
</tr>
<tr>
<td>Frey, Seth</td>
<td>Complex Collective Dynamics in Human Higher-Level Reasoning: A Study Over Multiple Methods</td>
</tr>
<tr>
<td>Simas, Tiago</td>
<td>Stochastic Models And Transitivity In Complex Networks</td>
</tr>
<tr>
<td>Wang, Zhiping</td>
<td>Biomedical Literature Mining For Pharmacokinetics Numerical Parameter Collection</td>
</tr>
<tr>
<td>Weng, Lilian</td>
<td>Information Diffusion on Online Social Networks</td>
</tr>
<tr>
<td>Huina Mao</td>
<td>Modeling Economic and Financial Behavior from Large-scale Datasets</td>
</tr>
<tr>
<td>Xin Shuai</td>
<td>Modeling Scholarly Communications Across Heterogeneous Corpra</td>
</tr>
<tr>
<td>Jasleen Kaur</td>
<td>Emergence of Innovation and Impact in Science</td>
</tr>
</tbody>
</table>

8 **Sample Coursework**
Included in attachment are two cases of students graduating this academic year:

**Jasleen Kaur**: entered PhD with M.S. degree (Bioinformatics, IU). Applied for 30 credit transfer from M.S. degree, therefore took fewer courses as PhD student.

**Artemy Kolchinsky**: entered PhD without M.S. degree.
9 SOME METRICS FOR COMPLEX SYSTEMS GRADUATES

- h-index (2014)
- Total citations (2014)
COMPUTING, CULTURE, AND SOCIETY (CCS)

Track Director: Christena Nippert-Eng

1 SUMMARY
Grounded in the Science and Technology Studies (STS) tradition, the Computing, Culture and Society (CCS) track focuses on the relationship between technological innovation and larger social, political, legal, and economic developments. From social media and artificial intelligence, gaming, domestic and workplace applications, little data and Big Data, to mobile technologies and giant server farms, computing technologies are a constant presence in our lives. The CCS track provides students with essential training in social scientific and humanistic theories, methods, skills, and knowledge. On this solid foundation, CCS students produce original research on the ways culture and society shape, reflect, challenge, and constrain the design and use of information and communication technologies around the world.

A highly interdisciplinary group, CCS faculty tackle a broad array of projects within this dynamic area of research. They draw on rich, multidisciplinary backgrounds in anthropology, cognitive science, engineering, history, information science, law, linguistics, music, political science, public policy, robotics, and sociology in order to do so. The faculty use a correspondingly wide range of methods in their work, including case-based, design, ethnographic, experimental, historical, survey, and visual methods. A reflection of their broad training and research interests, CCS faculty and their students often collaborate with faculty and students in other Informatics tracks as well as those in Computer Science, the larger university, and broader research communities. Most CCS faculty have adjunct appointments in their disciplinary departments at IU, as well. These include Anthropology; History; History and Philosophy of Science; Linguistics; Maurer Law School; and Sociology. The CCS track faculty play a large role in the STS group at IU and help sponsor the annual Gieryn lecture.

Current CCS faculty pursue projects that range from the local to the global, analyzing, for instance, the interactions between people and robots, the enacting of identity on and off line, the use of computing technologies to support communities and developing regions of the world, everyday privacy behaviors, gender and computing, the political uses of computing by nation-states, computing and intellectual property concerns, the ways scientists, YouTube, and Twitter users disseminate and consume information, and the impact of computing on the environment. For updates on faculty and student research projects, visit the Computing, Culture and Society group’s website.

2 PRIMARY TRACK FACULTY
Nathan Ensmenger: History of computing; software labor and gender; environmental impacts of computing; history of artificial intelligence; organizational informatics.
Allison Fish: Information and technology law, intellectual property and the knowledge commons, authorship and invention, intangible cultural heritage, health information and expertise, transportation logistics and circulation of commodities, ethnographic methods, cultural anthropology, science and technology studies, socio-legal studies, socio-medical studies.
Eden Medina: Law, technology, and data; human rights and civil liberties; history of computing; history of technology; computing outside of the U.S. and Europe; science and technology in Latin America; the relationship of technology and politics.
Christena Nippert-Eng: Technology and: cognition, culture, science and knowledge; space and time; home and work; everyday life; symbolic interaction; social psychology; identity; gender; privacy; security; ethnography; design; social structure and animal behavior.
John C. Paolillo: Social aspects of Information and Communication Technology use, Internet multilingualism, online language variation, genre emergence, semantics of tagging, online interaction in forums, games, etc., quantitative and social network approaches to analysis.

Selma Šabanović: Human-robot interaction, science and technology studies, social robotics, cross-cultural studies of technology, assistive technology, critical methods for designing and evaluating interactive artifacts, social studies of robotics.

Cassidy Sugimoto: Scholarly communication; scientometrics; science policy; public understanding of science; science communication; social media

3 REQUIRED COURSES
All required courses provided by faculty in the Computing, Culture and Society track, including 1609 and 1709, are open to and welcome students from other tracks and programs.

I609 – COMPUTING, CULTURE AND SOCIETY, ADVANCED SEMINAR I
This course is taught once every two years alternating with 1709. The majority of the students are from the CCS track, but students from other tracks and programs frequently take this seminar.

Recent Course Description
This graduate seminar introduces students to theory and research that conceptualize and study the intersections of culture, science, and technology from multiple disciplinary perspectives. We explore the approaches of science and technology studies, history of computing, and cognitive perspectives on science and technology, and design to understand how culture and technoscience are co-constructed at different levels of analysis. Topics explored include the cultural construction of science and technology, scientific and organizational cultures, the politics of science and technology, technology and the self, culture in design, and gender in technoscience. Students also have the opportunity to apply these approaches to their own areas of research interest.

In the course, students develop and practice a variety of skills needed for graduate study and participation in the academic community, including: Critical reading and collegial communication: Critical engagement with an author’s argument involves identifying the theoretical and methodological approaches (sometimes explicit, sometimes implicit, and sometimes both) in the work and discussing their strengths and weaknesses.

We consider further questions such as: What theoretical assumptions are made? What are the scope and scale of generalizations and their basis? How does this work relate and contribute to the continuing interdisciplinary academic discussion on culture, science and technology? Etc.

Problem-centered thinking and research: the study of technoscience and culture are interdisciplinary fields of inquiry, so our orientation in the course is likewise cross-disciplinary and problem-centered. Students learn to operate as interdisciplinary scholars, finding spaces between existing disciplines and crossing traditional disciplinary boundaries and identities to frame cultural critiques of science and technology and synthesize the course materials into original arguments. Synthesis of themes for individual research: In addition to learning about some of the different areas of research on science, technology, and culture, students also practice analytical and synthetic thinking skills by reflecting on and relating the materials we cover to bring them to bear on a problem of personal interest. This permits practicing the research skills of an interdisciplinary scholar. We also work together to develop a “cognitive map” of inquiry regarding culture, science, and technology, and to situate our own ideas within this map.
I709 – Computing, Culture and Society, Advanced Seminar II
This course is taught once every two years alternating with 1609. Most students are from
the CCS track but others frequently enroll in this seminar, too.

Recent Course Description
This seminar course will introduce graduate students to core and emerging literature on
the political and legal aspects of information technology. We will adopt an
interdisciplinary view of the topic and will draw from the fields of law, science and
technology studies (STS), history, anthropology, sociology, and computer science. This
semester we will address such topics as Internet governance; the creation, maintenance,
and regulation of information infrastructures; civil liberties and human rights; information
technology and development including science policy; open data and governance;
algorithmic regulation; intellectual property; and cyberwarfare. These topics have been
selected to provide students with an understanding of the issues involved in major policy
areas that pertain to information technology. Students will have the opportunity to
examine and explore relevant and influential research literature, methods, and theoretical
frameworks and apply this knowledge to a topic of their choosing in a final paper. This
seminar will provide the foundation for future doctoral work in social informatics. It is
cross-listed with Maurer School of Law.

Goals
By the end of this course, students will be able to:

• Understand major political and legal issues that pertain to information technology
  and form educated opinions about key areas of technology policy.
• Analyze and discuss representative literature on the political and legal dimensions of
  information technology.
• Apply the theoretical frameworks, themes, and critiques presented in class in a final
  essay assignment.

4 Elective Courses
In addition to required minor, research rotation, INFO (501, 502), and CCS (609, 709)
courses, PhD students should expect to take a minimum of an additional 27 credits in
elective courses and independent study work. At least four of these elective courses
should be taken with CCS faculty, providing more targeted training. Recent elective
offerings include the following:
INFO 590 Information Systems and Organizational Change (Ensmenger)
INFO 651 Ethnography of Information (Hakken/TBA)
INFO 528 Participatory Design (Hakken/TBA)
INFO 590 Geographies of Technology (Medina)
INFO 590 History of Technology (Medina)
INFO 590 Technology and the First Amendment (Medina)
INFO 590 Enacting Identity (Nippert-Eng)
INFO 590 Exercises in Ethnography (Nippert-Eng)
INFO 400/590 Privacy, Information and Identity (Nippert-Eng)
INFO 590 Social Media Research (Paolillo)
INFO 609 Cultural Perspectives on Science and Technology (Šabanović)
INFO 502 Human-Centered Methods (Šabanović)
INFO 440 Human-Robot Interaction (Šabanović)
Analytic-synthetic essays are built on careful readings of others’ claims (this is the analytic part) as well as the essay writer’s observations/claims about those claims (this is the synthetic part). Analytic-synthetic essays demonstrate mastery of existing domain knowledge by demonstrating understanding of individual scholars’ works as well as how a body of works relate to each other.

The written component has three parts: 1) an analytic-synthetic essay required of all students, written in response to a question determined by the CCS faculty and based on authors’ arguments found in the list of CCS Qualifying Examination Readings, 2) an analytic-synthetic essay addressing a question customized for the student according to their interests and based on a list of specialty readings within the CCS tradition, both of which are determined by the student and their three-person faculty examination committee, working in consultation with each other, and 3) one of three options intended to establish competence in appropriate research methodology – either a) an analytic-synthetic review essay on how a particular concept, behavior, etc., is observed or measured using a variety of approaches, or, b) a methodological critique of a recent peer-reviewed journal article, or, c) an original, proposed research technique, methodology, or plan designed to answer a specific research question. The decision of which of these methodology components the student will address is also decided by the faculty examination committee and student working in consultation with each other.

The oral examination is given by the faculty examination committee and takes place after the written examination. It is approximately one hour in length. It provides both the student and the examination committee with an opportunity to further discuss the content of the written examination.

The qualifying examination is given to all second year students two weeks after the last day of spring classes. The written questions are distributed on that Monday morning and students have five days to complete the exam. Answers must be original, written independently, and submitted by that Friday at 5:00 PM. Faculty grade the exams over the next several days, prior to the oral examination. The oral examination commences according to scheduled appointments on the subsequent Wednesday. Students will be informed of their exam grade by the end of that week, just before the Memorial Day weekend.

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1 Analytic-synthetic essays are built on careful readings of others’ claims (this is the analytic part) as well as the essay writer’s observations/claims about those claims (this is the synthetic part). Analytic-synthetic essays demonstrate mastery of existing domain knowledge by demonstrating understanding of individual scholars’ works as well as how a body of works relate to each other.

2 This is a list developed by the faculty consisting of general CCS-related readings. It is an on-going endeavor, available to all students. The version available at the start of their second year of studies is the version on which students will be tested during their qualifying exam.

3 For some questions, of course, this is only a formality. A student will already know at least one of the questions on their exam (#2) prior to this date, and will already have been working on their answer to it throughout the semester. Depending on what has been decided with their examination committee for question #3, it is possible that a student will encounter only one new question on this Monday morning when the exam questions are officially released (i.e., Q #1).

4 For example, during the spring 2016 term, classes ended on Friday, April 29th. The qualifying exam would have been distributed to second year PhD students at 9:00 AM on Monday, May 16th. Students would have had until 5:00 PM on Friday, May 21st to complete the exam. Each student would then meet with the faculty for their oral exam for one hour on Wednesday, May 25th. Students would receive notification of their exam grades by Friday, May 27th.)
The student’s faculty examination committee grades the qualifying examination, based on a combination of both the written and oral exams. Each part/question of the exam is assigned a grade of “pass,” or “fail.” Students must receive the grade of “pass” on all three parts of the exam in order to progress in the PhD program. Students who fail one or more parts of the exam are deemed unqualified to continue in the program. Students who do not pass the exam are entitled to one opportunity to revise and re-submit their answers to their faculty exam committee for reconsideration. Revised answers must be submitted by the end of the summer, so that the committee can grade them and inform the student of the outcome before the fall term begins.

**Timeline: Student’s 2nd year of study**

<table>
<thead>
<tr>
<th>Event</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>End of October</td>
<td>Faculty Examination Committee set</td>
</tr>
<tr>
<td>End of fall term</td>
<td>Questions 2&amp;3 set</td>
</tr>
<tr>
<td>Monday, two weeks after the end of the spring semester</td>
<td>Questions released to cohort</td>
</tr>
<tr>
<td>Friday, 5PM, two weeks after end of the spring semester</td>
<td>Answers due</td>
</tr>
<tr>
<td>(Grading commences immediately)</td>
<td>(Grading commences immediately)</td>
</tr>
<tr>
<td>Next Wednesday, by appointment</td>
<td>Oral exams take place</td>
</tr>
<tr>
<td>Friday of Memorial Day weekend</td>
<td>Students notified of results</td>
</tr>
</tbody>
</table>

6 **Typical Minors**

CCS students are required to take a minor and they have declared a wide range of them so far in order to supplement their training. There is no typical minor, as there is no typical dissertation topic in this track. However, students have so far enjoyed minors in Methods of Inquiry, African Studies, Latin American Studies, and Gender Studies, to name a few. Our students frequently take single elective courses in other departments at IU as well, taking advantage of IU’s excellent offerings across the campus – especially those in the social sciences and humanities. Where fieldwork requires it, students are also likely to take substantial coursework to acquire necessary language skills.

7 **Sample Dissertation Titles**

<table>
<thead>
<tr>
<th>Name</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>David Nemer</td>
<td>Rethinking Digital Inequalities: The Experience of the Marginalized in Community Technology Centers (August 2015)</td>
</tr>
<tr>
<td>Dong-oh Park</td>
<td>Digital Nation-Building: Interaction Between Technology and Policy of the Digital Identity Infrastructure in Korea (July 2016, ant.)</td>
</tr>
<tr>
<td>Jennifer Terrell</td>
<td>Constructing Rooms of Requirement: Transmediation and the Ethnography of Harry Potter Fans (July 2015)</td>
</tr>
</tbody>
</table>

8 **Sample Curriculum**

The following is a sample three-year curriculum. Students should consult with their advisors in order to select courses that will best support their plans of research. Courses in bold meet the minimum CCS PhD requirements. Additional courses may be necessary to fulfill the student’s minor or other programmatic choices.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>One</td>
<td>1501</td>
<td>1502</td>
</tr>
<tr>
<td></td>
<td>CCS elective 1</td>
<td>1609</td>
</tr>
<tr>
<td></td>
<td>CCS elective 2</td>
<td>Minor Course 1</td>
</tr>
<tr>
<td>Two</td>
<td>CCS elective 3</td>
<td>1709</td>
</tr>
<tr>
<td></td>
<td>CCS elective 4</td>
<td>Research Rotation 1</td>
</tr>
<tr>
<td></td>
<td>Minor Course 2</td>
<td>Minor Course 3</td>
</tr>
<tr>
<td>Three</td>
<td>Research Rotation 2</td>
<td>Elective/Independent Study</td>
</tr>
<tr>
<td></td>
<td>Elective/Independent Study/Minor 4</td>
<td>Elective/Independent Study</td>
</tr>
<tr>
<td></td>
<td>Elective/Independent Study/Minor 5</td>
<td>Elective/Independent Study</td>
</tr>
</tbody>
</table>
HUMAN-COMPUTER INTERACTION / DESIGN (HCI/D)

Track Director: Jeffrey Bardzell

1 SUMMARY

Human-computer interaction (HCI) has traditionally been the domain of engineering and psychology. Here, we approach it from the perspective of design. That is, we focus on the ways that design and research cooperate to create openings and insights into emerging design domains; how research contributes to design processes and methods; and how design practices can themselves be a form of research.

Human-computer interaction design research is more geared toward supporting interventions—toward bringing about better possible futures—than about describing the past or even the present. It asks, what possible futures are open to us, and how might we pursue them? What is “design thinking” and what methods best support design activities? How might information technology be developed in service of social justice and sustainability? How can design professions be more participatory and democratic? What makes user experiences aesthetic, and how can designers create them?

Human computer interaction design opens up possibilities, such as the following: massive scale collaborative systems like Wikipedia; global hardware/fabrication networks, as seen, for example, in the maker movement; educational applications of augmented and virtual reality; new forms of democratic participation in government; innovations in everyday life, such as personal health tracking; and entertainment computing, such as videogames. But interactive systems also contribute to serious social problems, such as e-waste and environmental destruction; concerns about privacy and surveillance; and unequal access due to socioeconomic status, disability, and other social issues. HCID research seeks to understand such opportunities and problems in a way that equally attends to emerging technological possibilities, studies of human needs, and sociocultural contexts and trends—in a way that is oriented toward intentional intervention, that is, design.

The human-computer interaction design track of the Ph.D. in Informatics offers the opportunity to conduct practical research in these areas:

• Interaction design
• Computer-supported cooperative work (CSCW) and social computing
• New media
• Dynamic visualizations
• ICT for Development
• Augmented reality
• Learning systems
• Design pedagogy
• Tangible and embodied interaction (TEI)
• Ubiquitous computing
• Mobile computing
• Political economy of computing

2 TRACK FACULTY

The core track faculty are as follows:

Jeffrey Bardzell: User experience (UX), philosophy and critical theory, humanistic HCI, interaction criticism, social creativity.
Shaowen Bardzell: Feminist/gender HCI and design, constructive design, humanistic
Human-computer interaction (HCI), transnational computing, making and fabrication.

**Eli Blevis:** Sustainable interaction design, visual thinking, photographic foundations of HCI, design theory, transdisciplinary design.

**Hamid Ekbia:** Political economy of computing, artificial intelligence, mediation, cross-cultural computing.

**Patrick Shih:** Social computing, smart devices, computer-supported cooperative work, behavioral change and persuasive computing.

**Martin Siegel:** Design pedagogy, design thinking, slow change interaction design, digital learning environments.

**Erik Stolterman:** Interactivity and interfaces, philosophy and theory of design, design thinking.

**Norman Makoto Su:** Computing and subcultures, computer-supported cooperative work, ubiquitous computing, science and technology studies.

### 3 Required Courses

All courses provided by faculty in the Human-Computer Interaction Design track, including the I609 and I709 Advanced Seminars, are open to and welcome students from other tracks and programs.

#### I609 – Advanced Seminar I in Human-Computer Interaction Design

This course combines the traditional seminar format with research skills-oriented sessions, and is attended not only by students who sign up for it, but also by all the other HCID Ph.D. students and faculty. Together, we survey contemporary research in the field of human-computer interaction design and design research. We discuss core aspects of research practice, including research questions and contributions, methods, and theory. We also have practical sessions on how to conduct peer review, write academic papers, and conduct literature reviews. The seminars also feature both student and faculty research presentations and group discussions and critiques. In addition to participating in the seminar and presenting their work at least once per semester, students are also expected to produce an annotated literature review for their research area.

This course is required of all HCID Ph.D. students (fulfilling one of the two seminar requirements) and is open to Ph.D. students from other tracks as well.

#### I709 – Advanced Seminar II in Human-Computer Interaction Design

The second seminar in human-computer interaction design is a continuation of the first and follows the same structure. However, instead of an annotated literature review as a deliverable, students will deliver an equivalent piece of writing in service of their dissertation research, to be determined through consultation with the instructor.

### 4 Elective Courses

In addition to required courses, students should take at least 12 elective credits for the doctoral degree.

Faculty in the HCID track offer courses that provide more targeted training in specific areas. This list is illustrative and not exclusive:

- INFO I528 – Participatory Design
- INFO I530 – Field Deployments
- INFO I541 – Interaction Design Practice
- INFO I542 – Foundations of HCI
- INFO I543 – Interaction Design Methods
- INFO I544 – Experience Design
- INFO I549 – Advanced Prototyping
- INFO I561 – Visual Thinking Meaning and Form
INFO I590 – Various (e.g., Augmented Reality; Design Strategy; Interaction Culture; Rapid Design for Slow Change; Social Computing; Sustainability in HCI and Design; Visual Foundations for HCI)
INFO I604 – HCI Design Theory

5 Qualifying Exam
Written and oral examinations will be decided by the student’s committee based on his or her research interests. A typical exam consists of an extensive annotated bibliography with accompanying critical essay that describes the student’s interpretation of the relevant literature and how they situate their own interests and work within it. The written portion of the exam is followed by an oral exam to defend the written submissions.

6 Typical Minors
Inquiry methodology, cognitive science, anthropology, sociology, intelligent and interactive systems, computing, culture, and society.
INTELLIGENT AND INTERACTIVE SYSTEMS (IIS)

Track Director: Selma Šabanović

1 SUMMARY
Intelligent and Interactive Systems (IIS) is an interdisciplinary field that studies the interactions between humans and digital technologies, and develops intelligent technologies that can interact with humans and their environment. Research and teaching in the field include artificial intelligence, computer vision, human-robot interaction, dynamical systems, and cognitive science, among others. Students and faculty explore theories, develop prototype technologies, and evaluate human responses to and interactions with them.

Intelligent and interactive technologies are becoming an increasingly important part of people’s daily lives. For instance, robots cooperate with and enable humans to perform common tasks, while pervasive wearable devices monitor our health habits and daily activities, and cloud-based systems seek to identify the sights and sounds of our surroundings. Investigating and building these technologies involves both understanding the relationship between people and computing systems, as well as technological advances in making computers better able to understand, perceive, and interact with their environment.

The Intelligent and Interactive Systems track in Informatics is a multidisciplinary program that approaches information and communication technology from both technological and human perspectives. Graduate students will have the opportunity to explore a diverse range of research topics, including autonomous robots, computer vision, culturally-situation technology design, dynamical systems, human-robot interaction, object and activity recognition, social robotics, video and image understanding, and wearable and ubiquitous computing.

2 TRACK FACULTY
The core track faculty are:

Randall Beer: Cognitive science, computational and theoretical biology. Understanding how coordinated behavior arises from the dynamical interaction of an animal’s nervous system, its body and its environment. Evolution and analysis of dynamical “nervous systems” for model agents, neuromechanical modeling of animals, biologically-inspired robotics, and dynamical systems approaches to behavior and cognition.

David Crandall: Computer vision, object recognition, 3d reconstruction, image processing, artificial intelligence, data mining, machine learning, social media, wearable computers.


Selma Šabanović: Human-robot interaction, social robotics, human-centered computing, cross-cultural studies of technology, science and technology studies, assistive technology, user-centered design and evaluation.

Chen Yu: Cognitive science, developmental psychology, language learning, embodied social cognition, multimodal human-human and human-robot interactions, perception and action, data mining and computational modeling.

3 REQUIRED COURSES
All courses provided by faculty in the Intelligent and Interactive Systems track, including the I609 Advanced Seminar, are open to and welcome students from other tracks and programs.
1609 – Advanced Seminar in Intelligent and Interactive Systems
This course is taught once every two years to obtain a sufficient number of students. It is required of students in the IIS track and fills one of their seminar course requirements. The course will present students with a broad spectrum of work related to the theoretical and foundations, design, technical development, and evaluation of intelligent and interactive systems. These include discussion of how intelligent and interactivity can be defined (e.g. embodied cognition, dynamic systems), technical tools needed for the design and development of intelligent interactive systems (e.g. computer vision, artificial intelligence), approaches to implementing and evaluating intelligent interactive systems (e.g. user evaluation), and various applications of these approaches in different intelligent interactive systems (e.g. human-robot interaction, mobile technologies).

The seminar will be composed of lectures by IIS faculty and invited speakers from IUB and other institutions, as appropriate. Students will also be expected to critically evaluate and present chosen readings on the course topics. Finally, students will prepare a term project based on their areas of interest in intelligent interactive systems.

1709 – Second Seminar in Intelligent and Interactive Systems
To satisfy their second advanced seminar requirement, students may take an advanced seminar offered by one of the other Informatics tracks (e.g. Advanced Seminar in Complex Systems, Advanced Seminar in Computing, Culture and Society), as well as other graduate level courses that have been approved by their doctoral advisor. These courses may be chosen from among the elective courses listed below, or other courses relevant to the student’s research specialization. This takes into account that IIS students will be coming to the field from various interdisciplinary perspectives, spanning the social sciences to artificial intelligence, and that they will have different needs from the advanced seminars.

All IIS track students will also be required to take both a course that will help them develop their technical skills in the field (e.g. artificial intelligence, computer vision, advanced prototyping), and a course that presents the conceptual and human-oriented aspects of the field (e.g. human-robot interaction, embodied cognition). Either course can be taken as their second seminar, as possible in relation to course offerings and appropriate for the student’s professional development. In this way students will have the ability to talk across the multiple disciplines that compose the domain of IIS research.

3 Elective Courses
In addition to required courses, students should take at least 12 elective credits for the doctoral degree.

Faculty in the IIS track offer courses that provide more targeted training in specific areas:
INFO I540 – Human Robot Interaction – Šabanović
INFO I590 – Vision for Intelligent Robotics - Ryoo
CSCI-B 551 – Elements of Artificial Intelligence – Crandall
CSCI-B 554 – Probabilistic Approaches to Artificial Intelligence – Crandall
CSCI-B 657 – Introduction to Computer Vision – Crandall, Ryoo, Yu
COGS-Q 580 – Introduction to Dynamical Systems in Cognitive Science – Beer

Additionally, a number of courses taught by other faculty are also relevant to the IIS track:
COGS-Q 511 – Introduction to Embodied Cognitive Sciences
COGS-Q 530 – Programming Methods in Cognitive Science
COGS-Q 550 – Models in Cognitive Science
COGS-Q 551 – Brain and Cognition
COGS Q-560 – Experimental Methods in Cognitive Science
COGS-Q 570 – Behavior-based Robotics
INFO I526 – Applied Machine Learning
INFO I590 – Relational Probabilistic Models
INFO I526 – Applied Machine Learning
INFO I534 – Seminar in Human-Computer Interaction
INFO I530 – Field Deployments
INFO I543 – Interaction Design Methods
INFO I549– Advanced Prototyping
INFO I586 – Artificial Life
CSCI-B 553 – Neural and Genetic Approaches to Artificial Intelligence
CSCI-B 552 – Knowledge Based Artificial Intelligence
CSCI-B 555 – Introduction to Machine Learning
CSCI-B 651 – Natural Language Processing
CSCI-B 659 – Stochastic Optimization for Machine Learning
CSCI-B 659 – Reinforcement Learning for Artificial Intelligence
STAT S620 – Introduction to Statistical Theory
STAT S657 – Statistical Learning and High-Dimensional Data Analysis
STAT S681 – Statistical Machine Learning
STAT S682 – Introduction to Graphical Models
STAT S710 – Statistical Computing

4 Qualifying Exam
Written and oral examinations will be decided by the student’s committee based on his or her research interests. A typical exam can consist of writing a survey paper and two shorter papers each reporting on a project or problem assigned by the committee, or it can consist of an annotated bibliography preceded by an essay that describes the student’s interpretation of the relevant literature and how they situate their own interests and work within it. The written portion of the exam is followed by an oral exam to defend the written submissions.

5 Typical Minors

6 Sample Dissertation Titles and Ph.D. Student Placements
Since IIS is new, no IIS students have graduated yet. However, IIS core faculty have supervised Ph.D. students in other tracks who have successfully defended, including:

- Korayem, Mohammed (2015). Social and egocentric image classification for scientific and privacy applications. (Computer Science, supervised by Crandall. Now at CareerBuilder.)
HEALTH INFORMATICS
Track Director: Kay Connelly

1 SUMMARY
Students who graduate from the Health Informatics programs in the School of Informatics and Computing at Indiana University understand how to combine cutting edge, innovative technologies with the latest in data analytics to design, implement, and evaluate technologies to help people better understand, manage, and improve their health. Students increase their impact in their research community and the world by empowering patients outside of the clinical setting where people live, work, and play.

The Health Informatics MS and PhD programs consist of a rigorous course sequence that introduce students to the fundamentals of design, implementation, data analytics, and evaluation. Students choose between a Design focused or Data-focused degree, selecting electives that fit their interests. Students tailor their degree with an emphasis on a particular health domain.

2 TRACK FACULTY
The core track faculty are:

Kay Connelly: Her research interests are at the intersection of mobile and pervasive computing and healthcare. In particular, she is interested in issues that influence user acceptance of health technologies, such as privacy, integration into one's lifestyle, convenience, and utility. She works with a variety of patient groups, including very sick populations who need help in an aging their disease, healthy populations interested in preventative care, and senior citizens looking to remain in their homes for as long as possible. Her work is funded by NSF, NIH, the Lilly Foundation & MSR.

James Clawson: He designs and evaluates novel mobile health technologies that improve communication and collaboration with the goal of increasing patient engagement with their health and encouraging everyday wellness. He designs holistic tools that support individuals over the course of a healthcare journey: from diagnosis to recovery. Healthcare journeys begin with a fundamental shift in a patient’s identity and progress over time as the patient enters active treatment/engages with healthcare professionals and then eventually exits formal care becoming wholly responsible for their own health.

Sriram Natarajan: He is interested in the fields of Artificial Intelligence and Machine Learning with emphasis in Learning from structured multi-relational data and their application of health informatics problems. He is interested in health status, adverse events, and disease susceptibility from electronic health records, natural language studies, medical images, mobile and demographic data. His research is supported by DARPA, NSF, ARO and NIH. He has been awarded Army Research office Young Investigator award and is an active member within AI and ML communities.

Katie Siek: Her primary research interests are in human computer interaction, health informatics, and ubiquitous computing. More specifically, she is interested in how sociotechnical interventions affect personal health and well-being. Her research is supported by the National Institutes of Health, the Robert Wood Johnson Foundation, and the National Science Foundation including a five-year NSF CAREER award. She has been awarded a CRA-W Borg Early Career Award and a Scottish Informatics and Computer Science Alliance Distinguished Visiting Fellowship.

Patrick Shih: His research focuses on the study of sociotechnical systems and mechanisms to enhance physical and mental wellbeing and to facilitate civic engagement and environmental stewardship. He utilizes mixed methods approaches to tackle research problems in online and geographic communities. Specifically, he leverages the
awareness of individual and community activities embedded in sensor technologies, smart devices, social media, and online forums in the design, prototyping, and deployment of novel personal informatics interfaces and civic engagement platforms.

3 STRUCTURE OF PROGRAM AND PH.D. MILESTONES
The incoming PhD students in the Health Informatics track are a single cohort, but are split into two clusters depending on their Informatics focus: Data and Design. Both clusters will take all of the required core courses, but in different orders to provide them with the necessary skills for their Research Rotations. There are a total of 90 credits in the Health Informatics PhD program.

INFORMATICS REQUIRED COURSES (6 CR.)
- 501: Introduction to Informatics
- 502: Informatics Management

HEALTH INFORMATICS REQUIRED COURSES (9 CR.)
- I526: Applied Machine Learning
- I527: Mobile & Pervasive Design
- I530: Field Deployments

RESEARCH ROTATION (6 CR.)
PhD students must perform two research rotations with different faculty members, and are encouraged to do so before the end of their second year. Students are expected to work on the research of the sponsoring faculty member and participate in their research lab. Research rotations allow students to get hand-on experience in doing research and gain exposure to more than one potential advisor. Students should approach faculty members their first year to arrange for their rotations.

INFORMATICS SEMINAR COURSE (6 CR.)
Ph.D. students are required to take I609 and I709, a seminar in informatics, after their second year in the program. The seminar includes students presenting current research (including their own), writing grant proposal and papers, and other professional development activities. Students are encouraged to take the I609 section specifically for Health Informatics PhD students, but may take the I709 section for other Informatics tracks.

THEORY AND METHODOLOGY (12 CR.)
The primary source for guidance for the appropriate courses is the student’s advisor, who may select from the entire range of courses offered at the University. The courses must contain theoretical or methodological components. Research lab experience may be substituted for classroom courses upon approval of the Advisor. Students must take at least one qualitative and one quantitative-based course.

ELECTIVES (12-21 CR.)
Research lab experience may be substituted for classroom courses upon approval of the Advisor and program committee.

MINOR (6-12 CR.)
Students must complete a minor of their choice.

DISSERTATION RESEARCH (21-30 CR.)
Students must complete 21-30 credits of dissertation research.
4 Required Courses

**I526 Applied Machine Learning (3 cr.)**
The aim of this course is to provide students with practical skills required to get learning algorithms to work on real data. We will cover a few important but practical learning algorithms and spend more time on practical skills for getting these algorithms to work. The focus would be on health care, business, natural language, and mobile data.

**I527 Mobile and Pervasive Design (3 cr.)**
The aim of this course is to provide students with the ability to design novel user interactions with mobile and pervasive technologies. We discuss new interaction paradigms and gain experience with different technologies. Students will learn how to design, build, implement and refine mobile and pervasive computing applications for their domain of interest, including health.

**I530 Field Deployments (3 cr.)**
The aim of this course is to provide students with the skills necessary to effectively design a field study that evaluates a sociotechnical system and execute the study in a small scale, real world setting. Students will learn how to design a study; identify relevant scholarly work; plan and execute a field study; and write the methods for professional dissemination.

**PROHealth Colloquia (0 cr.)**
Attendance at a regular PROHealth informatics colloquia is required for all health informatics students in the program. Invited speaker presentations will expose the students to new and exciting research directions. The invited speakers will be world-renowned experts in related topics from academia and industry. The colloquia will teach valuable professional development and networking skills between peers and senior researchers within their community.

5 Portfolio

Students are required to maintain an online portfolio of the work they complete during their degree progress that identifies:

- Professional bio
- Affiliation – including informatics focus
- Professional Experience
- Completed Projects with pictures, paragraph description, and any accompanying multimedia or deliverables.
- Contact Information
- Resume or Vita

Each course in the Health Informatics program sequence will provide students with portfolio materials. Students are encouraged to create an easily accessible, web enabled portfolio when they enter the program and add to their portfolio as they develop materials for courses. Students also will add materials they create as part of internships, research experiences, and capstone. Indiana University provides each student with web space.

6 Qualifying Exam

The main aim of the Ph.D. Qualifying Examination in Health Informatics is to evaluate the student’s ability to do PhD level research including the ability to identify, understand and synthesize relevant papers, conduct independent research and communicate the findings in a scholarly manner.
The qualifying examination consists of a written part and one oral defense.

The student should expect to spend the equivalence of 3 credits of work preparing the qualifying examination paper. The format of the written part of the Qualifying Exam can take one of two forms: 1) a systematic review, or 2) an annotated bibliography.

The aim of this two-hour long session is to evaluate the student’s research ability and depth of understanding in his/her research area. The first hour will include a presentation by the student to the general audience that includes the advisor plus the committee members. This will be followed by a one-hour closed room session in which faculty will ask the student general questions related to the list of papers he/she has read and presented in the previous session.
Security Informatics

Track Director: Steve Myers

1 Summary

Security Informatics is a uniquely unifying group in the School of Informatics and Computing. The right of any faculty member in the School of Informatics and Computing to supervise a doctoral student as long as the standards provides unification through diversity. Security threats range from integration of targeted hardware in integrated circuits with social engineering. Attackers are motivated by everything from obsessive love through Malthusian models of trade to crime for profit and even to Machiavellian politics. Security Informatics faculty have primary appoints in Informatics and Computer Science. Our larger footprint on the campus includes law, business, and public policy.

Security Informatics is the study of computer security as grounded in larger technical and human context. Security Informatics includes the core subjects that define computer security: mathematics, protocol analysis, system and network security. Security Informatics also includes the span of material covered by informatics. Security Informatics is security integrated with human interaction, organizational theory, social engineering, and information technology rather than isolated from the larger economic and social milieu. As such the Security Informatics faculty are integrated with Computer Security.

The core educational goals for Security Informatics include are correspondingly comprehensive: Develop the mathematical foundation required for Security Informatics. Become well versed in the recognition and understanding of seminal work (research, innovation and literature) that constitutes the core of information security. Acquire the technical skills to make effective use of current and emerging design applications. Understand the socioeconomic ramifications of security and privacy-enhancing technologies. Cultivate an understanding of security in practice and how it functions in organizations, as well as in systems and network administration. Develop an appreciation for the insights of economics and organizational informatics, to make optimal business decisions as embedded in security technology. Develop an interdisciplinary understanding that enables design and implementation that can address social engineering and economics of security.

The School of Informatics have become widely known for interdisciplinary work in security. The Security Informatics group is well-known in Interdisciplinary security conferences (SOUPS, eCrime, FC, USEC, WEIS) which consistently have a representative from the faculty at the School of Informatics on the program committee. Faculty receive far more invitations for participation as PC members in peer-reviewed interdisciplinary workshops than we can accept, particularly when considered as a group. Research in security combines faculty who are excelling in their own areas, and then joining with others beyond our group or in the broader conception of security to achieve prominence. This need to connect across disciplines and areas is reflected in the organizational framework that follows.

2 Track Faculty: Informatics Appointments


- **Sameer Patel**: Usable security, participatory design, privacy-centered design, usable tools for developers to improve security, Align incentives to minimize risk, human-
centered security and privacy. Security for vulnerable populations. Incentive-aligned security

3 TRACK FACULTY: COMPUTER SCIENCE APPOINTMENTS

Xiaofeng Wang: System security, Data privacy, Incentive engineering, Human genome privacy. Rated as one of the top 5 individuals published in applied security in past decade.


Raquel Hill: Develops ontology-based privacy mechanism to achieve semantic privacy and improve data utility, Online information and job discrimination, Bridging the TrustGap: Develop framework to enable those who manage infrastructure to map requirements to actions needed to satisfy those requirements.


Yan Huang: Secure Cloud Storage, Oblivious RAM and Data structures, Secure Human Genomics, Secure Computation, Game Theory and Applied Cryptography, Programming Languages and Cryptographic Implementation.

Ryan Henry: Applied cryptography, Transitional cryptography, moving theory to practice, Private Information Retrieval systems, Accountable anonymity, Efficient zero-knowledge proofs, GPU use in cryptography

4 REQUIRED COURSES

All required courses provided by faculty in the Security Informatics track are open to and welcome to all students from other tracks and programs who have the necessary skills. The majority of courses in the Security Informatics track are co-listed with Computer Science.

The structure of our qualifying exam combines independent study with topical areas of study, as described below. Therefore any student I effectively require to take the core material that is now offered in INFO 520 and INFO 533, provided at a new intensive focused depth. Until 2014, the School scheduled multiple courses that combined undergrad, masters and doctoral students in one classroom. It was not workable. The classes were literally so over-subscribed undergrads were sitting on the floor next to doctoral students.

In 2004, Indiana University had no technical security basic research program and no degree programs. Since that time, we have gone from having no security program in Informatics and Computer Security to being ranking 12th in security by csrankings.org. Examination of the cs rankings distribution of publications illustrates the contributions of the security group to the overall rankings. Indiana University had no degree programs in security in 2004. Informatics now has a cognate, a minor, and a doctoral track. Computer science has a minor and a doctoral track. There is a professional masters that includes computer science and informatics components.

It has long been a goal of the security faculty to create targeted doctoral courses. The opportunity to create a discrete doctoral class is an important step forward.

In addition to the courses, the University has an excellent Speaker Series, including those from Computer Science, Informatics, LIS, and CACR. When speakers are visiting, a few minutes of class time will is used to identify the speaker, and how the topic fits into the course. This allows students to easily catch the presentations on topics that engage you the most.

The entire security faculty happily anticipates creating targeted doctoral seminars in
computer security. The courses may be offered every year or every other year. They are integrated into our larger arena so the depth in one area of another may vary over time.

**Security Informatics: Advanced Seminar I & II**
This course will be an extensive and in-depth exploration of system and network security. Course materials will cover threats to information confidentiality, integrity and availability in a computing system and network, and defense mechanisms which control these threats. The course will also provide necessary foundation on information security, such as cryptographic primitives/protocols, authentication, authorization and access control technologies, and hands-on experiences through programming assignments and course projects.

Doctoral students from other areas of Informatics and Computer Science will be welcome. Because of the interest in computer security from Computer Science, it may be possible to offer these every year.

This seminar course will introduce graduate students to core and emerging literature on the political and legal aspects of information technology. We will adopt an interdisciplinary view of the topic and will draw from the fields of law, science and technology studies (STS), history, anthropology, sociology, and computer science. This semester we will address such topics as Internet governance; the creation, maintenance, and regulation of information infrastructures; civil liberties and human rights; information technology and development including science policy; open data and governance; algorithmic regulation; intellectual property; and cyberwarfare. These topics have been selected to provide students with an understanding of the issues involved in major policy areas that pertain to information technology. Students will have the opportunity to examine and explore relevant and influential research literature, methods, and theoretical frameworks and apply this knowledge to a topic of their choosing in a final paper. This seminar will provide the foundation for future doctoral work in social informatics. It is cross-listed with Maurer School of Law.

**Goals:**

*Foundational Security Vocabulary*
This is the breadth component of the course. Students should leave this course with an understanding of security and privacy concepts, practices, and how these interrelate. The readings from the textbook and some supplementary readings help meet that goal.

*Applied Security*
Students should be able to use the tools discussed in class and show some mastery of basic security technologies. The hands-on experiences in the labs are intended to meet this goal.

*Security Threats*
There is no question that current affairs and attacks are exciting. Not only will supplemental readings and lectures address applicable past attacks, real time security events will be part of the discussion. This will inevitably result in some jumping around, but (un)luckily there are usually applicable attacks for most topics in a timely manner. A major security event (e.g., on the scale of Heartbleed) will result in some changes in the schedule as needed.

*Introduction to Human and Economic Factors in Security*
An exposure to interdisciplinary approaches to security includes introduction to the heuristics and biases that are leveraged in attacks. A second focus is the economics of global ecrime. Specifically, how frauds are constructed and how they are then monetized.
Introduction to Cryptography
An introduction to cryptography adequate to understand both the user of major cryptographic tools and the knowledge of the risks of trying to alter the steps of any protocol or trying to create your own.

Mastery of One Component of Security
Any topic in this course is worthy of a course unto itself. There is a depth component of the courses. The ability to effectively summarize one core component of the course is the goal of the presentation. By selecting one topic, researching it, and presenting it you show a deeper understanding that topic.

5 Optional Courses
In addition to required courses, faculty in the track offer courses that provide more targeted training in specific areas. The qualifying exam includes the material in research rotations, the core year-long semester seminar, and the selected courses.
INFO 1521 Malware Epidemic: Threat and Defense (Wang)
INFO 1525 Organizational Informatics and Economics of Security
INFO 536 Foundational Mathematics of Cybersecurity (Myers, Huang, Henry)
INFO 1537 Legal and Social Informatics of Security (Camp, Patel)
INFO 1538 Introduction to Cryptography (Myers, Huang, Henry)
INFO 1539 Cryptographic Protocols
INFO 520 Security for Networked Systems
INFO 533 System & Protocol Security & Information Assurance

In addition to required courses, faculty in the track offer courses that provide more targeted training in specific areas. The qualifying exam includes the material in research rotations, the core year-long semester seminar, and the selected courses.
INFO 590 Past topics courses have included
Trusted Computing (Hill)
Security and Privacy in the Internet of Things
Advanced Topics in Privacy
Usable Security

6 Qualifying Exam, Dissertation Proposal and Thesis
There are three components to the security qualifier for doctoral candidacy. There is a comprehensive written exam. There is production of independent research. There is an oral defense of that independent research.

The written exam is a 4-hour closed book exam. During the exam the student may not reference any material except what is stored in the student’s head. Students must turn-off and place on of the desk any cellphones, or other digital devices. The exam is broken in to four sections. First there are breadth questions related to security in general that all students should know. Second, there questions related to specific security courses the students has taken that are most applicable to the student’s area of research, and therefore is expected to have more than basic knowledge. Third, questions from a course from those related to the student’s minor. Fourth, and most in-depth, questions relating to the students research area. The advisor usually writes these last questions. The student must pass each of the four sections in order to pass the exam. The student will not discuss the questions on this exam with anyone but faculty at any point during or after the exam. The student will write the student’s answers exam in tradition IU bluebooks. On two occasions due to disability concerns the students have been provided stripped-down computers without internet access for the exam.
The second component is demonstrated research progress in a written form. Often this will take the form of a work that has either been accepted in a peer-reviewed event or is judged as equivalent quality by the student’s qualifying committee. In some domains, most obviously theory and cryptography, there is not a requirement for a publishable unit but rather proof of clear research ability and knowledge as illustrated by significant progress.

The oral exam is a presentation of that publication. It requires the student be able to defend his or her own, and illustrate mastery. Every stage of the research is subject to question.

Security Informatics uses the standards and formats of the University as whole for a student’s proposal process and thesis.

7 Typical Minors
One of the strengths of security informatics is the possibility of minors beyond traditional computer science and networking.

Minors have included or currently include social informatics, psychology, and the most popular has been computer science. Current minors include psychology, public management, and complex systems.

The range of minors reflects the range of methods applicable to economics of security, user-centered design of security, cryptographic primitive design, security modeling, foundational cryptography, threat assessment and analysis, protocol design, provable security, security heuristics, light-weight cryptography, network security, privacy, security auditing, security and computer forensics are all under the umbrella of security informatics.

8 Sample Dissertation Titles
The associated areas of interest were financial modeling, decision-making under

<table>
<thead>
<tr>
<th>Student Name</th>
<th>Title</th>
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<tbody>
<tr>
<td>Deb Liu</td>
<td>Incentives, Behavior and Risk Management</td>
</tr>
<tr>
<td>Vaibhav Garg</td>
<td>Risk Perceptions of Security and Privacy Risks Online</td>
</tr>
<tr>
<td>Chris Soghoian</td>
<td>The Spies we Trust: Third Party Service Providers and Law Enforcement Surveillance</td>
</tr>
<tr>
<td>Rui Wang</td>
<td>Security and Privacy Hazards of Software-as-a-Service: Analyses and Mitigations over Distributed Functionalities</td>
</tr>
<tr>
<td>Nathaniel Husted</td>
<td>Analysis Techniques for Exploring Emergent Vulnerabilities and Attacks on Mobile Devices</td>
</tr>
<tr>
<td>Shirin Nilizadeh</td>
<td>Privacy-Aware Decentralized Architectures for Socially Networked Systems</td>
</tr>
<tr>
<td>Timothy Kelley</td>
<td>Systemic Effects of Human Factors in Information Security</td>
</tr>
<tr>
<td>Zheng Dong, October</td>
<td>Small Communities with Strong Ties (And, Or, Versus) Big Data in Detecting Masquerade Attacks</td>
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</tbody>
</table>

uncertainty, social informatics, cloud computing, distributed networks, ubiquitous systems, distributed architecture, complex systems, and big data. These are listed in order corresponding to the alumni listed above.
9 **SAMPLE CURRICULUM**
The following is a sample three-year curriculum. Students should consult with their advisors in order to select courses that will best support their plans of research. Additional courses may be necessary to fulfill the student’s minor or other programmatic choices.

<table>
<thead>
<tr>
<th>Year</th>
<th>Fall Semester</th>
<th>Spring Semester</th>
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<tr>
<td>One</td>
<td>I501</td>
<td>I502</td>
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<tr>
<td></td>
<td>SI elective 1</td>
<td>I609</td>
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<tr>
<td></td>
<td>SI elective 2</td>
<td>Research Rotation 1</td>
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<tr>
<td>Two</td>
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<td>I709</td>
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<tr>
<td></td>
<td>SI elective 3</td>
<td>Research Rotation 2</td>
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<td></td>
<td>Minor Course 1</td>
<td>Minor Course 2</td>
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<td>QUALIFIERS EXPECTED HERE</td>
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<tr>
<td>Three</td>
<td>SI elective 4</td>
<td>Elective/Independent Study</td>
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<td></td>
<td>Elect/Indep Study/Minor 4</td>
<td>Elective/Independent Study</td>
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<td></td>
<td>Elect/Indep Study/Minor 5</td>
<td>Elective/Independent Study</td>
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<tr>
<td></td>
<td>Qualifiers</td>
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</table>
VIRTUAL HERITAGE
Track Director: Bernard Frischer

1 SUMMARY
Virtual Heritage is the study of how information technology can be applied in pursuit of the traditional goals of cultural heritage professionals: the discovery, recording, restoration, analysis, interpretation, and transmission of three-dimensional human creations from the small scale of a cylinder seal, vase, or statue to the large scale of a building, settlement, or cultural landscape. The purpose of our program is both to offer students practical training in the use of 3D tools (e.g., PhotoScan, AutoCad, 3D Studio Max, Zbrush, etc.) and also to develop the student’s ability to conceptualize and demonstrate how these tools can be used to develop new and compelling solutions to important problems faced by professionals in fields such as Conservation, Exhibition Design, Archaeology, and Architectural History.

2 PRIMARY TRACK FACULTY
Bernard Frischer: Theory and practice of Virtual Heritage, use of game engines for historical simulation, virtual archaeoastronomy, application of Virtual Reality and Augmented Reality in museums and on cultural heritage sites, digital reconstruction of the monuments of ancient Rome and other sites of the classical world.

3 REQUIRED COURSES
All required courses provided by faculty in Virtual Heritage are open to students from other tracks and programs.

I590 – INTRODUCTION TO VIRTUAL HERITAGE, I. DIGITIZATION OF 3D OBJECTS
This course is offered every year.
Most recent offering:
https://docs.google.com/document/d/1eL9PGfHC3Ufe8iEyDcbKWn16EfoR1M7StiAWqiA5Bpw/edit?usp=sharing

Motivation
Cultural heritage artifacts and monuments are often centuries or even millennia old. The passage of time not infrequently brings changes such as damage, destruction, reuse, or fanciful restoration. In an ideal world, cultural objects which have suffered such changes would be physically restored to their original condition, but this is rarely possible. In this course, the student learns the principles of physical restoration and adapts them to a digital representation of the cultural heritage objects of interest. The course generally concentrates on a specific class of objects (e.g., the statues decorating an ancient theater, villa, or temple).

Aims
This course focuses on the application of digital technology to the representation, restoration, online publication, and analysis of small cultural heritage artifacts such as vases, furniture, sculpture, and monuments. Students will learn how to capture the 3D data of a three-dimensional object, how to use the raw data to make a polygonal model, how to texture and paint the model, how to restore damage to the object, and how to publish the resulting 3D digital models on web pages, print it on a 3D printer, and visualize it interactively on a Virtual Reality device such as a head mounted display (HMD).

I590 – INTRODUCTION TO VIRTUAL HERITAGE, II. DIGITIZATION OF COMPLEX CULTURAL HERITAGE ENVIRONMENTS
This course is offered every year.
Most Recent offering:
https://iu.instructure.com/courses/1529302/assignments/syllabus
Motivation
The built environment is in a constant state of flux as cultural and natural processes of creation and destruction play out in unending cycles. Few, if any, buildings, settlements, or cities resist the forces of change for very long. In order to better analyze and interpret the built environment, Cultural Heritage specialists often need to roll back the clock and visualize how it looked at an earlier time. For a variety of practical reasons, this can rarely be done in the real world. Virtual Heritage offers new tools for re-creating the lost worlds of the past, which, once digitally reconstructed, can be used as assets in simulations needed to study typical human behavior, be it social, economic, political, or religious.

Aims
This course picks up where Introduction to Virtual Heritage, I left off by taking the individual 3D models of specific cultural heritage objects and arranging them in virtual spaces that reproduce a complex form such as a building, settlement, or city. Then the modeled environment is imported into a game engine or other piece of software that supports virtual experiments and observations in the reconstructed past world.

1698 – Virtual Heritage Laboratory
This course is taught every semester and is open to admission by students who have successfully completed Introduction to Virtual Heritage, I and II. Participants in the course collaborate to tackle a complex project such as the preparation of 3D assets for a museum exhibition, creation of a website dedicated to the presentation of a cultural heritage monument or site. The course serves three purposes: to sharpen and intensify the skills learned in the introductory courses; to apply the skills to create a group project that has its own inherent value; and to give the student experience in the collaborative environment so typical of the field of Virtual Heritage.

Motivation
The laboratory course offers the student the opportunity to further develop the skills learned in the introductory courses and to apply them to real-world projects of cultural heritage professionals such as archaeologists, art historians, and exhibition designers.

Aims
• To learn how to work as a member of a collaborative team.
• To hone skills of 3D modeling, simulation, and interpretation.
• To work closely with cultural heritage professionals to create resources useful in their research projects or museum exhibitions.

4 Elective Courses
In addition to required courses, students are required to take 12-21 credits of electives, some of which may come from lab experience. Students are encouraged to take the following courses:
- IS90 – Topics in Informatics
- Virtual World Design – Chabin
- Programming Virtual Worlds – Chabin
- CSCI-B 657 – Computer Vision – Crandall

5 Qualifying Exam
Written and oral examinations decided by program committee based on bibliography from the two introductory courses in Virtual Heritage and specific research interests of candidate. Typical written exam: three papers or one-week take home exam.

6 Typical Minors
Archaeology, Art History, Anthropology, Egyptology.
APPENDIX B

UNIVERSITY GRADUATE SCHOOL 2016-2017 BULLETIN (EXCERPT PAGES 1-18)
University Graduate School

Administration
JAMES C. WIMBUSCH, Ph.D., Dean of The University Graduate School
DAVID L. DALEKE, Ph.D., Associate Dean
JANICE S. BLUM, Ph.D., Associate Dean

Overview

The University Graduate School administers degree programs on eight campuses of Indiana University: Bloomington, East, Fort Wayne, Indianapolis, Kokomo, Northwest at Gary, South Bend, and Southeast at New Albany. As of fall, 2014, the University Graduate School offers a total of 43 certificate programs, 156 Master’s degrees, and 133 Ph.D. degree programs state-wide.

At Bloomington there are seventeen graduate certificate programs, ninety-eight Master’s programs in the College of Arts and Sciences, School of Fine Arts, School of Journalism, School of Music, School of Optometry and Kelley School of Business. The University Graduate School offers ninety-six Ph.D. programs and/or Ph.D. minors in the College of Arts and Sciences, Kelley School of Business, School of Education, School of Informatics and Computing, School of Journalism, the Maurer School of Law, School of Optometry, School of Public and Environmental Affairs, and the School of Public Health.

At Indianapolis, the programs administered by the Indiana University Graduate School include seventeen certificates in the School of Dentistry, the School of Health and Rehabilitation Sciences, the School of Liberal Arts, the School of Medicine, the School of Public and Environmental Affairs, the School of Philanthropy, and the School of Public Health. A total of thirty-nine Master’s programs are available in the School of Liberal Arts, the School of Health and Rehabilitation Sciences, the School of Medicine, the School of Public Health, and the School of Science. The University Graduate School-Indianapolis also administers thirty-seven Ph.D. programs as well as several Ph.D. minor programs in the Schools of Informatics and Computing, Dentistry, Education, Nursing, Public Health, Health and Rehabilitation Sciences, and Social Work.

At Fort Wayne, the University Graduate School programs include a graduate certificate, Master of Arts for Teachers, and three Master of Liberal Studies degrees. Kokomo offers a Master of Arts; Northwest offers a Master of Liberal Studies; South Bend offers five Graduate Certificates and nine Master’s; I.U. East offers two Graduate Certificates and two M.A. degrees, and I.U. Southeast offers a Graduate Certificate and two Master of Liberal Studies degrees

Mission Statement

The mission of The University Graduate School is to promote and support excellence in graduate education for individual students, faculty, departments, and the university as a whole.

In accomplishing this mission, The University Graduate School values excellence, integrity, collaboration, efficiency, innovation, and inclusiveness in all that it does. These values are central to the school’s role in encouraging a creative environment for scholarship, research, teaching, and learning. The University Graduate School is a recognized leader in developing new concepts and best practices for graduate education. It assists departments in recruiting, supporting, retaining, and graduating outstanding scholars. Through its connections with national higher education organizations, it serves as a resource in forging the future directions of graduate education.
History and Organization

In 1908, upon the insistence of faculty members of the College of Arts and Sciences, the university placed its graduate courses into a newly formed unit, the Graduate School, and named biology professor Carl Eigenmann its first dean (1908-27). Four years later, Indiana University awarded its first Ph.D. degree, although Master of Arts degrees had been conferred in cursus upon graduates of Indiana University in the nineteenth century. Today, the Graduate School awards approximately 300 Ph.D.'s and some 500 master's degrees annually. In addition to the Ph.D., the Graduate School at Indiana University has sole jurisdiction over the Master of Arts, the Master of Science, the Master of Arts for Teachers, and the Master of Fine Arts degrees wherever they are offered in the university system. The professional schools have jurisdiction over other postbaccalaureate degrees and provide the instruction for Graduate School degrees in their disciplines. As a university-wide office, the Graduate School grants degrees at five of the university's eight campuses: Bloomington, Fort Wayne, Indianapolis, South Bend, and Southeast.

In the Graduate School's early years, during the presidency of William Lowe Bryan, the university concentrated on undergraduate instruction. When Herman B Wells became president in 1938, graduate education at Indiana began to thrive under the deanship of Fernandes Payne, another biologist (1927-47). With the strong support of President Wells and under the guidance of Dean Payne's successors, English professor and folklorist Stith Thompson (1947-50) and botanist Ralph Cleland (1950-58), the Graduate School grew rapidly during the post-World War II years. Twenty-five graduate fellowships were created during the war years.

John W. Ashton, the second English professor to occupy the Graduate School deanship (1958-65), had served as dean of the College of Arts and Sciences before taking over the new Graduate School offices in Kirkwood Hall. During his tenure in the College and in the Graduate School, Dean Ashton gave strong support to interdisciplinary programs and emerging disciplines such as linguistics, comparative literature, East European studies, folklore, School of Letters, and Uralic and Altaic studies. By 1960, Bernard Berelson's book *Graduate Education in the United States* ranked Indiana University twelfth of 92 institutions of higher education. Allan Carter's *Assessment of Quality in Graduate Education* (1966) also reflected the increased stature of the university's graduate programs. In that work, four Graduate School programs ranked among the top ten of their kind in the nation, and twenty programs emerged among the top twenty.

The appointment of Harrison Shull, a chemist (1965-72), marked an outstanding increase in the research and graduate development activities of the Graduate School. When Dean Shull left the Graduate School to become the vice chancellor for research and development, he took many of these activities with him, leaving the Graduate School to be concerned primarily with graduate education. As the university underwent reorganization under the leadership of President John W. Ryan, two temporary deans, Harry Yamaguchi, a psychologist (1972-77), and James Holland, the third biologist to head the Graduate School (1977-78), presided over an office that, without a research and development component, was able to focus its attention on the quality of graduate education.

From 1978 until 1987, the historian Leo F. Solt was dean. Under his leadership, the Graduate School became a university-wide entity, encouraging excellence in graduate education throughout the state of Indiana by systematically reviewing all existing programs and by implementing new graduate programs on the Indianapolis and South Bend campuses, as well as on the Bloomington campus. Fellowship funds were increased, and more minority students were recruited; the Graduate School was computerized to improve record keeping and monitoring of students; additional steps were taken to improve the quality of Ph.D. dissertations; and participation by graduate students in the administrative and policy making activity of the Graduate School was encouraged.

Thomas Noblitt, a music historian, was acting dean from 1987 until 1989. During his tenure, new graduate programs were approved for the Northwest and Fort Wayne campuses, and offerings at Bloomington and Indianapolis were expanded. In August 1989, George Walker, a physicist, became associate vice president (and later vice president) for research and dean of the University Graduate School, thus reuniting two offices that had been separated for nearly 20 years. Under his direction, the University Graduate School was reorganized to allow departments and schools to assume a larger part of the responsibility for the monitoring of graduate students' progress toward their degrees. Increased emphasis on financial support for graduate education led to substantial additions to the fellowship budget, new initiatives were undertaken to encourage research on all campuses of the university, and the Graduate Council was significantly expanded. Dean Walker also established a Preparing Future Faculty Program to prepare graduate students to face the full range of professional responsibilities they might encounter in the academy.

In 2003, the Office of Research and the University Graduate School were again separated, and John Slattery, a pharmacologist from the University of Washington, was recruited to head the again independent University Graduate School. Unfortunately he was lured back by the University of Washington, and in the fall of 2005, Sherry Queener (who had been associate dean at Indianapolis) and Eugene R. Kintgen (who had been associate dean at Bloomington) were named acting co-deans. James C. Wimbush, a professor of business administration, was appointed dean of the University Graduate School in September, 2006. Dean Wimbush continues to advocate for the enhancement of graduate education and improvement of the overall quality of graduate student and post-doctoral student life, and works to increase funding for programs promoting educational equality. In July, 2013, Dean Wimbush also was appointed Vice President for Diversity, Equity, and Multicultural Affairs.

In 1951, the faculty elected nine of its number to a Graduate Council. Today, the Graduate Council has 24 voting members elected by the University Graduate School faculty. That faculty of about 2,200 members comes from all campuses of the university. Beginning in 1980, a University Graduate School faculty committee has added new members to the graduate faculty upon
work with the University Graduate School to advocate for programs on the Indianapolis campus. Both organizations Organization represents graduate students enrolled in the Bloomington campus. Likewise, the Graduate Student The Graduate and Professional Student Organization is careers.

of professional responsibilities they will encounter in their academic programs and prepared for the full range within the departments and centralized in the University

Mentoring and Preparing Future Faculty programs, both of graduate programs, and (through the recorders) the School monitor indicators of the quality of individual

Members of the University Graduate School faculty ultimately determine standards of admission, set the general requirements for degrees, pass upon the specific requirements of programs, approve courses for graduate credit, and certify candidates for degrees. These functions are executed by the Graduate Council and the dean and administrative staff. More specifically, the University Graduate School faculty serve on advisory and research committees for doctoral students, direct master’s theses and doctoral dissertations, and elect members of the Graduate Council.

The Graduate Council, which represents faculty in all graduate units, meets monthly during the academic year. In addition to the functions delegated to it by the faculty of the University Graduate School, it serves as an executive advisory body to the dean and administrative staff. It receives the reports of the school’s standing faculty committees; acts upon recommendations for changes in admission, the curriculum, degree requirements, and procedures for the administration of student programs; it receives and acts upon the recommendations of ad hoc committees appointed by the dean; it gives advice on ways to improve the quality of graduate work; and it seeks ways to coordinate the programs of the University Graduate School with other graduate programs in the university.

In addition, the deans and staff of the University Graduate School monitor indicators of the quality of individual graduate programs, and (through the recorders) the quality of master’s and doctoral degrees granted. Mentoring and Preparing Future Faculty programs, both within the departments and centralized in the University Graduate School, ensure that students are integrated into their academic programs and prepared for the full range of professional responsibilities they will encounter in their careers.

The Graduate and Professional Student Organization is the representative body for graduate students enrolled on the Bloomington campus. Likewise, the Graduate Student Organization represents graduate students enrolled in programs on the Indianapolis campus. Both organizations work with the University Graduate School to advocate for the interests of graduate and professional students.

Contact Information
University Graduate School
The University Graduate School - Bloomington Office
Wells Library
1320 E. 10th Street, Room E546
Bloomington, IN 47405
(812) 855-8853
grdschl@indiana.edu
IUPUI Graduate Office
University Library, UL 1170
755 W. Michigan Street
Indiana University–Purdue University Indianapolis
Indianapolis, IN 46202
(317) 274-1577
gradoff@iupui.edu

Admission
Undergraduate Requirements
The University Graduate School will consider applications from students holding baccalaureate degrees from Indiana University or from other accredited four-year collegiate institutions. The University Graduate School may admit students who do not meet stated admission criteria provided that the deficiencies amount to no more than one year's work. The dean will determine the condition of admission in such cases. If more than a year’s work is deficient, students should apply to the University Graduate School for admission to the Continuing Nondegree Program. Students from unaccredited institutions may be admitted as special students for one semester; if their records are then satisfactory and their department, program, or school recommends them, they will be given full standing. Ordinarily, a B (3.0) average in the undergraduate major is required for admission to the University Graduate School.

Distance/Distributed Education
The University Graduate School recognizes the role in contemporary curricula of modern technologies that enhance learning in both traditional formats featuring primarily face-to-face interaction and in non-traditional formats where students and faculty engage each other primarily via electronic means. In considering course work for admission purposes or for transfer of credit into a degree program, the Graduate School expects programs to evaluate course work and to apply the same criteria for quality to both traditional and distance formats. Course work must be from an accredited four-year collegiate institution to be considered for admission purposes, or must otherwise comply with the requirements for non-accredited institutions (see prior section)

Indiana University Baccalaureate Degree Candidates
Candidates for baccalaureate degrees at Indiana University may apply for conditional admission to the University Graduate School and may enroll for graduate credit for that portion of their program not required for completion of the baccalaureate degree, provided that:

1. They are within one semester of meeting baccalaureate degree requirements. (If the baccalaureate is not completed within that semester, graduate credit earned may not be counted toward an advanced degree).
2. The total course load does not exceed that ordinarily taken by a full-time graduate student.
3. The courses taken for graduate credit are authorized to carry such credit. (In certain instances graduate credit is allowed for undergraduate courses.)

Application for Admission

To assure that course credit will be eligible to count toward an intended graduate degree, prospective graduate students, including graduates of Indiana University, must make formal application and be admitted to a department, program, or academic school, or must be registered as a continuing nondegree student before taking courses for graduate credit. Most programs of the University Graduate School consider applications for admission and financial aid that are completed by the following dates: January 15 for the fall semester, September 1 for the spring semester, and January 1 for the summer. If a program uses other deadlines, the applicant will be informed by the staff of the program. Many graduate programs consider applications submitted after a deadline as long as all available spaces for students have not been filled by highly qualified applicants. Inquiries about late applications for admission or financial aid should be addressed to the program of the student’s intended major.

Electronic applications are the only form of application at IU Bloomington. IUPUI does accept paper application submissions and forms are available at the IUPUI Graduate Office, IUPUI, University Library, UL 1170, Indianapolis, IN 46202. Paper application forms are also available in departmental offices.

For further information, consult www.gradapp.indiana.edu. All applications must be accompanied by one complete transcript of previous college and university work and should be submitted directly to the department in which the student wishes to apply.

By action of the Trustees of Indiana University, a nonrefundable application fee of $55 is required of all applicants. An application fee of $55 (2015-16) is required for all applicants applying to Indiana University Graduate School programs on the IUB campus and $60 on the IUPUI campus. All Graduate Nondegree students on the Indianapolis campus must pay a $60 (2015-16) application fee as well. At IU Bloomington, Continuing Nondegree Program students are not assessed an application fee, but a $25 processing fee is assessed each semester in which they enroll.

Admission (except for Continuing Nondegree students) is made to a particular department for a specific degree, and no student shall be permitted to work toward a degree without first having been admitted to do so. A flexible entry procedure for basic science programs at Indianapolis allows Ph.D. students up to one year to identify a research laboratory and degree program. Students desiring to change departments should fill out Transfer of Department Forms, which may be obtained in the offices of individual departments or schools (e.g., the School of Education, the College of Arts and Sciences). Requests for change of degree status must be submitted by the department and approved by the dean.

Following the notice of admission to the University Graduate School, an applicant normally has two calendar years in which to enroll. Supplementary transcripts of any additional academic work undertaken during that period are required, and a department may request additional letters of recommendation. Should the updated material prove unsatisfactory, the admission may be canceled. If the applicant fails to enroll within two years, a completely new application is required.

Graduate Record Examination

Applicants may be required to take the Graduate Record Examination General Test, Subject Test, or both (see departmental requirements). Information concerning these examinations may be obtained online at www.ets.org. Further information is available in the office of the University Graduate School (IUB) or at the Graduate Office (IUPUI).

International Students

There are special application procedures for those who are not citizens of the United States or who have had their previous schooling outside the United States. At IU Bloomington, international students can apply online at www.gradapp.indiana.edu or obtain the International Paper Packet from the Office of Admissions at Bloomington (300 N. Jordan Ave; [812] 855-0661; e-mail intladm@indiana.edu) or the Office of International Affairs at IUPUI (902 W. New York St., ES 2126; [317] 274-7000; e-mail intladm@iupui.edu; the international application may be downloaded from www.iupui.edu/ -cie/). Because of the extra procedures required in evaluating foreign credentials, the application fee for international students is $60 (IUB and IUPUI).

Once enrolled, international students who wish to change their programs of study must first obtain the approval of the Office of International Services. After such approval is granted, application for formal change of status may be made to the University Graduate School according to the same procedures governing United States citizens.

International students must enroll in at least 8 credit hours each fall and spring semester in order to meet visa requirements. Any exceptions to this regulation must be approved in advance by the Office of International Services.

Since the language of instruction at Indiana University is English, proficiency in reading, writing, speaking, and understanding English is essential. Applicants whose native language is not English should submit proof of such proficiency by the time they apply for admission. Normally this is done by taking the Test of English as a Foreign Language (TOEFL). Results of this test should be submitted as part of the application for admission. The TOEFL examination is given six times a year in the United States and many foreign countries. Further information may be obtained at American consulates or by writing to TOEFL, Box 899, Princeton, NJ 08541, U.S.A. If it is not possible to take the TOEFL, applicants should obtain a statement by a responsible official, ordinarily a United States consular official, attesting that they read, write, speak, and understand the English language well enough to pursue, at an American university, a program leading to an advanced degree in their chosen field. Such a statement should be submitted with the application for admission.

Prior to registration for classes, all new students whose native language is not English are required to take an
English Language Proficiency Test administered by the Indiana University Center for English Language Training (CELT) at Bloomington, and by the ESL program and the Office of International Affairs at Indianapolis. If the results of this test indicate that a student needs additional work in English as a second language, appropriate recommendations will be made to the student's academic advisors. This requirement has been established in recognition of the vital importance of language competency to the student's academic success. Prospective students whose native language is not English and who have been offered positions as associate instructors are required to pass additional tests in English, since success as a teacher at Indiana University is dependent upon one's ability to communicate in the English language. Information regarding these examinations may be obtained directly from the individual academic departments at IU Bloomington or from the Graduate Office at IUPUI.

Nondegree Students
Special Students
Students who have not been admitted to a degree program but who intend to study primarily in one department may be admitted by that department with the approval of the dean as special students. They must apply to a department just as degree students do and should indicate their desired status.

Continuing Nondegree Students
The holder of a baccalaureate degree who wishes to study on a nondegree basis without necessarily concentrating in a single department may be admitted to the University Graduate School as a continuing nondegree student. Such students may not accumulate more than 18 credit hours in a single subject area, and may enroll only in those courses for which they can obtain specific permission to register, which takes into consideration the academic background of the individual and course enrollment limitations. In addition to Indiana University tuition and mandatory fees, a program processing fee of $25 is assessed each semester. For details of admission and further information, students should consult The University Graduate School at Bloomington (Wells Library ES46, [812] 856-4503, nondeg@indiana.edu, http://graduate.indiana.edu/admissions/non-degree.shtml), or the Graduate Nondegree Program at Indianapolis (University Library, UL 1170, [317] 274-1577, http://www.iupui.edu/~gradoff/admissions/non-degree.shtml).

A student initially admitted as a continuing nondegree student who later wishes to obtain a graduate degree must make formal application and be admitted to a departmental degree program. The department may then recommend to the dean that credit earned as a continuing nondegree student be applied to degree requirements. Students should be aware that certain departments and schools specifically prohibit work taken under continuing nondegree status from counting toward a degree after a student has been admitted to a degree program.

Policies & Procedures
The following content provides an overview of the academic regulations and procedures of the University Graduate School and Indiana University.

Degree Conferral
The University Graduate School will recommend the candidate to the Board of Trustees for the degree only upon completion of all the requirements stated in this Bulletin. Degrees are awarded on the last day of each month of the year.

For all students seeking a master’s degree, an application for the degree must be filed with the University Graduate School at least 30 days before the date anticipated for degree conferral. All degree requirements must be completed at least 30 days before the date of expected degree conferral, including submission to the University Graduate School of the master’s thesis (if required for degree). Electronic submissions are preferred.

For doctoral students, submission to the University Graduate School of the copies of the completed dissertation and abstract as described under Submission of the Dissertation constitutes an application for conferral of the Ph.D. degree. Doctoral students are reminded (a) that the 30-day announcement deadline prior to the defense of the dissertation and the 30-day deadline prior to degree conferral are nonoverlapping time periods; and (b) that research committees frequently require revisions and corrections after the defense of the dissertation and that these revisions must be made before the dissertation is ready for submission to the University Graduate School.

Commencement
All graduate students are encouraged to participate in the Commencement ceremonies. The solemn yet colorful academic pageantry can provide a fitting culmination to a period of intense study and work. At IUB, all Ph.D. candidates are now hooded by their professors. Procedures for participating in Commencement may be obtained from the University Graduate School for IUB students and from the Graduate Office for IUPUI students.

Full-Time Study
Ordinarily, students shall be considered full time if they are registered for 8 hours of credit (fall, spring, and summer terms) and their programs of study meet with the approval of the departments. Courses taken as an auditor may not be counted in the definition of “full-time study”; however, courses taken to remove undergraduate deficiencies for admission may be counted.

Students holding appointments as associate instructors, graduate assistants, or research assistants must ordinarily be registered for 6 credit hours during each full semester. For academic purposes, the University Graduate School will consider as full-time certain students who are exceptions to the above definitions: M.A. and M.S. candidates whose completed courses and deferred thesis credits total 30 hours; M.F.A. candidates whose completed courses and deferred thesis credits total 60 hours; and Ph.D. students whose completed courses and deferred dissertation credits total 90 hours, providing they are working on theses or dissertations for the completion of the degree. Such students, however, must enroll in at least one hour of graduate thesis (for master’s students) or dissertation (for doctoral students) credit each semester. For master’s candidates, such enrollment will be limited to the five-year period allowed for completion of the master’s degree; this enrollment for doctoral candidates will be limited to the seven-year period after passing
the qualifying examination. Students who have already accumulated 90 or more hours of graduate credit and who hold university-administered student appointments as associate instructors, graduate assistants, or research assistants amounting to at least 0.375 FTE (15 hours per week workload) will be required to enroll for at least 6 hours of credit during each semester they continue to hold an appointment. Such hours will be charged at the allocated fee rate.

Students may take no more than 16 hours of credit in any semester or more than a total of 16 credit hours in all the summer sessions in any one year without permission of their graduate advisor. Students who are employed are advised to take into account the demands that such activities make on their time and to reduce their course loads accordingly.

Grading Policies

Grades
Grade points are assigned at Indiana University according to the following scale, and grade point averages are computed taking into account any plus or minus which accompanies a letter grade.

\[
\begin{align*}
A &= 4.0 \\
A- &= 3.7 \\
B+ &= 3.3 \\
B &= 3.0 \\
B- &= 2.7 \\
C+ &= 2.3 \\
C &= 2.0 \\
C- &= 1.7 \\
D+ &= 1.3 \\
D &= 1.0 \\
D- &= 0.7 \\
F &= 0
\end{align*}
\]

Ordinarily a minimum of a B (3.0) average in graduate work is required for continuance in graduate study, and for all graduate degrees. 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. Some departments may require an average grade in graduate courses higher than 3.0, while others may count no courses completed with grades below 3.0 toward degree requirements (see departmental entries). No work may be transferred from another institution unless the grade is a B (3.0) or higher.

The dean may review a grade record at any time and may place a student on academic probation if the record justifies such action. When the grade point average of a student falls below 3.0 or the student is not making sufficient progress toward the degree, the dean will notify the student that he or she has been placed on probation. Unless the student brings this record up to a 3.0 grade point average or begins making satisfactory progress in the next semester of enrollment, the student will not ordinarily be allowed to continue in the University Graduate School.

Pass/Fail Option
Students in good standing (i.e., with a grade point average of 3.0 or better) who have completed graduate course work sufficient for a master’s degree may, with the written consent of their graduate advisor or of their advisory committee, enroll in courses outside their major and minor areas on a pass/fail basis under conditions stated in a memorandum available from the University Graduate School office. Such courses may not be used to fulfill departmental language or research-skill requirements. Enrollment under this option will be made at the beginning of the semester and may not be changed after the date fixed for dropping and adding of courses.

Incomplete Grades
The grade of Incomplete may be given only when the completed portion of a student’s work is of passing quality. It is the responsibility of the student who has incurred the grade of Incomplete in any course 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 because of circumstances clearly beyond the student’s control, it is the student’s responsibility to notify the instructor of the course, the graduate advisor, and the dean within the year of such circumstances and to request an extension of time. According to university policy, every overdue Incomplete will be changed to F after one calendar year. Both the student and the instructor shall be notified of this change in grade. This change will be made unless the dean has received notice of a regular grade duly assigned before that time or has approved a request for an extension of time. A change of the grade F will be considered only if the request for change is accompanied by an explanation of the circumstances involved. Students may not register in a course in which they have a grade of Incomplete.

These regulations do not apply to research and reading courses in which completion of the course work is not usually required at the end of the semester. Such courses are indicated in departmental listings by the sign “***”; incomplete work in those courses will be denoted by R (deferred grade).

Withdrawal from Course Work
Withdrawals prior to the “last day to drop a course with an automatic W” (see official calendar for each semester) are automatically marked W. According to university regulations, withdrawal after this date is permitted only with the approval of the dean of the student’s school for urgent reasons related to the student’s health or equivalent distress. In all such cases, the student must submit a request for late withdrawal to the advisor or to the departmental chairperson. This request must be supported by the instructor of the course, the graduate advisor, and the departmental chairperson and then be forwarded to the dean with an accompanying statement outlining the reasons for the request. If the dean approves the request, the student’s mark in the course shall be W if the work completed up to the point of withdrawal is passing; otherwise a grade of F shall be recorded. Failure to complete a course without an authorized withdrawal will result in the grade of F.

Residence Requirements
All candidates for graduate degrees (with the exceptions outlined below) must complete at least 30 credit hours of graduate work while enrolled on campuses of Indiana University. Of these hours, at least one semester or two summer sessions of full-time work must be taken
in University Graduate School degree-granting units on the Bloomington, Fort Wayne, Indianapolis, South Bend, or Southeast campuses. Candidates for the Ph.D. degree must spend two consecutive semesters during one academic year on the Bloomington or Indianapolis campus.

Work Done at More Than One Indiana University Campus
Students who plan to earn a degree through a degree-granting unit on one Indiana University campus and who plan to take a substantial number of hours on one or more of the other Indiana University campuses in partial fulfillment of degree requirements should have their programs of study approved in advance by the degree-granting unit. The residency requirement must be met on the campus where the degree-granting unit is located.

Revalidation of Courses
Normally, a course may not be counted toward degree requirements if it has been completed more than (a) five years prior to the awarding of the degree for master’s students or, (b) seven years prior to the passing of the qualifying examination for Ph.D. students. The graduate advisor, after consultation with the advisory committee, may, however, recommend to the dean that course work taken prior to the above deadlines be revalidated if it can be demonstrated that the knowledge contained in the course(s) remains current. Currency of knowledge may be demonstrated by such things as: (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; (d) teaching a comparable course; or (e) publishing scholarly research demonstrating substantial knowledge of the content and fundamental principles of the course. Each course for which consideration for revalidation is being requested should be justified separately. If the qualifying examination is used for the purpose of revalidation, the number of courses to be revalidated by this method should be limited to two in order to avoid compromising the integrity of the qualifying examination process.

Graduate Credit

Graduate Credit—General
Only courses listed in this bulletin or specifically allowed by it may be counted toward the requirements for a degree offered by the University Graduate School. These courses are ordinarily numbered at the 500 level or above. In certain cases, courses at the 300 and 400 level have been specifically approved for graduate credit; all such courses are listed in this bulletin. Normally, these courses require a higher level of performance and significantly more work (such as an increased number of readings, additional papers, extra class sessions, oral class presentations) for the graduate students than for the undergraduates. Each instructor should identify the graduate students enrolled in the course during the first week of classes and should outline the nature of the work expected of them at that time. In certain other unusual instances the dean may approve, upon recommendation and justification by the student’s advisory committee, other 300- or 400-level courses for graduate credit, typically to count toward requirements in the student’s outside minor. Such approval should be requested before the course is taken.

In many departments there are strict limitations on the number of 300- and 400-level courses that may be counted toward advanced degree requirements; see departmental notices for details. For descriptions of 300- and 400-level courses, see the College of Arts and Sciences Bulletin or the School of Liberal Arts Bulletin.

Not all courses listed in this bulletin are offered every year and on every campus. Inquiries concerning the availability or suitability of a particular course should be directed to the appropriate departmental chairperson.

The number of hours of credit given a course is indicated in parentheses following the course title. The abbreviation “P” refers to the course prerequisite or prerequisites. Similarly, the abbreviation “R” indicates recommended prerequisites. Courses eligible for a deferred grade are marked by the sign *. *

Courses taken while an undergraduate and counted toward the requirements of a baccalaureate degree may not also be counted toward a graduate degree. With only three exceptions, courses counted toward the requirements for one advanced degree may not be counted toward requirements for another degree at the same level.

In the case of the M.F.A., course work completed as part of an M.A., M.S., or M.A.T. degree may, with the approval of the student’s department, be counted toward the M.F.A., provided it otherwise meets the conditions stated in this bulletin.

In the case of the Dual Master’s Program, certain reductions are allowed in the total number of hours required if the two degrees had been taken separately. The Dual Master’s Program involves two degrees at the master’s level; the degrees may be under the jurisdiction of the University Graduate School or of another Indiana University school. For further information, see below (under Requirements for Master’s Degrees) and the departmental entries for African American and African Diaspora Studies, African Studies, Biology, Central Eurasian Studies, Chemistry, Comparative Literature, East Asian Languages and Cultures, Economics, English, Environmental Programs, Fine Arts, Folklore and Ethnomusicology, Geography, History, History and Philosophy of Science and Medicine, Information and Library Science, Institute for the Studies of Europe, Jewish Studies, Journalism, Latin American and Caribbean Studies, Music, Near Eastern Languages and Cultures, Nursing Science, Philanthropic Studies, Philosophy, Physics, and Russian and East European Institute.

Work counted toward a master’s degree may also be counted toward the Ph.D. if it has been approved by the student’s advisory committee and if it otherwise meets the conditions stated in this bulletin, including the rules governing the transfer of credit from other institutions.

Transfer of Credit
Upon recommendation of the department and with the approval of the dean, work taken for graduate credit at other institutions may be transferred in partial fulfillment of degree requirements. No course may be transferred from another institution unless the grade is B or higher.
and unless the course was completed within the time limit prescribed (see “Graduate Credit—General” section above). The following restrictions apply:

1. Candidates for the M.A., M.S., LL.M., or M.A.T. degree may offer up to 8 hours of graduate credit from other institutions.
2. Candidates for the M.A.T. degree who are graduates of Indiana University may offer up to 12 hours of graduate credit from other institutions.
3. Candidates for the M.F.A. degree may offer up to 20 hours of graduate credit from other institutions.
4. Candidates for the Ph.D. degree may offer up to 30 hours of graduate credit from other institutions.

It must be emphasized that the transfer of credit is not an automatic occurrence. Students must obtain the written consent of both their departmental advisor and the dean before credit earned at other institutions will be added to their records.

Transfer from One Department to Another
Matriculated students wishing to transfer from one department within the University Graduate School to another should first consult their graduate advisors or advisory committees and the graduate advisor of the new department about the wisdom of the change. International students desiring to make such a change must also obtain the approval of the Office of International Services.

General Requirements for Advanced Degrees
Guidelines for Requirements
The following statements regarding degree requirements outline the minima that are acceptable. The student must meet not only the general requirements of the University Graduate School but also the specific requirements of the individual department(s). Requirements are given in this bulletin only for degrees awarded by the University Graduate School. Professional graduate degrees are also available at Indiana University. These professional degrees are administered by the respective schools; information regarding these degrees and the requirements for each may be found in the bulletins of the individual schools.

The University Graduate School recommends that those who intend to continue graduate work toward the Ph.D. degree elect one of the traditional master’s degree programs requiring a thesis or a foreign language or both.

Academic Integrity
Students are expected to adhere to the highest ethical standards in all their course work and research. Individuals violating that code of conduct are subject to disciplinary action; such breaches could lead to expulsion of the student from Indiana University or to rescission of a degree already granted. To acquaint students more fully with the range of issues relating to academic integrity, The University Graduate School has prepared a document entitled Integrity in Graduate Study which can be obtained by calling the office at 812-855-8853. Students also can refer to Indiana University’s Code of Student Rights, Responsibilities, and Conduct (http://www.iu.edu/~code/code/rights/index.shtml). Academic misconduct is any activity that tends to undermine the academic integrity of the institution...it may include, but is not limited to human, hard-copy, or electronic resources, cheating, fabrication, plagiarism, interference, violation of course rules, and facilitating academic misconduct.

About the Requirements for Master's Degrees
Master's Degrees
Master of Arts
Thirty (30) credit hours are required for the M.A. (some departments require more than 30), all of which may be taken in a single department; at least 20 of these credit hours must be earned in the major field. A minimum of 9 credit hours of course work or at least three courses in the major field (excluding thesis) must be numbered 500 or above.

Master of Science
General requirements for the M.S. are identical with those for the M.A. (see above). There are a few exceptions. M.S. students in computer science are currently exempted from the regulations requiring that 9 credit hours of course work or three courses in the major field (exclusive of thesis) be numbered 500 or above. Students in the combined M.S./M.D. program have seven years in which to complete requirements for the M.S. degree; students in the M.S. program in geology at Indianapolis have six years in which to complete the requirement.

Master of Fine Arts
The M.F.A. degree, which is offered in the Departments of English, Fine Arts, and Theatre, Drama, and Contemporary Dance, requires a minimum of 60 credit hours.

Master of Arts for Teachers
In order to be admitted to this program, students must hold a baccalaureate degree from a regionally accredited institution. The degree should include sufficient hours in each discipline in which students plan to work to enable them to elect courses carrying graduate credit (see departmental entries for details).

Thirty-six (36) credit hours beyond the baccalaureate degree are required, at least 20 of which must be in the major teaching field, with the remainder allocated either to additional work in the major or to one or more minors. Certain interdepartmental programs have specific minor requirements (for details, see the individual program statements). Each candidate must possess a teacher’s certificate (from Indiana or another state in the United States) at the time the degree is conferred, with the exception of international students, who must be certified by their departments. Because in some cases licensing requirements and M.A.T. course requirements may overlap, the teaching certificate will be issued and the degree will be conferred at the same time. Graduates who do not hold certificates (teaching licenses) should have their credentials evaluated for teaching certification purposes by the graduate licensing advisor in the School of Education.

Upon recommendation of the department and approval by the dean, a maximum of 6 credit hours of undergraduate courses taken after completion of the baccalaureate
degree may be applied toward the M.A.T. degree. M.A.T. degrees are available in most areas represented in the high school curriculum. Interested students should consult the chairperson of the department or the division concerned to discuss programs of study.

Dual Master's Program
Students who are concurrently enrolled in two departments may qualify for two master's degrees under a provision that allows credit earned to satisfy the major requirements of one department to count as elective credit in a second department. Dual master's degrees require a minimum of 50 credits, with at least 21 credits earned in each of the programs. To be eligible for this program, a student must be formally admitted by both departments and by the University Graduate School. All requirements of both degrees must be met, including passing any departmental examinations and satisfying foreign-language/research-skill requirements. If both departments require a thesis, the student may write a single thesis that meets the requirements of both fields. The thesis committee will comprise an equal number of representatives of both departments, and the thesis credit will be split between the two. All course work for the program must be completed within a period of six years.

Preparing Theses and Dissertations
Theses and dissertations must be typed with the body of the text double-spaced. For thesis and dissertations that will be bound in paper form, margins must be at least one-and-a-half inches on the left and one inch on the top, right, and bottom. Students who submit their publications in electronic form only may choose to have one-inch margins on all sides. Page numbers must be consecutive throughout, with Arabic numerals used for the body of the work and small or lowercase Roman numerals for the front matter. Script fonts (ex. Monotype Corsica) and italicizing large sections of text are not allowed for the main body of your text, although italics may be used appropriately.

The paper used for any bound copies must be watermarked, 100-percent cotton bond paper of 20 or 24 lbs., measuring 8 1/2 by 11 inches. If photographs or detailed graphics are part of the work, make certain they are crisp and clear when printed. It is acceptable to use special laser or photo paper for the pages(s) in the dissertation containing images in order to achieve the best possible quality.

Theses and dissertations must be written in English unless you and your department/committee have decided otherwise. For more information, see http://www.indiana.edu/~grdschl/theses-dissertations/index.shtml.

About the Requirements for Master's Degrees
The number of credit hours required by the University Graduate School for master's degrees varies according to the individual degree (see below for details). However, with the exception of the Dual Master's Program, the requirements for all master's degrees must be completed within five consecutive years.

With the exception of the Master of Arts for Teachers (M.A.T.), a thesis or reading knowledge of a foreign language is normally required for a master's degree (see departmental entries for exceptions). If a thesis is not required, departments are encouraged to substitute some other type of special project that is creative, exploratory, or experimental in nature. In lieu of the traditional thesis, for example, the department might require seminar papers, presentations, publishable reports, artistic performances, or exhibitions. The thesis or alternative project should be equivalent to no fewer than 3 nor more than 9 hours of graduate credit; such credit should be granted under an appropriate departmental course or independent study number. Departures from traditional thesis requirements prescribed by the individual departments must be approved by both the department and the dean. If a thesis is submitted, the student must electronically submit the thesis through Proquest. If the student prefers to submit a bound thesis, two copies must be filed with the University Graduate School. Electronic and bound copies of the thesis will be placed with the University Library. Additionally, departments may require bound copies. The title page must bear the statement: “Submitted to the faculty of the University Graduate School in partial fulfillment of the requirements for the degree Master of ______ in the Department of ____________, Indiana University.” (Note: Students majoring in programs will use “Program of;” students majoring in departments outside of the College of Arts and Sciences will use “School of.”) At least three members of the faculty shall normally participate in the approval of the thesis and must sign an acceptance page which appears after the title page. The statement, “Accepted by the faculty of the University Graduate School, Indiana University, in partial fulfillment of the requirements for the degree Master of ______,” should precede the signatures on the acceptance page. Each copy of the thesis is to be accompanied by the student’s vita sheet inserted at the end. For details regarding the typing and duplication of theses, see Preparation of Theses and Dissertations. Three or more faculty members should participate in certification of the student’s fulfillment of the requirements for a master’s degree. Their participation may take any of several forms, such as administering a final or comprehensive examination, or evaluating the candidate’s thesis or alternative project. In instances where shortcomings are apparent, the student may be required to complete additional course work or assignments.

If the master's degree is used to meet part of the requirements to convert a provisional or standard teaching certificate into a professional certificate (which is no longer a life license), the student’s degree program must include at least 18 credit hours of graduate work in the major or minor field or both.

Deficient Progress
The policy of the Graduate Faculty is that students may be dismissed for failure to maintain adequate academic progress toward the degree. For candidates, this standard is set by the faculty of each program or by the student’s dissertation committee.

The student must first be notified of deficient academic progress by being placed on probation for one semester. If the deficiency is not rectified then the student may be dismissed.
Ph.D. Degree

The Ph.D. degree requires completion of at least 90 credit hours of an advanced course of study. The degree is awarded in recognition of a candidate’s command of a broad field of knowledge and accomplishment in that field through an original contribution of meaningful knowledge and ideas.

- Major Subject and Minor Subjects
- Double Majoring
- Combined Degree Programs
- Assignment to an Advisory Committee
- Qualifying Examinations
- Admission to Candidacy Status
- Continuing Enrollment
- Dissertation
- Research Committee

Major Subject and Minor Subjects

Major Subject

The student will select a major subject from the departments and programs listed in this bulletin. The major department or program is responsible for monitoring the student’s progress toward the degree and for making recommendations to the University Graduate School regarding the nomination to candidacy, the appointment of a research committee, the defense of the dissertation, and the conferring of the degree.

Minor Subjects

The student will select at least one minor subject. A minor provides additional breadth and depth to the individual’s program. It must be taken outside the major department from among those minors offered listed in this bulletin or in a specifically approved inter- or intradepartmental area—see departmental entries. (As an exception to this rule, Indiana University doctoral students may take a minor in a Purdue University graduate degree program at Indiana University-Purdue University Indianapolis [IUPUI].) Courses counted toward a minor cannot also be counted toward the major. The determination of the minimum requirements and examination procedure (if any) for the minor is entirely at the discretion of the minor department or program.

Individualized Minor. In certain cases, special individualized minors (12 or more credit hours of work in two or more programs) or minors not specifically listed in this bulletin may be approved by the dean upon recommendation of the student’s advisory committee. Provided such approval is requested prior to pursuit of any of the proposed courses of study. Examination procedures (if any) or other requirements (for example, stipulation of the minimum grades acceptable) should also be specified in the proposal to the dean.

Double Majoring

Students may pursue two majors in two departments simultaneously, if so recommended by each department and approved by the dean. Two general requirements pertain to double majors: (1) there must be a substantive relationship between the two major fields, particularly with respect to the topic of the student’s dissertation; and (2) all degree requirements for each major must be fulfilled, including the passing of two sets of qualifying examinations. In some instances it may be possible to count the same work toward requirements in both departments (e.g., a specific foreign language acceptable in both programs). The exact courses of study and examinations required are to be determined by members of the research committee from each of the majors. Any area of substantial overlap in the two courses of study or in the examinations is to be negotiated by the committee as a whole and approved by the dean.

There must be at least four faculty members on both the advisory and research committees for a double major, with two from each of the majors. Additionally, the research committee must have two chairs (co-chairs), one from each of the majors. If other minor fields are involved, a representative must also be present from each of these.

A total of 90 credit hours is required for the Ph.D. degree with a double major. While judicious program planning may permit completion of some double majors within the 90 credit hours, other students may accrue additional hours due to the programs of study required for each major. In recognition of such a possibility, students in the program will be allowed one additional year, for a total of eight years, before they must take the qualifying examinations. A link to the complete set of rules relating to double majors and the appropriate form for applying for a double major can be found on the University Graduate School Forms page or by downloading it here.

Combined Degree Programs

The School of Medicine, the School of Dentistry, the McKinney School of Law, the Maurer School of Law, and the University Graduate School offer selected students an opportunity to pursue the M.S. or Ph.D. degrees, concurrently or sequentially, with a coordinated and flexible program leading also to the M.D., D.D.S., or J.D. degree. Combined degree programs are available in anatomy, biochemistry, dental science, medical biophysics, medical genetics, medical neurobiology, microbiology and immunology, pathology, pharmacology, physiology, and toxicology. At Bloomington, the combined degree is available not only in these basic medical, biological, and physical sciences but also in the humanities and social studies. The combined degree program is designed to meet the student’s particular objectives and needs and is planned by the student and an advisory committee of faculty representing the School of Medicine, the McKinney School of Law, the Maurer School of Law, or the School of Dentistry and the respective department or program.

Entry into a combined degree program requires approval of the University Graduate School and the relevant school (the School of Medicine, the School of Dentistry, the McKinney School of Law, the Maurer School of Law). Two applications are necessary: one to the Indiana University School of Medicine, of Dentistry, or of Law, and another to the Indiana University Graduate School via the sponsoring department or program.

Indiana University School of Medicine has established an Indiana Medical Scientist Program for fellowship and tuition support of students in the combined M.D./Ph.D. program. A faculty committee nominates students for the program based on commitment to a career as a physician scientist, research experience, undergraduate grade point average, and MCAT scores. A flexible entry
program allows students up to one year to identify a research laboratory and degree program. Information can be obtained from the Graduate Division of the School of Medicine.

Completion of the program entails meeting all requirements for both degrees. Many nonclinical courses of the curriculum of the School of Medicine satisfy course requirements for both degrees, and credit given for graduate study may fulfill some of the School of Medicine requirements. The combined degrees may thus be acquired in less time than would be required if both were taken separately.

As well as fulfilling requirements for the M.D. program, a minimum of 30 credit hours of graduate study is required for the combined M.S./M.D. degree. Of these, 10 credit hours may be transferred from exclusively School of Medicine courses with the approval of the student's advisory committee and the University Graduate School. Similarly, a minimum of 90 credit hours of graduate study is required for the combined Ph.D./M.D. degree. A maximum of 30 credit hours of exclusively School of Medicine courses may count toward the Ph.D. degree.

On the Bloomington campus there is a combined M.A. in Telecommunications and J.D. in Law; see the entry in Telecommunications for details.

Within the University Graduate School, combined degrees are available in American Studies and Cognitive Science. Students in these programs must be accepted by a Ph.D.-granting department and by either the American Studies or the Cognitive Science Program, and must satisfy the requirements for both chosen fields. Requirements are the same as those for the Ph.D. degree with a double major (see above).

Advisory Committee
The student's major department or program shall assign the student to an advisory committee no later than one year after admission to the Ph.D. program. The advisory committee must include at least two members from the major area and one from another. At least two members of the advisory committee must be members of the graduate faculty. The names of faculty members nominated to serve on the advisory committee shall be forwarded to the student's school or college for approval no later than one year after the student has been admitted to the Ph.D. program. The advisory committee shall approve the student's program of study and counsel the student until the passing of the qualifying examination.

Qualifying Examinations
This examination, given at such time and in such manner as the major department shall determine, shall be written, although additional oral examinations may be required. The qualifying examination shall cover the major subjects and may, at the discretion of the minor department(s) or the interdepartmental committee, cover the minor subjects as well.

Normally, the qualifying examination is taken after the student has completed all course work for the Ph.D. All such work offered in partial fulfillment of degree requirements must either have been completed within seven consecutive calendar years of the passing of the qualifying examination or be revalidated according to procedures outlined in this bulletin (see Revalidation). For students in combined M.D./Ph.D. programs, all course work offered in partial fulfillment of degree requirements of the Ph.D. must have been completed within nine consecutive calendar years preceding the passing of the qualifying examination; for students in Ph.D. programs in music, within 10 consecutive years. Reading proficiency required in one or more foreign languages must also have been demonstrated, whether by course work or examination, no more than seven years before the passing of the qualifying examination. In the case of an examination of more than one part, the date of passing is regarded as the date of passing the final portion of the examination, typically the oral examination. Students who fail the qualifying examination are normally allowed to retake it only once. The qualifying examination must be passed at least eight months before the date the degree is awarded. Some programs may have deadlines which are earlier than those of the University Graduate School; therefore, students should consult with their program office.

Admission to Candidacy Status
Following the passing of the qualifying examination and the completion of all course work and departmental language or research-skill requirements (if any), the student's advisory committee will submit a Nomination to Candidacy Form to the University Graduate School. Upon approval of the dean, the student will be admitted to candidacy. By request, students can be provided a certificate of candidacy. The date of successful completion of the qualifying examination (not the date of final approval of candidacy) is the one used in determining the seven-year periods for currency of courses (see Qualifying Examination) and completion of the dissertation (see Submission of the Dissertation).

The policy of the Graduate Faculty is that students may be dismissed for failure to maintain adequate academic progress toward the degree. For candidates, this standard is set by the faculty of each program or by the student's dissertation committee. The student must first be notified of deficient academic progress by being placed on probation for one semester. If the deficiency is not rectified, the student may be dismissed.

Continuing Enrollment
Students who have passed the qualifying examination must enroll each semester (excluding summer sessions) for any remaining required course work or dissertation credits. Once such students have accumulated 90 credit hours in completed course work and deferred dissertation credits, they must enroll for a minimum of 1 hour of graduate credit each semester until the degree is completed. Failure to meet this requirement will automatically terminate the student's enrollment in the degree program. Students who have completed 90 credit hours and all requirements for the Ph.D. are eligible to enroll in G901 for a flat fee of $150 per semester. Enrollment in G901 is limited to a total of six semesters. These hours do not count toward the required 90 credit hours of course work. (For students not on campus, enrollment may be completed by mail.)
A candidate who will be graduated in June, July, or August of any year must enroll in a minimum of 1 hour of credit during the summer semester as described above.

Dissertation

**Dissertation**

The culmination of the Ph.D. program is the writing of the dissertation, which is required of all doctoral students. The dissertation must be an original contribution to knowledge and of high scholarly merit. The candidate’s research must reveal critical ability and powers of imagination and synthesis. The dissertation is written under the supervision of a research director and a research committee, as described below. Although work published by the student may be incorporated into the dissertation, a collection of unrelated published papers, alone, is not acceptable. There must be a logical connection between all components of the dissertation, and these must be integrated in a rational and coherent fashion. It is the responsibility of the student’s research committee to determine the kind and amount of published materials which may be included in a dissertation.

**Defense of the Dissertation**

When the dissertation has been completed, the student should submit an unbound copy to each member of the research committee as the initial step in scheduling the defense of the dissertation. All members of the research committee should read the dissertation in its entirety before attending the defense. At this stage both the student and the faculty members must extend certain courtesies to each other. It is the responsibility of the student to give faculty members sufficient time to read the dissertation without making unreasonable requests of them based upon University Graduate School time limitations, immediate job possibilities, contract renewal, or some other reason. Similarly, a faculty member should not keep a student’s work for inordinate periods of time because of the press of other duties. Once a faculty member assumes membership on a research committee, it becomes another part of his or her teaching assignment, comparable to conducting regularly scheduled classes.

After the committee members have read the dissertation, there should be direct communication (either in writing or orally) between the research committee chairperson and the other committee members about its readiness for defense. Readiness for defense, however, is not tantamount to acceptance of the dissertation; it means that the committee is ready to make a decision. The decision to hold a doctoral defense, moreover, is not entirely up to the research committee. If a student insists upon the right to a defense before the committee believes the dissertation is ready, that student does have the right to due process (i.e., to an oral defense) but exercises it at some risk.

If the decision to proceed with the defense of the dissertation is made against the judgment of one or more members of the committee, or if one or more members of the committee disapprove of parts of or all of the dissertation, the committee member(s) should not resign from the committee in order to avoid frustration or collegial confrontation. The University Graduate School urges that such committee members, after ample communication with both the student and the chairperson, remain on the committee and thus prevent the nomination of a committee that might eventually accept what could be unsatisfactory work. Such a committee member could agree that a dissertation is ready for defense but should not be passed (or should not be passed without substantial modification). There will, of course, be situations in which the membership of research committees should or must be changed (e.g., turnover of faculty), but changes because of modifications in the dissertation topic or some equally plausible reason should be made early in the writing of the dissertation.

Thirty days prior to the scheduled defense of the dissertation, the candidate must submit to the University Graduate School a defense announcement via the electronic document (e-doc) system. (Some programs may have requirements which are earlier than those of the University Graduate School; therefore, students should consult with their program office.) The announcement contains, among other things, a summary of the dissertation (not less than 150 words) which is informative and contains a brief statement of the principal results and conclusions. The announcement must be approved by the research committee chairperson. If the candidate has published any scholarly articles relevant to the topic of the dissertation, bibliographical references should be included in the summary. A copy of such announcements will be sent to any member of the graduate faculty upon request.

Once the final examination has been scheduled, the announced time and place of the defense must not be changed without the approval of the dean. Any member of the graduate faculty who wishes to attend the final examination is encouraged to do so; it is requested, however, that the faculty member notify the chairperson of the research committee in advance so that space can be arranged. With the approval of the research committee and the consent of the candidate, other graduate students may attend the defense of the dissertation; normally such students will act as observers, not as participants.

At the end of the oral examination, the research committee must vote on the outcome of the examination. Four options are available to the committee: (1) pass, (2) conditional pass, (3) deferred decision, and (4) failure.

If the decision to pass is unanimous, the dissertation is approved once it is received by the University Graduate School along with an acceptance page signed by the members of the research committee. If the decision is not unanimous, majority and minority reports should be submitted to the dean who, within 10 working days, will investigate and consult with the research committee. Upon completion of the dean’s investigation and consultation, another meeting of the research committee will be held, and if a majority votes to pass, the dissertation is approved when it is received by the University Graduate School with an acceptance page signed by a majority of the members of the research committee.

The student must have received acceptance of his or her dissertation and must submit a copy to the University Graduate School within seven years after passing the qualifying examination. Failure to meet this requirement will result in the termination of candidacy and of the student’s enrollment in the degree program. Any student whose candidacy lapses will be required to apply to the University Graduate School for reinstatement before further work toward the degree may be done formally. To be reinstated to candidacy in the University Graduate
School, the student must: (1) obtain the permission of the departmental chairperson; (2) fulfill the departmental requirements in effect at the time of the application for reinstatement; (3) pass the current Ph.D. qualifying examination or its equivalent (A department must define in advance specifically what is meant if an "equivalent" examination is to be used, and that definition must be approved by the dean); and (4) request reinstatement to candidacy from the dean. Such reinstatement, if granted, will be valid for a period of three years, during which time the candidate must enroll each semester for a minimum of one credit.

Submission of the Dissertation
Following acceptance by the research committee, the dissertation is submitted to the University Graduate School. Students are expected to submit the final version of the dissertation within six months of the defense date to maintain sufficient academic progress. For complete guideline information, see the University Graduate School's website (www.graduate.indiana.edu) section related to Thesis & Dissertations.

Each dissertation must include a title page bearing the statement: “Submitted to the faculty of the University Graduate School in partial fulfillment of the requirements for the degree Doctor of Philosophy in the Department of __________, Indiana University.” (Note: Students majoring in programs will use "Program of:" students majoring in departments outside of the College of Arts and Sciences will use "School of.") The date of this page should be the month and year when all requirements have been satisfied; this is not necessarily the month in which you defend. Following the title page is the acceptance page with the statement: “Accepted by the faculty of the University Graduate School, Indiana University, in partial fulfillment of the requirements for the degree Doctor of Philosophy.” The acceptance page must be signed by members of the research committee. See the online guide for the complete order for the front matter.

The candidate must also submit an abstract of no more than 350 words for the dissertation that has been approved and signed by the research committee. The abstract will appear in ProQuest Dissertations & Thesis Database, managed by ProQuest D dissertation Publishing, Ann Arbor, Michigan. If the original abstract is not in English and an English translation has been made, submit both the English and non-English language abstracts.

Any creative work, such as a dissertation, is automatically copyrighted; however, registration with the U.S. Copyright Office provides (various/certain) legal benefits. The cost for registering a work through ProQuest is currently $55. Contact the University Graduate School for details.

Many Indiana University departments now allow electronic submission of the dissertation. Contact the department for more information.

Electronic Submission: This is the preferred submission method. Once approved and finalized, the dissertation should be submitted electronically in the form of a .pdf file to ProQuest. A microfilm version will also be made available for purchase from ProQuest Dissertation Publishing by all those who request it. Effective September 27, 2010, there is no longer a fee for those dissertations submitted electronically and opting for Traditional Publishing. Open Access publishing has a fee of $160.00

Traditional Unbound Paper Submission: If the student wishes to submit via traditional unbound paper method, he or she must schedule a dissertation review appointment with the Ph.D. recorder in the University Graduate School, once his/her research committee has approved the final version of the dissertation. In this appointment, the recorder will review an unbound copy of the dissertation for necessary formatting revisions. The student will need to make the requested revisions and submit to the University Graduate School one unbound copy of the dissertation for necessary formatting revisions. The student will need to make the requested revisions and submit to the University Graduate School one unbound copy of the dissertation, in a box suitable for mailing, and one bound copy. The bound copy is sent to the University Library. Some departments also require an additional bound copy. Students should contact their department regarding departmental policies on bound copy submission. The unbound copy will be submitted to ProQuest where the abstract will be published and the dissertation microfilmed for storage in their database. The required fee for publishing the abstract and microfilming the dissertation is currently $65 for traditional publishing or $160 for Open Access Publishing.

Dissertation Research Committee
To initiate research for the dissertation, the student chooses a professor who will agree to direct the dissertation. The department shall then recommend to the dean for approval a research committee composed of the chosen director (who will also normally serve as chairperson of the committee), two or more additional faculty members from the major department, and a representative of each minor. The committee should be selected from the members of the graduate faculty who are best qualified to assist the student in conducting the research for the dissertation. In the event that the dissertation research does not involve the area(s) of the minor(s) whether outside or inside the department the major department may request, with the consent of the minor-field representative(s), the substitution of a representative or of representatives from some other field(s) more appropriate to the topic of the dissertation. The committee has the responsibility of supervising the research, reading the dissertation, and conducting the final examination.

All chairpersons of research committees and directors of research must be members of the graduate faculty with the endorsement to direct doctoral dissertations. If, however, special expertise in an area is held by a member of the graduate faculty who does not have the endorsement, the departmental chairperson may request that the dean approve such an individual as research committee chairperson or director of the dissertation research.

All members of a research committee must be members of the graduate faculty. At least half of the members of the committee must be members of the graduate faculty with the endorsement to direct doctoral dissertations; others may be regular members.
After consultation with and approval by the dissertation director and research committee, the student will submit to the University Graduate School a one- or two-page prospectus of the dissertation research. If the proposed research involves human subjects, animals, biohazards, or radiation, approval from the appropriate university committee must also be obtained. The membership of the research committee and the dissertation prospectus must be approved by the University Graduate School at least six months before the defense of the dissertation. Some programs may have deadlines which are earlier than those of the University Graduate School; therefore, students should consult with their program office.

Foreign Language and Research Skills

Individual departments determine whether foreign languages or research skills or both will be required. Where such requirements exist, students must select the specific language(s) or research skill(s) from those approved by the major department and listed in its statement of departmental requirements. Another language demonstrably useful in the student’s research program may be substituted upon special recommendation of the major department and approval by the dean. A student whose native language is not English may, with the permission of the major department, either (1) demonstrate the required proficiency in that native language, or (2) use English to meet foreign language requirements. Proficiency in English may be demonstrated by taking the Test of English as a Foreign Language (TOEFL) examination. (For further information regarding requirements. Proficiency in English may be demonstrated by presenting an original translation of the student’s research program may be substituted upon special recommendation of the major department and approval by the dean. A student whose native language is not English may, with the permission of the major department, either (1) demonstrate the required proficiency in that native language, or (2) use English to meet foreign language requirements. Proficiency in English may be demonstrated by presenting an original translation of the Test of English as a Foreign Language (TOEFL) examination. (For further information regarding the TOEFL examination, see the section International Students.)

Reading proficiency in a foreign language is normally established in one of three ways:

1. By achieving an appropriate score on an examination administered on the Bloomington campus by the respective language department. Students should contact the language department for details.

2. By completing, with a grade of B (3.0) or better, the reading course _492 (e.g., F492 for French, G492 for German). Students may register for the first course in the sequence, _491, to prepare for _492; those who feel they have sufficient preparation may register for _492, though they should consult the language advisor first.

3. By receiving, in the cases of Catalan, French, German, Italian, Portuguese, Russian, or Spanish, a grade of B (3.0) or better in a literature or civilization course at Indiana University numbered 300 or higher (exclusive of individual readings and correspondence courses) in which the reading is done in the foreign language. Courses in Russian offered to meet this requirement must be approved by the Department of Slavics and East European Languages and Cultures. For details, consult the respective language departments.

In certain departments, reading proficiency may be demonstrated by presenting an original translation for approval by a faculty examiner designated by the appropriate language department.

Proficiency in Depth

In certain departments, students have the option of substituting proficiency in depth in one language for reading proficiency in two languages. Proficiency in depth in a language is defined as the ability to read rapidly without the aid of a dictionary and the ability to speak, understand, and write in a manner comparable to that expected of students who have successfully completed fourth-year composition and conversation courses. For information about demonstrating proficiency in depth, students should consult the graduate examiner in the foreign language department concerned.

Courses taken to fulfill research-skill requirements may, at the discretion of the student’s major department, be counted for graduate credit in a student’s program of study provided such courses are listed in this bulletin as carrying graduate credit. Each course must be passed with a grade of B (3.0) or higher to satisfy the proficiency requirement.

Financial Aid

There are many forms of financial aid for graduate students awarded or facilitated by the University Graduate School and Indiana University. A number of options are included in this site.

Assistantships and Instructorships

Associate Instructorships, Graduate Assistantships, and Research Assistantships

A large number of associate instructorships, graduate assistantships, and research assistantships are available in departments and schools offering degrees through the University Graduate School. Some of these positions are accompanied by fee remissions which defray a large percentage of tuition and fees. Application for such positions should be made to the department or school in which the student wishes to work. Early application is advisable.

Resident Assistantships

Positions are available on the Bloomington campus and at IUPUI for single graduate students to serve as resident assistants in the residence halls. Selection of graduate students for these positions is based on the applicant’s academic record, previous background and experience, potential for work with undergraduate students, and personal qualifications necessary to relate successfully to other people. The resident assistant serves as an advisor to a living unit of 50 students in one of the university residence centers. These positions provide room, board, and a cash stipend; course work is limited to a maximum of 12 credit hours each semester. For further IUB information, contact the director, Department of Residence Life, 801 N. Jordan Avenue, Bloomington, IN 47405, telephone (812) 855-1764. For further IUPUI information, contact the director, Office of Housing and Residence Life, 1226 W. Michigan Street, Indianapolis, IN 46202-5180, telephone (317) 274-7200.

Fellowships

A number of fellowships are available to students enrolled in the University Graduate School. Among them are University Graduate School fellowships, fee scholarships, and various privately and federally funded awards. Students should apply for these fellowships directly to the major department. In all cases, early application is
 advisible. It should be noted that all such award holders are required to devote full time to their studies.

Indiana University also offers several recruitment fellowship and support programs for students underrepresented in graduate education (ethnic minority, first generation and/or low income college students and women in the sciences). These include the Graduate Scholars Fellowship, Adam W. Herbert Graduate Fellowship, Women in Science Graduate Fellowship, Ronald E. McNair Graduate Fellowship, and the Educational Opportunity Fellowship. In some cases students must meet certain criteria in order to be eligible for consideration for these awards.

To be considered for any of these awards, a student should submit an IU application form for admission and financial aid to the relevant graduate program at IUB by mid-January of the year preceding enrollment. Information for IUB students can be obtained from the University Graduate School Fellowship Coordinator, Wells Library E546, 1320 E. 10th Street, Bloomington, IN 47405 (telephone [812] 855-8853; e-mail grdschl [at] indiana [dot] edu; web: http://graduate.indiana.edu/index.shtml.

Further information for IUPUI students can be obtained from the Graduate Office at IUPUI, University Library, Room 1170, 755 W. Michigan St., Indianapolis, IN 46202 (telephone [317] 274-1577; web: http://www.iupui.edu/~gradoff/).

**Doctoral Student Grants-in-Aid of Research**

**Grant-in-Aid of Doctoral Research**

The grant-in-aid of doctoral research is designed to assist Bloomington doctoral students in funding unusual expenses arising from the research required for the dissertation. Examples of such expenses include travel to special libraries or laboratories, payments to consultants, specialized equipment, and duplication of vital materials needed for writing the dissertation. Expenses that are not supported include typing and duplicating of dissertations, normal living expenses, routine laboratory supplies, and computers. A student must have been formally admitted to Ph.D. candidacy by the application deadline (the Nomination to Candidacy Form must have been approved by the Dean of The University Graduate School). Students pursuing doctoral degrees other than the Ph.D. (i.e., Ed.D. or D.M.) may also apply for a Doctoral Student Grant-in-Aid of Research Award. Current students must be enrolled full-time on the Bloomington campus during the semester in which an application is submitted (6 credit hours is considered full time). The maximum amount of aid is $1,000 per academic year. Awards are made two times a year; the deadlines for completed applications are in January and September for receipt by the University Graduate School. Application information can be found on the University Graduate School website, http://www.indiana.edu/~grdschl/internal-awards.php.

**Other Student Financial Assistance**

Long-term loans and Federal Graduate Work-Study are available to graduate students at IU. More information and application requirements are on the Indiana University Web site: www.indiana.edu/~sfa/.

IUPUI students should contact the Office of Student Financial Services, CE 250A, 420 University Boulevard, Indianapolis, IN 46202 (telephone [317] 274-4162). For information about other campuses, contact the Office of Financial Aid and Scholarships, Whitewater Hall 112, 2325 Chester Boulevard, Richmond, IN 47374-1289, (telephone 765-973-8206); contact Financial Aid Services, 2101 E. Coliseum Blvd., Fort Wayne, IN 46805-1499 (telephone [260] 481-4739); the Office of Scholarships and Financial Aid, KC 230, 2300 S. Washington St., Kokomo, IN 46904-9003 (telephone [765] 453-2000); the Office of Scholarships and Financial Aid, Administration Building 157, P.O. Box 7111, 1700 Mishawaka Avenue, South Bend, IN 46634-7111 (telephone [574] 520-4357); or the Office of Student Financial Aid, University Center South, Room 105, New Albany, IN 47150 (telephone [812] 941-2246).

**The GradGrants Center—Bloomington**

The GradGrants Center—Bloomington (GGC) is a free service available to all enrolled graduate students on all campuses of Indiana University. The GGC provides information and training to assist graduate students in their search for funding to further research and graduate study at Indiana University. The GGC’s services include funding-database searches, workshops, one-on-one proposal-writing consultation, a library of funding sources and proposal-writing books, and an electronic mailing list used to inform patrons of upcoming workshops, grant deadlines, and relevant news. The center’s website also provides students a central location to find available student academic vacancies and gives departments on any IU campus an additional means to advertise their positions.

The GradGrants Center—Bloomington is located in the Herman B Wells Library, Room 651E (telephone [812] 855-5281; e-mail gradgrnt@indiana.edu; website: www.indiana.edu/~gradgrnt/).

**Special Opportunities**

This site describes additional opportunities and services provided by the University Graduate School and Indiana University which facilitate the attainment of graduate student goals.
Certificates

Area Certificates
Certificate programs are available in a number of areas; for further information, students should see the departmental entries in this bulletin. Such certificates can be pursued only in conjunction with a degree program and cannot be awarded independently.

Free-Standing Certificates
Graduate certificates are offered in some fields to allow a focused credential to be earned by a person who has already earned an undergraduate degree, whether or not the person is currently enrolled in an Indiana University master's or doctoral program. The courses taken are typically the same as those taken for other degrees, but a more limited number of courses is required for the certificate. Graduate certificates typically involve a predetermined curriculum of 16 to 20 credit hours. Students enrolled in free-standing certificate programs who wish subsequently to pursue an advanced degree must make separate application to the University Graduate School and must have specific permission of the faculty of their degree program to use any credits earned as a certificate student for the more advanced degree.

Foreign Language Courses

Language Instruction
Indiana University offers instruction in a wide variety of foreign languages. Formal courses or tutorials have been offered in recent years on the Bloomington campus in the following:

- Akan
- American Sign Language
- Ancient Egyptian
- Arabic
- Avestan
- Azerbaijani
- Bamana
- Bengali
- Buryat
- Catalan
- Chaghatay
- Chechen
- Chinese (Classical and Mandarin)
- Coptic
- Croatian
- Czech
- Dari
- Dutch
- English as Second Language
- Estonian
- Evenki
- Finnish
- French
- Georgian
- German
- Gothic
- Greek (Classical and Modern)
- Haitian Creole
- Hebrew (Biblical and modern)
- Hindi
- Gujarati
- Hungarian
- Italian
- Japanese (Classical and Modern)
- Kazakh
- Korean
- Kurdish
- Lakota (Sioux)
- Latin
- Macedonian
- Manchu
- Manichaean
- Middle High German
- Mongolian (and Classical Mongolian)
- Norwegian
- Old Church Slavonic
- Old English
- Old High German
- Old Icelandic
- Old Irish
- Old Saxon
- Old Tibetan
- Old Turkic
- Pahlavi
- Pashto
- Persian
- Polish
- Portuguese
- Quechua
- Romanian
- Russian
- Sakha ('Yahut)
- Sami (Lappish)
- Sanskrit
- Serbian
- Sioux (Lakota)
- Slovak
- Slovene
- Sogdian
- Spanish
- Swahili
- Syriac
- Tajik
- Tibetan
- Turkish (Modern and Ottoman)
- Turkmen
- Ukrainian
- Urdu
- Uyghur
- Uzbek
- Welsh
- Wolof
- Yiddish
- Yucatec Maya
- Zulu

Preparing Future Faculty
A number of graduate programs have established Preparing Future Faculty programs, which are designed to introduce graduate students to the full range of professional responsibilities in research, teaching, and
service they will encounter in academia. These programs typically include more advanced courses in pedagogy, the opportunity to work closely with teaching mentors and to construct teaching portfolios, workshops on specialized topics, and expanded teaching possibilities, often in cooperation with other campuses of Indiana University or other institutions. For information about these programs, contact the individual departments. Further information for IUB students can be obtained from the University Graduate School, Wells Library E546, 1320 E. 10th Street, Bloomington, IN 47405 (telephone [812] 855-5697; e-mail grdschl [at] indiana [dot] edu; web: http://graduate.indiana.edu/index.shtml.

Traveling Scholar Program
Committee on Institutional Cooperation Traveling Scholar Program
This program enables Indiana University doctoral-level students to take advantage of special resources available at other CIC institutions that do not exist at Indiana University. Students in the program register and pay fees at Indiana University but attend one or more of the participating institutions, each for no more than two semesters or three quarters. To find eligibility requirements, program details, and online application information, please visit the Web site http://www.cic.net/projects/shared-courses/traveling-scholar-program/introduction. For further information regarding Indiana University, contact Assistant Dean Jeff Rutherford, the University Graduate School, Wells Library E546 (812-855-4010; jruther@iu.edu).

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- Networks specializes in network operations, architecture, and planning, and serves high performance state, national, and international research and education networking infrastructures such as I-Light, the Internet2 Network, and TransPAC2
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Programs by Campus

Bloomington

African American and African Diaspora Studies

College of Arts and Sciences

Departmental E-mail: aaads@indiana.edu

Departmental URL: http://www.indiana.edu/~afroamer/

(Please note that when conferring University Graduate School degrees, minors, certificates, and sub-plans, The University Graduate School's staff use those requirements contained only in The University Graduate School Bulletin.)

Curriculum

Program Information

The multidisciplinary Department of African American and African Diaspora Studies (AAADS) seeks to:

1. create and share with academic and nonacademic communities scholarship of the highest quality dealing with the broad range of the African American and African Diaspora experience;
2. promote the study and understanding of the historical and contemporary connections among Africans, African Americans, and other New World black communities; and
3. affirm the democratic tradition of equal opportunity for all by combating all forms of discrimination based on ethnicity, gender, class, and religious differences. The department assumes the ongoing responsibility of creating materials and conducting seminal research that aids in the development and shaping of African American and African Diaspora Studies as a discipline.

Master of Arts Degree in African American and African Diaspora Studies

The Department of African American and African Diaspora Studies at Indiana University is committed to being one of the world's leading multi- and interdisciplinary graduate studies programs focused on peoples of African descent in the United States in comparison to African-descent peoples in other globalized contexts. With an emphasis on diverse epistemologies, theories, methodologies, ethical considerations, and innovative teaching pedagogies, our goals are:

1. to offer students an intense program in the examination of African American and Diasporic African descent issues in and outside the United States including their transnational continuities and discontinuities;
2. to encourage students to develop and/or fine-tune excellent skills in areas such as creative research, writing, oral communication, technology intercultural competence and collaborative research;
3. to provide students with invaluable intellectual training by bridging curriculum content and practical experience gained from course content in oral history, survey, and ethnographic field work, museums and library archives, and internship opportunities with a range of agencies, organizations, and institutions;
4. to sustain a learning environment in which students create and refine critical questions, develop problem solving skills, and synthesize intellectual bridges between the arts, humanities, and social sciences with emphasis on interpretations of African American experiences in the United States and abroad;
5. to give students excellent research foundations in the humanities, the social sciences, and other interdisciplinary fields;
6. to prepare students for a broad spectrum of career opportunities in areas such as academia, creative and performing arts, nonprofit management, public policy, urban studies, conflict resolution, and social services.

The purposes of the M.A. degree are:

1. to offer students an intense program in the analysis of African American issues;
2. to expose students to both historical and current methodological approaches;
3. to expose students to issues throughout the African Diaspora;
4. to refine critical and problem-solving skills in both the humanities and social sciences;
5. to extend a sound basis for those going into a doctoral program; and
6. to prepare students for administrative, teaching, communication, and social service careers.

In sum, the program provides a theoretical base of knowledge, methods of research, and a context for analyzing African American and Diaspora experiences that