Doctor of Philosophy in Informatics
2020 Guidebook

Note: The Doctor of Philosophy in Informatics follows the policies described in this Guidebook and the University Graduate School Bulletin 2020-2021. This Guidebook does not substitute for the official University Graduate School (UGS) Bulletin. Always consult the UGS Bulletin for further details and official explanations.

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

This Guidebook contains text from the University Graduate School Bulletin, the Office of International Services, and Informatics Track Handbooks. 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 Luddy School of Informatics, Computing, and Engineering as a place where innovative multidisciplinary programs could thrive, in programs where a student 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 a student works 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

Each student is expected to abide by the Indiana University *Code of Student Rights, Responsibilities, & Conduct, https://studentcode.iu.edu*. This applies to scholarship, any role a student may have as an Associate Instructor (AI), relations with colleagues, relations with a student, and compliance with academic standards with respect to academic ethics.

In particular, if a student is 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.

EXPECTATIONS OF STUDENTS

We expect you to develop as a scholar, an instructor-mentor, and a professional. As a doctoral student and in your career, it is expected that you maintain professionalism and high standards in your interactions with faculty, staff, colleagues, and students as well as in your role as a researcher or associate instructor.

PROGRAM OF STUDY

A student 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 each student to pursue internships and related activities.

LENGTH OF PROGRAM

For a student who enters the program with a relevant master's degree, it will take approximately four years to complete the Ph.D. degree; for a student who enters 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:

Requirements	Required Courses	Credits
Informatics Core	INFO-I 501 and INFO-I 502	6 cr.
Seminars	INFO-I 609 and/or INFO-I 709	6 cr.
Research Rotation	INFO-I 790	6 cr.
Track Specific Requirements, if any		0-12 cr.
Theory & Methodology		12 cr.
Minor		6-15 cr.
Electives		12-30 cr.
Thesis Readings and Research	INFO-I 890	21-30 cr.
M.S. Transfer Credits		Up to 30 cr.

Note: Appendix A contains each track's specific requirements.

REQUIREMENTS FOR DOUBLE MAJORS

A student may pursue majors from two departments simultaneously which requires being admitted to each program. For more information about becoming a double major, contact the Luddy SICE Graduate Student Office at gradvise@indiana.edu.

Each department and their respective deans must approve the double major. Double majors have four general requirements: (1) a substantive relationship between the two major fields, particularly with respect to the topic of the student's dissertation; (2) approval to change from a single to a double major by both departments and the University Graduate School; (3) fulfillment of both degree requirements; and (4) successful completion of the qualifying exam(s).

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 the student is required to take the qualifying examinations.

For double majors, both departments must agree that the research credits can be shared. Informatics requires students to take 21-30 credits of Thesis Readings and Research (INFO-I 890). If there is disparity in the number of research credits required by the two departments, the greater number of the two departments must be satisfied.

The Doctor of Philosophy in Informatics for a double major follows the policies described in this Guidebook and the University Graduate School Bulletin 2020-2021. Consult with the Luddy SICE Graduate Studies Office for further details.

RESIDENCY REQUIREMENT

Indiana University Bloomington does not offer any online or distance doctoral programs. Each doctoral student must comply with the UGS residency requirement below:

> *All candidates for graduate degrees 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.*

> (Excerpt is taken from https://bulletins.iu.edu/iu/gradschool/2019-2020/gradschool-pdf.pdf)

Residency Requirement for Part-Time Students and IU Employees
The University Graduate School will consider a part-time status on a case-by-case basis. As part of the part-time approval process, Informatics Graduate Studies Office will prepare a course plan for each part-time student and submit it to the University Graduate School for their approval.

FULL-TIME STATUS

In order to receive funding from the School, the student must maintain full-time status. It is imperative that an international student maintain full-time status to remain in visa compliance. For questions about visa compliance, contact the Office of International Services (ois.iu.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:

- A Ph.D. student who holds a Student Academic Appointment (SAA) as an Associate Instructor or Research Assistant will be required to enroll in 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.

- A Ph.D. student who has completed courses and deferred dissertation credits totaling 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.

- A Ph.D. student who has already accumulated 90 or more hours of graduate credit and who holds a Student Academic Appointment (SAA) as an Associate Instructor or Research Assistant will be required to enroll in 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 an Informatics graduate student 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 course work from previous terms during a leave, the student may not attend class or use the leave to catch up on current course work, prepare for exams, or write their dissertation.

Leave of Absence Eligibility

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.

Requesting a leave before the term begins

You may request a leave of absence as early as six months prior to the leave start date. You can request up to 12 consecutive months of relief from coursework and academic requirements. The maximum period that you may be on leave is 24 (nonconsecutive) months or four regular academic terms. Leaves can be taken for extended or intermittent periods of time provided that the total length of the leaves is 24 months or less.

Requesting a leave after the term begins

If you wish to take a leave of absence after the term has begun, you are encouraged to first contact your department's director of graduate studies to discuss whether you can remain registered (e.g., by taking incompletes). If your program cannot reasonably accommodate your situation, you can request a leave.

To request a leave after the semester has begun, you must submit your request through the Luddy SICE Graduate Studies Office and contact the Student Advocates Office to arrange a full withdrawal. A full withdrawal can impact international student visas, tuition payments, student loans, fellowships, and health insurance. Registrar deadlines will determine the amount of tuition that can be refunded.

Leave of Absence Approval Process

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 Luddy SICE Graduate Studies Office for more information (gradvise@indiana.edu).

FUNDING

Any funding awarded to a student is detailed in their admission letter. Associate Instructor (AI) and Research Assistant (RA) awards require a student 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 a student is funded, they will receive an appointment as an AI or 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, a student 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. A student 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 December 19 2020 following finals week, and return to campus for the spring semester on or before January 12 2021, prior to the first day of class. A student should plan to leave for the summer break on or after May 9 2021, following the end of finals for the Spring semester. Contact the Informatics Director of Curriculum and Instruction, Akesha Horton, with any questions (akmhorto@iu.edu).

TRAVEL AWARD

To enhance academic and professional goals, a student will have opportunities to travel in the United States and abroad. To help defray expenses, a student will receive a Travel Allowance Award of up to $1,500 during the first two years of study and another $1,500 during the third or fourth years of study.

PH.D. IN INFORMATICS – TRACK OVERVIEWS

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, artificial life, and 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.

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.

HUMAN COMPUTER INTERACTION / DESIGN
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 studies systems that perceive, understand, and interact with people and the environment, focusing on areas such as autonomous robots, human-robot interaction, social robotics, computer vision, video and image understanding, wearable and ubiquitous computing, evolutionary robotics, digital music libraries, music recognition (audio, optical, time-sequence), modeling musical expression, musical accompaniment systems, computational music analysis, music information retrieval, motion planning and control, and dynamical systems.

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

An interdisciplinary program that focuses on information technology, digitization of three-dimensional objects, time-tested principles of art and architectural restoration to digitally restore the object to its original condition; digital tools for analysis of cultural heritage objects, and best practices of the profession as well as 3D state and restoration models in print, video, mobile, and restoration of augmented reality devices, and on the Internet.

ANIMAL INFORMATICS

Animal informatics, including the subfield of animal-computer-interaction, is an interdisciplinary applied research program of interest to the pet care industry, captive animal management (e.g. zoos, aquariums, livestock), animal welfare organizations, assistive and therapeutic support animal programs, veterinary medicine, wildlife conservation, and the cognitive, biological, and evolutionary sciences.

PH.D. MILESTONES, GUIDELINES AND ANNUAL REVIEW

ADMIT ADVISOR

A student admitted to the Ph.D. Program is assigned a program advisor who may be consulted for advice. A student may change advisor upon the consent of the new advisor and by filing documentation with the Luddy SICE Graduate Studies Office. A 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 a student to be successful in the Informatics program. A student will be evaluated in three areas: Milestones to Complete, Noteworthy Accomplishments, and Evaluation Summary. In preparation for the GED, each student is 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, each student 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 advisory committee will guide the student's doctoral program as well as oversee and conduct the qualifying exam in the student's research track.

For Single Majors, the student's advisory committee should consist of (1) a chair and at least one other members from the student's major track; and (2) a third member who represents the student's minor, or is another Informatics faculty member. At least 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.

For Double Majors: Within the first year (or earlier as required by written agreement), 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, the Chair and/ or Director of Graduate Studies of the other major, and the University Graduate School.

The Advisory Chair must be a faculty member from the student's track. Once the student has formed an advisory committee, the student must submit the completed Advisory Committee form to the Informatics Graduate Studies Office.

All Advisory Committee members are expected to be present in person and on campus. If a member must participate remotely, the student should email the Director of Graduate Studies (and copy the Graduate Studies Office at gradvise@indiana.edu) with justification well in advance to request permission for remote participation.

TRANSFER OF CREDIT
In compliance with the University Graduate School policy on transfer of graduate credit, the Informatics policy allows up to thirty (30) credit hours of graduate work completed at another university to be applied toward the Ph.D. In order for a course from another university to transfer, a grade of B or higher must have been earned. All transfer credit is subject to approval by the student's advisor and the Informatics Director of Graduate Studies.

To request a credit of transfer, the student should fill out the Transfer of Credit Request form with their advisor and submit the completed form to the Luddy SICE Graduate Studies Office. Once the Transfer of Credit Request has been approved and processed, the transfer of credit will appear on the student's transcript with the transfer noted.

MINOR
Each doctoral student is 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.

Within the first year of enrollment in the program, a student must select a minor. They need to complete the top portion of the Ph.D. in Informatics Doctoral Minor form and list 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 form and submit the form to the Luddy SICE Graduate Studies Office.

Note for Individualized Minors: The student's advisor, 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, there is not a minor requirement.

QUALIFYING EXAMINATION (QUALS)

The student should take their quals, which will be in the scholarly domain of their track, once the required coursework for their track is completed, including I501, I502, I609, I709, two research rotations (I790) and any additional track requirements. This is generally expected to be at the end of their second or beginning of their third year. The quals can be taken only during the academic year (August to May) and not the summer months of June and July. Quals should be scheduled so that all Advisory Committee members can be present in person and on campus. If a member must participate remotely, the student should email the Director of Graduate Studies (and copy the Graduate Studies Office at gradvise@indiana.edu) with justification well in advance to request permission for remote participation.

During the coronavirus pandemic, qualifying exams are being held remotely for Fall 2020, and possibly later in the academic year as well. You can get information on best practices and procedures on the UGS website: The University Graduate School website has relevant information in its https://graduate.indiana.edu/thesis-dissertation/defenses-covid-19.html

The quals are written and oral as prescribed by the student's advisory committee. Quals can be taken only twice. Before the quals, a student should request a degree audit from the Informatics Graduate Studies Office for their eligibility to take the quals.

After the quals, the student needs to complete and submit the Qualifying Exam form to the Luddy Graduate Studies Office. A quals form must be submitted even if the student received a conditional pass or did not pass the quals. A student who does not successfully pass the examination can retake the exam a second time.

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After passing the quals, the student must remain continuously enrolled beginning the first semester (excluding the summer sessions) after passing the quals until the degree is conferred.

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 e-doc and the Nomination to Research e-doc. Having the University Graduate School approve both the Nomination to Candidacy e-doc and the Nomination to Research e-doc after passing the quals allows a student more flexibility in selecting a defense date.

NOTE for Double Majors: Candidacy expires eight (8) 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 e-doc and the Nomination to Research e-doc. Having the University Graduate School approve both the Nomination to Candidacy e-doc and the Nomination to Research e-doc after passing the quals allows a student 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 course work to be counted toward the degree requirement must be revalidated if the course work was completed more than seven (7) years prior to the passing of the qualifying examination for a Ph.D. student or more than eight (8) years prior to the passing of the qualifying examination for a Ph.D. double major student.

To revalidate course work, it must be demonstrated that the knowledge contained in the course(s) remains current by such things as:
1. Passing an examination 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.

A student must complete the Request for Revalidation of Course work. Each course should have its own justification for revalidation.

A student should avoid this tedious process by completing all course work in a timely fashion. A student who enters the program with graduate course work that they would like to transfer to the doctoral program and which may need to be revalidated should talk with the Luddy SICE Graduate Studies staff about what needs to be done.

NOMINATION TO CANDIDACY (NTC)
The Nomination to Candidacy verifies the completion of the student's course work and the successful completion of the qualifying exam. Using one.iu.edu, the student will submit the Nomination to Candidacy e-doc form. Additionally, the Nomination to Candidacy expires seven (7) years from the date that the student passed the qualifying exam. Failure to graduate by that date results may result in dismissal from the program.

For Double Majors: After passing the qualifying exam, the student submits a Nomination to Candidacy e-doc for the Ph.D. Degree with a Double Major form. For a double major, the Nomination to Candidacy expires eight (8) years from the date that the student passed the qualifying exam. Failure to graduate by that date results may result in dismissal from the program.

Once the student's Nomination to Candidacy has been approved, the student is not yet a Ph.D. Candidate. To achieve that title, the student needs to submit their Nomination of Research and pass their dissertation proposal defense.

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 e-doc form. 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 and is any faculty member from the major department; (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. Additional members may be included as external members of the research committee.

Expectations of Chairs and Committee Members: All members of a Ph.D. student's Research Committee are expected to participate in the student's defense in person and on campus with the student.

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 e-doc. The outside committee member will need to send an email to gradvise@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 their doctoral dissertation, the University Graduate School must approve the Nomination of Research. If the student makes a change to their Research Committee, a Ph.D. Research Committee Change e-doc must be submitted and approved by the student's advisor, 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. e-doc. The double major Research Committee will consist of four people, two people from each major. There will be two chairs (co-chairs), one from each major.

DISSERTATION RESEARCH PROPOSAL AND ORAL DEFENSE
The goals of the Dissertation Research Proposal and its oral Defense are for a student 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. The Dissertation Research Proposal Defense can be taken only during the regular school year, not the summer months of June and July.

A student should remain in especially close contact with the chair and Research Committee members while preparing their dissertation proposal, 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 Dissertation Proposal and hold an oral defense of the proposal at least 30 days prior to their final Dissertation Defense. At the Dissertation Proposal Defense, the student will present their dissertation research plan to the Research Committee. The student's Research Committee will require a final written description the student's planned dissertation

research at least two weeks prior to the dissertation proposal defense. The dissertation proposal defense will be open to the public.

At the conclusion of the dissertation proposal defense, the student's Research Committee will give a pass, a conditional pass, or a fail. Each person on the Research Committee must sign the Dissertation Proposal Defense form and the student must submit the completed form to the Luddy SICE Graduate Studies Office regardless of the grade awarded.

The proposal should contain: (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, methods used, 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 and well-developed plan.

A student must submit a detailed written proposal, usually 20 or more pages, and provide it to the student's Research Committee with sufficient time to review it before the below-mentioned public Dissertation Proposal Defense (usually at least two weeks, but subject to the committee's recommendation).

After the Research Committee has accepted the written proposal, the student should schedule the public Dissertation Proposal Defense. The public Dissertation Proposal Defense will be scheduled for a two-hour time slot, which includes a 45-minute presentation with question and answer time. Immediately following the public defense, the student and Research Committee will meet to discuss the approval or disapproval of the dissertation proposal. If the public Dissertation Proposal Defense is approved, the student can continue to work on their dissertation research and later 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 each doctoral student. 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 those components 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. The dissertation should be edited for correct grammar and usage of the English language.

DISSERTATION DEFENSE ANNOUNCEMENT

The student should complete the Ph.D. Defense Announcement Submission e-doc form 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 receive the Defense Announcement at least 30 days before the date of the defense. It is recommended that a student submit the Defense Announcement at least 40-45 days before the defense date to allow time for approvals.

Along with the Dissertation Defense Announcement, a student must include a summary of their dissertation. 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, a student should request other arrangements, if necessary. 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, the student should track the document to ensure timely approval and retain the email confirmation containing the document ID.

Note: If the announced time and place of the defense must be changed, a student must seek the approval of their advisor, the Informatics Director of Graduate Studies, and the University Graduate School.

Note expectations of Chairs and Committee Members: All Research Committee members are expected to be present in person and on campus for the student's Dissertation Defense. In the event that a member is unable to participate in person and on campus with the student, the student must reply to the University Graduate School's confirmation receipt of the Defense Announcement stating that the faculty member is unable to attend the defense in person along with a with an explanation as to why the member is unable to attend and how the member plans to participate in the defense.

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.

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. Other graduate students may attend the defense of the dissertation as well; normally such students will act as observers, not as participants. The observers will have an opportunity to ask questions during the dissertation defense. Members of the public may also attend.

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, a student will submit the signed acceptance page and abstract to the University Graduate School being sure to provide scanned copies to the Informatics Graduate Studies Office.

   Within six (6) months of passing the Dissertation Defense, the student must submit the final Dissertation which the University Graduate School will approve and confer the student's doctoral degree.

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. The Research Committee will provide the student a specific length of time in which to complete the required changes. If a student receives a conditional pass where the committee will require revisions so substantial that they wish to allow the student more than six (6) months to complete the degree, then immediately following the defense the research chair should send to the University Graduate School Recorder an email in which the chair states a conditional pass was earned in the defense and provides information on the deadlines/expectations for completion that the student was given by the committee.

   The student will be informed of the requirements for degree conferral in an email reply from the University Graduate School. Once the Research Committee approves the changes to the dissertation, the student will submit the signed acceptance page and abstract to the University Graduate School being sure to provide scanned copies to the Luddy SICE Graduate Studies Office.

3. Deferred decision.

4. Failure.

If the decision is not unanimous, majority and minority send a written report to the Luddy SICE Associate Dean for Graduate Education. Within 10 working days, the Luddy SICE ADGE will investigate and consult with the Research Committee. Upon completion of the Associate 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, the student will submit the Final Defense Approval/Doctoral Acceptance Page and signed Abstract to the Informatics Graduate Studies Office.

NOTE Expectations of Chairs and Committee Members: All Research Committee members are expected to be present in person and on campus for the student's Dissertation Defense. In the event that a member is unable to participate in person and on campus with the student, the student must reply to the University Graduate School's confirmation receipt of the Defense Announcement stating that the faculty member is unable to attend the defense in person along with a with an explanation as to why the member is unable to attend and how the member plans to participate in the defense.

During the coronavirus pandemic, dissertation proposal and dissertation defenses are being held remotely for Fall 2020, and possibly later in the academic year as well, as an exception to usual practice. You can get information on best practices and procedures on the UGS website: The University Graduate School website has relevant information in its https://graduate.indiana.edu/thesis-dissertation/defenses-covid-19.html

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 and Abstract to the Luddy SICE Graduate Studies Office for processing prior to taking it to the University Graduate School.

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 https://graduate.indiana.edu/thesis-dissertation/submission/doctoral.html. For complete guideline information, see the University Graduate School's website section related to Theses & Dissertations (https://graduate.indiana.edu/thesis-dissertation/index.html).

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, Computing, and Engineering, 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 & Theses Global 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. Contact the University Graduate School for details.

A student can submit an electronic version or a traditional unbound paper submission. The School of Informatics, Computing, and Engineering 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.

TRADITIONAL UNBOUND PAPER SUBMISSION

If a student wishes 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, 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 will have the dissertation microfilmed for storage in their database. There are required fees for publishing the abstract and microfilming in both traditional and Open Access Publishing models.

DEGREE CONFERRAL

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

The Ph.D. degree is conferred by UGS. With the exception of May and December, the student's degree conferral date is the last day of the month in which the dissertation is accepted as finalized by UGS. The initial submission of the dissertation to UGS must occur by the 15th of the month for degree conferral to be considered for that same month (May and December excepted). Contact the Luddy SICE GSO for details pertaining to May and December degrees.

Note: A student should keep in mind that the Research Committee 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.

DIPLOMAS

A student who earns a doctoral degree will receive a diploma. The diploma will read "Doctor of Philosophy." The diploma will not note any majors, minors, or honors.

TRANSCRIPTS

On the doctoral student's transcript, the degree will be conferred as the "Doctor of Philosophy." The student's major, track, and minor will be listed on the transcript.

APPLY FOR GRADUATION

A student must submit an *Informatics Application for Graduation* form to the Luddy SICE GSO.

UNIVERSITY COMMENCEMENT CELEBRATION

The solemn yet colorful academic pageantry can provide a fitting culmination to a period of intense study and work. The University holds two university wide commencement events – Winter and Spring. The majority of the students attend the Spring Commencement. A student who finishes their degree during the fall can attend the Winter or Spring Commencement. Upon completion of all outstanding requirements of the Research Committee, a student can apply to graduate. For commencement related activities, visit https://commencement.indiana.edu/index.html.

A student must submit a *Ph.D. Commencement Participation Application* to UGS via one.iu.edu for inclusion in the University Commencement Ceremony and the Commencement Program. Future IUB commencement dates are available here: https://commencement.indiana.edu/about/future-dates.html. Prior to each event, information will be distributed with instructions on how to register for the Indiana University Commencement Event. Visit https://commencement.indiana.edu/index.html

for detailed information. Be sure to watch for these emails as many of the deadlines are time sensitive.

School of Informatics, Computing, and Engineering Celebration Event
In addition to Indiana University's Commencement Event, the School of Informatics, Computing, and Engineering hosts a Celebration Event. In early spring 2020, information will be distributed with instructions on how to register for the School of Informatics, Computing, and Engineering Celebration Event. Be sure to watch for these emails as many of the deadlines are time sensitive.

MILESTONE DEADLINES AND TRIGGERS

- **Transfer of Credit:** A student should submit a Transfer of Credit form within the first year of enrollment in the program.

- **Advisory Committee:** A student should submit their Advisory Committee form within the first year of enrollment in the program.

- **Proposed Minor:** A student should identify a minor within the first year of enrollment in the program by completing the top portion of the Ph.D. in Informatics Doctoral Minor form listing the courses they will be taking to fulfill the minor requirements.

- **Minor Completion:** The student will complete the bottom portion of the Ph.D. in Informatics Doctoral Minor form and submit the form to the Informatics Graduate Studies Office once the minor has been completed.

- **Completion of Course work:** A student's course work should be completed with final grades prior to taking the quals.

- **Passing Quals:** A student must pass their quals eight (8) months before defending. The quals can be taken only during the academic year (August to May) and not the summer months of June and July. Note: Nomination to Candidacy expires seven (7) years from the date that the student passed the quals. For double majors, the Nomination to Candidacy expires eight (8) years from the date that the student passed the quals.

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

- **Nomination to Candidacy:** A student should submit their Nomination to Candidacy soon after passing the quals to give the student more flexibility in selecting a defense date.

- **INFO-I 890 Thesis Readings and Research:** A student must enroll in a minimum of 21 credits and up to a maximum of 30 credits after the student has completed their course work.

- **Nomination of Research to Defense:** A student's Nomination of Research must be formed and approved by University of Graduate School at least six (6) months prior to defending.

- **Dissertation Research Proposal:** A student must submit a 20 page or more Dissertation Research Proposal (usually at least two weeks, but subject to the committee's recommendation) and hold a public Dissertation Proposal Defense. The Dissertation Research Proposal must be passed by the student's Research Committee prior to their final Dissertation Defense.

- **INFO-G 901:** In order to enroll in INFO-G 901 Ph.D. Dissertation Research, the student (1) must be current with their milestones; (2) must have completed all course work with final grades except for INFO-I 890 deferred grades; and (3) must have successfully completed 90 credits of course work. For details on how to enroll in INFO-G 901, email gradvise@indiana.edu.

- **Defense Announcement**: A student must submit their Defense Announcement and it must be received by University of Graduate School at least thirty (30) days prior to the final defense.

- **Dissertation Submission:** A student must submit their final dissertation to the University Graduate School within six (6) months after passing the Final Defense.

- **Degree Conferral:** A student's degree will be conferred by the University Graduate School once the student has uploaded their final defense in ProQuest.

  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.

REGISTRATION

To help with the registration process, students are given an Informatics Course Planning Checklist and a Course Registration Form. Ph.D. and M.S. Informatics students meet with their advisor prior to registering to plan courses for the upcoming semester. M.S. Human Computer Interaction (HCI) students follow the career plan presented during orientation.

Some courses require course permission from the instructor and/or the department prior to enrollment. This information is found in the Schedule of Classes which 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 gradvise@indiana.edu.

Independent study classes and all research classes taken prior to entering candidacy require that the student and the instructor define the study/rotation, including the deliverables. Students should complete the Informatics Independent Study/Rotation/Research Agreement, obtain the signed permission of the instructor supervising the study/rotation, and submit it to gradvise@indiana.edu along with the Course Registration Form.

After all approvals are secured, students should complete the Course Registration Form and ask their advisor sign it. (Advisor approval is not required for M.S. HCI students.) Students should then send registration and agreement forms to gradvise@indiana.edu. The Informatics Graduate Studies Office will process the form and notify students by email of any issues or that students may proceed with registration for the term.

Students then register for courses via one.iu.edu.

Instructions for how to register are found at websites for Student Central https://studentcentral.indiana.edu/register/steps-register/index.html and the Enrollment and Student Academic Information Bulletin http://enrollmentbulletin.indiana.edu/pages/registration.php?t=fall#procedure

WAITLIST

If a course is shown as full, the student should add themselves to the waitlist, which serves as a place holder 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 order. Note: The waitlist runs for the last time on the Thursday before the first day of classes. Anyone on the waitlist is removed and needs to register for class as soon as the last waitlist runs. The Drop if Enroll feature allows a student to enroll in another course while waitlisted for their course of first preference. Students must remember to cancel this feature if they decide to remain in the class of their second choice. The Swap feature allows a student to delay dropping a course until they are safely enrolled in their new class.

Permission. Any deviations from a student's approved Course Registration Form requires that the student request approval from the advisor (for Ph.D. or M.S. Informatics students) or from the program director (for M.S. HCI students) if the course to be dropped/added is a program core course or required for the student's track or minor. Approval should then be conveyed in writing (email or signed document) to the Informatics Graduate Studies Office.

*Drop and Add Fees/Refund. Starting two business days after the student's <u>initial</u> registration, a system access fee is charged every calendar day the student makes one or more successful adjustments to their schedule. A late schedule change fee is assessed for each course dropped after the first week of classes. The late schedule change fee also applies to a section change, a change of arranged hours, or an audit change. Students are responsible for paying all drop and add fees. 100% of tuition is refunded for a course dropped during the first week of classes. After the first week, the amount of tuition refunded (if any) for a dropped course depends on the type of session the course is and when the course is dropped.

Withdrawal. During the automatic withdrawal period (see the Registrar's Official Calendar for exact dates), students who withdraw will be assigned an automatic grade of W. After that period, withdrawals are only possible with approval from the Dean, which is normally given only for urgent reasons such as illness. Instructors may award a grade of F for a student who is failing and withdraws after the automatic withdrawal period.

FALL 2020 AND SPRING 2021 TERM 2020 REGISTRATION FEES

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

Students are strongly encouraged to review registration and fee information from IU's Student Central website. Student Central is your one-stop-shop for all things related to financial aid, scholarships, the registrar, and the bursar. The site contains the schedule of classes, steps to register, IU's Official Calendar, payment due dates, and more.

REFUNDS

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

NOTE: Course-specific deadlines refer to full-term courses only. Consult the Official Calendar at https://registrar.indiana.edu/official-calendar/index.shtml for dates relevant to partial-term courses.

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

Tuition, fees, and all other charges (e.g., IU Health Center, IU Library) are billed to the student on their Bursar bill. 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. Students should refer to Student Central for information regarding paying their bill. Student Central is closed to in-person traffic.

CURRICULUM OVERVIEW AND COURSE REQUIREMENTS

Requirements	Required Courses	Credits
Informatics Core	INFO-I 501 and INFO-I 502	6 cr.
Seminars	INFO-I 609 and/or INFO-I 709	6 cr.
Research Rotation	INFO-I 790	6 cr.
Track Specific Requirements, if any		0-12 cr.
Theory & Methodology		12 cr.
Minor		6-15 cr.
Electives		12-30 cr.
Thesis Readings and Research	INFO-I 890	21-30 cr.
M.S. Transfer Credits		Up to 30 cr.

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 with the Informatics Graduate Studies office.

SUBSTITUTIONS AND EXCEPTIONS

All course substitutions and exceptions must be approved by the student's advisor, 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. A student is required to submit a Request for Substitution or Waiver of Program Requirements e-doc form.

GRADES

The minimum overall GPA of a grade of B (3.0) for all Ph.D. Informatics courses is required. A student whose semester GPA falls below a grade of B (3.0) will be put on probation. The student must raise their semester and cumulative grade point average to a B (3.0) or higher by the end of the following semester. Failure to do so may result in academic dismissal from the program. A student whose cumulative GPA falls below a grade of B (3.0) for two consecutive semesters (excluding summer) may result in academic dismissal from the program.

GRADE APPEALS

If a student believes there has been an error in calculating the final grade in a course, the student may appeal that grade. For information on the grade appeal process, please follow the instructions provided by the Student Advocates Office at https://studentaffairs.indiana.edu/student-support/advocates/help/academic-help/changes-appeals.htm.

ACADEMIC EXPECTATIONS

Each student 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 *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 STANDING

In order to be considered in Good Academic Standing, the student's GPA (semester and overall) needs to be a 3.0 or above. Furthermore, the student needs to be current with their Ph.D. milestones (e.g. advisory committee declaration, qualifying exam, nomination of research). Being current with Ph.D. milestones means the student fulfills the milestone before or within at most 2 semesters (Fall and Spring or Spring and Fall) from the milestone deadline given in the Ph.D. handbook. Failure to comply with these requirements will result in the student being put in probationary status.

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, the student must bring their GPA cumulative grade point average to 3.0 or higher by the end of the next semester (Fall or Spring), and/or complete their milestone requirements as defined in their probation letter. Failure to do so may result in academic dismissal from the program. Students may be on probationary status for at most two semesters during their participation in the graduate program. They may not have probationary status in consecutive semesters.

ENTERING WITH A MASTER'S OR BACHELOR'S DEGREE

Entering with both a BS and Relevant MS Degree	
Years 1 & 2	
Required Course work	30 cr.
A student may be able to transfer up to 30 cr. of graduate course work from their MS degree to the Ph.D. degree. Transfer credits equate to electives.	30 cr.
Complete 60 cr. of Course work (including the transfer credits) and take the Quals	
Years 3 & 4	
Candidacy and Research Phase	30 cr.
Total Credit Needed for Graduation	90 cr.

Entering with a Only a BS Degree	
Years 1-3	
Required Course work	30 cr.
Course work Electives	30 cr.
Complete Course work and Take the Quals	
Years 4 & 5	
Candidacy and Research Phase	30 cr.
Total Credit Needed for Graduation	90 cr.

YEARS 1-3: COURSE WORK FOCUS

During the first three years, students work toward completing the required course work 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 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.)
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.)
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.)

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.

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 faculty member 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 INFO-I 699 Independent Study with that professor, as a third research rotation will not count for course credit.

Each student will engage in two research rotations 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 Informatics Independent Study, Rotation, Research Agreement form signed by the supervisor and student. The signed Agreement must be sent to inforecd@indiana.edu as an attachment for processing.

As is expected through the normal course of research, the student may encounter challenges 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.

TRACK SPECIFIC REQUIREMENTS, IF ANY (0-12 CR.)
See Appendix A for track requirements

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 can approve substituting classroom courses for research lab experiences.

Minors (Credits vary by minor)

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.

Within the first year of enrollment in the program, a student must identify a minor. They need to complete the top portion of the Ph.D. in Informatics Doctoral Minor form and list 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 form and submit the form to the Informatics Graduate Studies Office.

NOTE for Individualized Minors: The student's advisor, 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, there is not a minor requirement.

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 (9) 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 INFO-I 501 Introduction to Informatics (3 cr.) and two other
approved Informatics courses available in the Informatics Ph.D. program. For information about the Informatics minor, contact the Luddy Graduate Studies Office (gradvise@indiana.edu).

Ph.D. Minor in Animal-Computer Interaction (9 cr.) (External and Internal Minor)

A minor in Animal-Computer Interaction requires nine (9) credit hours. Two courses are required; the third is an elective to be chosen from a list of regularly offered core ACI courses.

- INFO-I 511 Animal-Computer Interaction Methods
- INFO-I 514 Seminar in Animal-Computer Interaction
- Choose a single course from the entire list below, grouped by skill set. Note that this list will be updated annually to add any relevant courses that become available.

Artificial Intelligence and Cognition
- BIOL-Z 460 Animal Behavior
- BIOL-L 553 Sensory Ecology
- CSCI-B 551 Elements of Artificial Intelligence
- CSCI-B 657 Computer Vision
- INFO-I 513 Usable Artificial Intelligence
- INFO-I 540 Human-Robot Interaction
- INFO-I 585 Bioinspired Computing
- INFO-I 586 Artificial Life

Data Analytics
- CSCI-B 456 Image Processing
- CSCI-B 555 Machine Learning
- CSCI-B 565 Data Mining
- CSCI-B 651 Natural Language Processing
- CSCI-B 656 Web Mining
- CSCI-P 556 Applied Machine Learning
- ENGR-E 511 Machine Learning for Signal Processing
- ENGR-E 533 Deep Learning Systems
- ENGR-E 534 Big Data Applications
- ENGR-E 584 Scientific Visualization
- GEOG-G 588 Applied Spatial Statistics
- ILS-Z 534 Search
- INFO-I 421 Applications of Data Mining
- INFO-I 427 Search Informatics
- INFO-I 468 Network Science Applications
- INFO-I 513 Usable Artificial Intelligence
- INFO-I 523 Big Data Applications and Analytics
- INFO-I 524 Big Data Software and Projects
- INFO-I 526 Applied Machine Learning
- INFO-I 529 Machine Learning in Bioinformatics
- INFO-I 569 Collective Intelligence

- INFO-I 590 Topics in Informatics (topic: Data Visualization)
- INFO-I 601 Introduction to Complex Systems
- INFO-I 606 Network Science

Geospatial Information System
- GEOG-G 535 Environmental Remote Sensing
- GEOG-G 536 Advanced Remote Sensing
- GEOG-G 538 Geographic Information Systems
- GEOG-G 539 Advanced Geographic Information Systems
- GEOG-G 578 Global Change, Food and Farming Systems
- GEOG-G 639 GIS & Environmental Analysis

IoT Systems and Physical Fabrication
- CSCI-B 541 Digital Design
- CSCI-P 535 Pervasive Computing
- CSCI-P 542 Digital Systems
- ENGR-E 514 Embedded Systems
- ENGR-E 537 Rapid Prototyping for Engineers
- INFO-I 527 Mobile and Pervasive Design
- INFO-I 540 Human-Robot Interaction
- INFO-I 549 Advanced Prototyping
- INFO-I 590 Topics in Informatics (topic: Makerspace: Design & Fabrication)
- INFO-I 590 Topics in Informatics (topic: Prototyping with Arduino Tools)

Mobile App Development
- CSCI-P 535 Pervasive Computing
- INFO-I 400 Topics in Informatics (topic: Cross-Platform Mobile Programming)
- INFO-I 527 Mobile and Pervasive Design

Qualitative Methods and Design
- CSCI-P 535 Pervasive Computing
- INFO-I 441 Interaction Design Practices
- INFO-I 512 Direct Observation and Design
- INFO-I 516 Informatics in Disasters and Emergency Response
- INFO-I 527 Mobile and Pervasive Design
- INFO-I 528 Participatory Design
- INFO-I 530 Field Deployments
- INFO-I 540 Human-Robot Interaction
- INFO-I 543 Interaction Design Methods
- INFO-I 544 Experience Design
- INFO-I 590 Topics in Informatics (topic: Environmental Policy and Health Design)

- INFO-I 604 Human-Computer Interaction Design Theory
- INFO-I 651 Ethnography of Information
- INFO-I 709 Animal and/as Technology

Technology Entrepreneurship
- INFO-I 566 Technology Innovation
- INFO-I 567 Design Strategy
- INFO-I 568 Technology Entrepreneurship

Virtual Reality Platform
- CSCI-B 453 Game Development
- INFO-I 590 Topics in Informatics (topic: Artificial Life in VR)
- INFO-I 590 Topics in Informatics (topic: Building Virtual Worlds)
- INFO-I 590 Topics in Informatics (topic: Creating Virtual Assets)
- INFO-I 590 Topics in Informatics (topic: Intro to Virtual Reality)

Website and Database Design
- CSCI-B 561 Database Concepts
- CSCI-B 661 Database Theory and Systems Design
- CSCI-B 662 Database Systems and Internal Design
- CSCI-P 462 Database Application Design and Implementation
- ILS-Z 511 Database Design
- ILS-Z 515 Information Architecture
- ILS-Z 517 Web Programming
- ILS-Z 532 Information Architecture for the Web
- ILS-Z 556 Systems Analysis & Design
- INFO-I 535 Management, Access, and Use of Big and Complex Data

For information about the Animal-Computer Interaction minor, contact the Luddy Graduate Studies Office (gradvise@indiana.edu)

Ph.D. Minor in Bioinformatics (12 cr.) (External and Internal Minor)
A minor in Bioinformatics requires twelve (12) credit hours. The core curriculum consists of graduate level courses in Informatics. The student 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, Computing, and Engineering 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." For information about the Bioinformatics minor, contact the Luddy Graduate Studies Office (gradvise@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 Luddy Graduate Studies Office.

Ph.D. Minor in Complex Networks and Systems (9 cr.) (External and Internal Minor)
A minor in Complex Networks and Systems requires nine (9) credit hours. Both INFO-I 609 and INFO-I 709 are required. The student may choose among the following courses to obtain the degree:
- INFO-I 609 Advanced Seminar I in Informatics: Complex Systems (3 cr.)
- INFO-I 709 Advanced Seminar II in Informatics: Complex Systems (3 cr.)
- 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 Networks and Systems (3 cr.)
- INFO-I 690 Mathematical Methods for Complex Networks and Systems (3 cr.)

In consultation with both the Complex Networks and Systems track director and the student's advisor, a student may apply additional classes toward the degree. For information about the Complex Networks and Systems minor, contact the Luddy Graduate Studies Office (gradvise@indiana.edu).

Ph.D. Minor in Computer Science (9 cr.) (External and Internal Minor)
A minor in Computer Science requires nine (9) credit hours. 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 six (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 Luddy Graduate Studies Office (gradvise@indiana.edu)..

Ph.D. Minor in Data Science (12 cr.) (External and Internal Minor)
A minor in Data Science requires twelve (12) credit hours. The Data Science minor consists of four (4) courses (twelve (12) credit hours) of graduate course work in data science or related topics. The required twelve (12) credit hours include any four courses suitable for the student's research, which are 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 Luddy Graduate Studies Office (gradvise@indiana.edu)..

Ph.D. Minor in Human Computer Interaction (HCI) (12 cr.)
The Human Computer Interaction (HCI) minor requires twelve (12) credit hours. Students must take a three (3) credit hour introductory HCI graduate course either from Informatics or Information Library Science: INFO-I 541 Human Computer Interaction Design (3 cr.) or ILS-Z 516 Human-Computer Interaction (3 cr.). Additionally, students must take nine (9) credit hours from at least one department (Informatics, Computer Science, Sociology, etc.) other than the student's home department (Informatics, Computer Science, Sociology, etc.), including courses that include but are not limited to those listed below. All topical seminar classes must be approved by the student's HCI advisor and the Informatics Director of Graduate Studies. For information about the HCI Minor, contact the Luddy Graduate Studies Office (gradvise@indiana.edu).

- EDUC-P 544 Applied Cognition and Learning Strategies (3 cr.)
- INFO-I 528 Participatory Design (3 cr.)
- INFO-I 541 Human Computer Interaction Design (3 cr.)
- INFO-I 542 Foundations of HCI (3 cr.)
- INFO-I 543 Interaction Design Methods (3 cr.)
- INFO-I 544 Experience Design (3 cr.)
- INFO-I 561 Visual Thinking Meaning and Form (3 cr.)
- INFO-I 604 Human Computer Interaction Design Theory (3 cr.)
- INFO-I 609 Advanced Seminar I in Informatics: Human Computer Interaction (3 cr.)
- INFO-I 709 Advanced Seminar II in Informatics: Human Computer Interaction (3 cr.)
- ILS-Z 515 Information Architecture (3 cr.)
- ILS-Z 516 Human-Computer Interaction (3 cr.)
- ILS-Z 561 User Interface Design for Information Systems (3 cr.)
- ILS-Z 661 Concepts and Contemporary Issues in Human Computer Interaction (3 cr.)
- ILS-Z 662 Interface Design for Collaborative Information Spaces (3 cr.)
- SPH-K 578 Cognitive Ergonomics (3 cr.)
- MSCH-T 571 Applied Cognitive and Emotional and Psychology Theory (3 cr.)

Ph.D. Minor in Information Science (12 cr.) (External and Internal Minor)
The outside minor in Information Science consists of four courses (twelve (12) credit hours) of graduate course work in the Department of Information & Library Science.

Course work for the minor is identified in consultation with the ILS faculty member who serves as the outside member on the student's advisory committee. A qualifying examination is generally not required for the minor in Information Science. For information about the Information Science minor, contact the Luddy Graduate Studies Office (gradvise@indiana.edu).

Ph.D. Minor in Security Informatics (9 cr.) (External and Internal Minor)
A minor in Security Informatics requires nine (9) credit hours, selected from the following courses:
- INFO-I 520 Security for Networked Systems (3 cr.)
- INFO-I 521 Malware Epidemic: Threat and Defense (3 cr.)
- INFO-I 525 Organizational Informatics and Economics of Security (3 cr.)
- INFO-I 533 Systems and Protocol Security and Information Assurance (3 cr.)
- INFO-I 536 Foundational Mathematics of Cybersecurity (3 cr.)
- INFO-I 537 Legal and Social Informatics of Security (3 cr.)

For information about the Security Informatics minor, contact the Luddy Graduate Studies Office (gradvise@indiana.edu).

Ph.D. Minor in Social Informatics (12 cr.) (External and Internal Minor)
Social Informatics (SI) refers to the interdisciplinary study of the design, uses, and consequences of information and communications technologies (ICT) that takes into account their interaction with institutional and cultural contexts. Social Informatics research examines the roles of technologies in social and organizational change and the social shaping of ICT. SI research and SI courses are organized within diverse fields, including information systems, telecommunications, journalism, information science, and political science. One key goal of the field is to shape ICTs and policies relevant to them in order to enhance human communication and lead to more acceptable technological developments at organizational and social levels.

For more information about requirements for the Information & Library Science Social Informatics minor, contact the Luddy Graduate Studies Office (gradvise@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 minors that the School of Informatics, Computing, and Engineering offers, the University Graduate School offers an individualized minor which requires a minimum of twelve (12) credits. The University Graduate School must approve an individualized minor 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 courses. 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 "Course work used to satisfy the minor" section of the Request for

Individualized Minor form, the student 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.
The student must have the individualized minor 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

African Studies	1
Anthropology	1
Biophysics	1
Cognitive Science	3
College Pedagogy	1
Communication and Culture	2
Computer Science	17
Entrepreneurship-Business	1
Evolutionary Biology	1
Genetics	2
Gerontology	1
Human Computer Interaction	2
Individualized Minor - Informatics	2
Information & Library Science	2
Inquiry Methodology - Education	3
Internal Minor - Complex Systems	3
Physics	1
Public Management - SPEA	2
Social Informatics - ILS	1
Sociology	1
Statistical Science	5
Statistics	3

ELECTIVES (12 – 30 CR.)

A student must take at least 12 credits of electives and up to a maximum of 30 credits.

YEARS 2-5: CANDIDACY AND RESEARCH PHASE

Upon completion of the course work and passing the quals, the student will turn their 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. The student's candidacy will expire seven (7) years after the date of passing the quals. For double majors, the candidacy will expire eight (8) years after the date of passing the quals.

Once the student's Nomination to Candidacy has been approved, the student is not yet a Ph.D. Candidate. To achieve that title, the student needs to submit their Nomination of Research and pass their dissertation proposal defense.

INFO-I 890 THESIS 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)

Enrollment in INFO-G 901 requires special permissions if a student needs more time to finish the degree. In order to enroll in INFO-G 901 Advanced Research, the student (1) must be current with their milestones; (2) must have completed all course work with final grades except for INFO-I 890 deferred grades; and (3) must have successfully completed 90 credits of course work. INFO-G 901 is limited to a total of six semesters. The tuition for INFO-G 901 is a flat fee of $150 per semester. These hours do not count toward the required 90 credit hours of course work. . For details on how to enroll in INFO-G 901, email inforecd@indiana.edu.

FOR INTERNATIONAL STUDENTS
The Office of International Services (OIS)
OIS is your comprehensive resource for all matters related to international study. OIS offers services including advising on and facilitating compliance with U.S. visa and immigration regulations, assisting with financial matters and planning, and offering ongoing orientation and other educational, cultural, and social programming. Students can find detailed information about OIS and their services on their website.

Many OIS services and approvals, including OPT and CPT requests and I-20 extensions, are requested through an online system called Atlas. When the system asks for contact information for your department or advisor, please use gradvise@indiana.edu.

Full-time Status
International students should note that SEVIS regulations are stringent about having a full course load, and that it is essential to check with International Services well in advance of any event that might affect visa status (e.g., dropping a course) to avoid the risk of deportation for being out of status. Check OIS for links to information on staying in status, to be sure that you are aware of the current policies.

Completion dates for Visa Purposes
International students are considered to have completed their degrees as soon as they have completed the degree requirements, regardless of whether they have filed for the degree. Consequently, it is essential to make sure that post-graduation visa arrangements are in place before completing the requirements. Please contact International Services for details; they are experts on these rules.

Optional Practical Training (OPT)
Optional Practical Training (OPT) is employment related to a student's major field of study prior to or shortly after graduating. The date of graduation is normally the end of the semester in which they take the last courses needed for the degree, regardless of whether the student will receive a grade of Incomplete in one of these courses. Even if the student has an Incomplete that prevents receiving the degree, they should expect the OPT to be processed using the normal completion date for their last courses (the last day of finals). Refer to the OIS website for detailed information regarding OPT. When asked for department or advisor contact information, please use gradvise@indiana.edu.

Internship and Curricular Practical Training (CPT)
Curricular Practical Training (CPT) is a work authorization that allows students with an F-1 visa to engage in an off-campus academic internship that is an *integral part* of their academic curriculum. CPT requirements can be found on the Office of International Services website.

CPT Policies and Requirements
U.S. Immigration regulations are extremely complicated, change often, and differ depending on each student's specific situation. Please consult with the Office of International Studies for the most up-to-date policies and requirements. Our understanding of current immigration regulations for F-1 students include:

- • A student must have been in full-time, F-1 status for at least one full academic year – 30 weeks of instruction -- to be eligible for CPT.
- • Employment must not begin until the date authorized in the I-20 issued by OIS.

In addition, the Informatics Department may have several additional policies to ensure that internships are considered an *integral part* of the academic curriculum and thus eligible for CPT. It may be possible to waive these requirements in extenuating circumstances.

- • Students are typically not permitted to have CPT during their last semester in the program.
- • **For M.S. students,** internships during the Fall and Spring semesters must be either conducted in Bloomington or conducted remotely while the student is physically in Bloomington. For this reason, the majority of internships take place during the summer after the first year in the program.
- • **For Ph.D. students,** internships must be approved by their faculty advisor (or the DGS if they do not have an advisor).

CPT Application Process
The CPT application process can take several weeks so it is very important to begin as early as possible. This is especially true during the Spring semester, when the Luddy Graduate Studies Office and OIS must process hundreds of applications.
The CPT application begins after you have received an offer(s) from employer(s) and have decided to accept one of them. Then follow the following steps:

1. Review and follow the SICE Career Services Recruiting Guidelines.

2. Accept only one offer from one employer. Withdraw all pending applications, cancel all scheduled interviews, and cease seeking employment or internships elsewhere. It is not ethical to continue searching for a job after you have already accepted an offer.

3. Obtain an offer letter listing the following details:

• Name of Company

• Physical address – No P.O. box

• Contact phone number

• Email of employer/supervisor

• Your job title

• A full job description, with job duties listed

• Start date and end date of employment. Please ask the employer to include the specific phrase "or date of authorization" when giving the start date. For example, "The candidate will begin the training opportunity on October 1, 2020, or date of authorization, whichever is later." (This helps prevent additional delays if CPT is not approved by the original date.)

• Total hours you will be working 35

4. Upload the offer letter to the Luddy CPT Application,

5. Wait for Luddy Graduate Studies Office to review your CPT application. You will need to enroll in an IU approved course during the CPT period.. We will advise you which course to enroll in, depending on your particular circumstances. The enrollment must be completed before OIS will be able to approve your CPT request.

6. Upload Offer Letter in Atlas. Follow the instructions carefully and upload your offer letter into Atlas for OIS Approval. When OIS approves the offer letter, they will notify you by email with instructions for completing the Academic Advisor Form.

7. Complete the Academic Advisor Form. Indicate the Luddy Graduate Studies Office as the Academic Advisor, and use gradvise@indiana.edu as the email address on the Academic Advisor form (and on any other OIS-related communication).

8. Wait for OIS to review the CPT application. CPT approval typically takes about two weeks after the request has been *approved by the department,* which is typically several days after you complete the Academic Advisor Form.

9. Watch for and complete surveys from Career Services about your internship. These surveys are important because they help IU attract top employers, including helping to find future internships and full-time positions for you.

10. Upon completion of the Internship, provide the Luddy Graduate Studies Office with an Exit Letter, a formal letter from the employer stating that the terms of employment or internship were satisfactorily completed. For M.S. students, a Summary Report by the student, detailing the internship experience in relation to their program of studies, is also required. This letter is used to assign a grade for the IU course. The exit letter (and report) should be emailed to the Luddy Graduate Studies Office (gradvise@indiana.edu) for review. If an exit letter (and report for M.S. students) are not both submitted, a grade of Incomplete will be posted; unless these materials are submitted, the Incomplete grade will automatically turn to an F after 1 year.

RESOURCES

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/.

FORMS
From time to time, students will need access to both international and external forms. The internal forms are on the School website under the Student Portal at informatics.indiana.edu. There students will find forms for travel, course registration, graduation application, etc. External forms which are managed by the University Graduate School, the Office of the Registrar, etc. are located in one.iu.edu. Contact the Informatics Graduate Studies Office for assistance.

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.

LUDDY SICE 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 Luddy GSO will encourage students to complete their academic program in a timely manner. If there are questions, email (gradvise@indiana.edu).

SICE 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, Computing, and Engineering's career services specialist, email sice+careers@indiana.edu.

VETERANS SUPPORT SERVICES 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 Veterans Support Services at 812-856-1985. 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

AI Assignment Questions
aiassign@indiana.edu

Office of International Services
ois@iu.edu

Student Central/Bursar/Registrar
scu@indiana.edu

Student Employee/Human Resources Questions
sicepay@indiana.edu

Technology/Building Access Questions
sicehelp@indiana.edu

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APPENDIX A

TRACK REQUIREMENTS

PH.D. IN INFORMATICS – ANIMAL INFORMATICS TRACK REQUIREMENTS

Animal-Computer Interaction is a new and growing field of applied research, and is a key part of Animal Informatics research. It is of interest to professionals working in the commercial pet industries, captive animal management (e.g., zoos, aquariums, livestock), animal welfare organizations, assistive and therapeutic support animal programs, veterinary medicine, wildlife conservation, and the cognitive, biological, and evolutionary sciences. These individuals typically have backgrounds in biology and animal care and management but may lack the technical skills that would let them innovate and incorporate ACI, data science, artificial intelligence, and virtual and augmented reality technologies into their current work practices. The Animal Informatics track would serve individuals from these backgrounds as well as individuals who already possess good technical backgrounds and who might wish to apply their skills on behalf of animal populations and interspecies relationships – whether in the wild, in zoos, on farms, in shelters, or in our homes.

A student must successfully complete ninety (90) credit hours of graduate-level course work. The specific track requirements are listed below.

Informatics Core Requirements (6 cr.): A student must take INFO-I 501 Introduction to Informatics (3 cr.) and INFO-I 502 Human-Centered Research (3 cr.)

Animal Informatics Core Requirements (15 cr.): INFO-I 511 Animal-Computer Interaction Methods, INFO-I 512 Direct Observation and Design, INFO-I 513 Usable Artificial Intelligence, INFO-I 514 Seminar in Animal-Computer Interaction, INFO-I 590 Topics in Informatics (topic: Prototyping with Arduino Tools)

Seminar Requirement (6 cr.): A student must take INFO-I 514 Seminar in Animal-Computer Interaction (3 cr.) and/or INFO-I 709 Animal and/as Technology (3 cr.).

Research Rotation Requirement (6 cr.): A student must complete two INFO-I 790 Informatics Research Rotation (3 cr.). A third rotation will not count for course credit.

Theory and Methodology Requirement (12 cr.): This requirement can be satisfied by the Animal Informatics Core Requirements (12 credits).

Minor (6-15cr.): A student must complete an internal or external minor approved by the University Graduate School and the School. If a student selects an individualized minor, prior to taking courses, the University Graduate School must approve the proposed minor course list. There is no typical minor; however, students in the Animal Informatics track are encouraged to complete a minor that complements their major studies and fills in any gaps in their animal-, technology-, methods-, or field site-related training, such as (but not limited to): Animal Behavior, Anthropology, Cognitive Science, Computer Science, Human Dimensions of Global Environmental Change, Environmental Science, Geography, Human Evolutionary Studies,

Bioinformatics, Complex Networks and Systems, Human-Computer Interaction, Information Science, Intelligent Systems Engineering, Bioengineering, Computer Engineering, Cyber- Physical Systems, Security Informatics, Global Studies, Human Rights, Computational Linguistics, Inquiry Methodology, Neural Science, Pure and Applied Logic, Psychological and Brain Sciences, Nonprofit Management, Public Management, Regional Economic Development, Urban Affairs, Scientific Computing, Social Science Research Methods, Statistical Science, Sustainable Energy Science, Vision Science, Environmental Health Science, Life Sciences, and, especially for those planning to work in the conservation sphere, minors in various languages and area studies.

Electives (12-30 cr.): A student must have all electives approved by the student's advisor and the Director of Informatics Graduate Studies prior to enrolling in the course. Below is an approved list of elective courses grouped by skill set. Note that this list will be updated annually to add any relevant courses that become available.

Artificial Intelligence and Cognition
- BIOL-Z 460 Animal Behavior
- BIOL-L 553 Sensory Ecology
- CSCI-B 551 Elements of Artificial Intelligence
- CSCI-B 657 Computer Vision
- INFO-I 540 Human-Robot Interaction
- INFO-I 585 Bioinspired Computing
- INFO-I 586 Artificial Life

Data Analytics
- CSCI-B 456 Image Processing
- CSCI-B 555 Machine Learning
- CSCI-B 565 Data Mining
- CSCI-B 651 Natural Language Processing
- CSCI-B 656 Web Mining
- CSCI-P 556 Applied Machine Learning
- ENGR-E 511 Machine Learning for Signal Processing
- ENGR-E 533 Deep Learning Systems
- ENGR-E 534 Big Data Applications
- ENGR-E 584 Scientific Visualization
- GEOG-G 588 Applied Spatial Statistics
- ILS-Z 534 Search
- INFO-I 421 Applications of Data Mining
- INFO-I 427 Search Informatics
- INFO-I 468 Network Science Applications
- INFO-I 523 Big Data Applications and Analytics
- INFO-I 524 Big Data Software and Projects
- INFO-I 526 Applied Machine Learning
- INFO-I 529 Machine Learning in Bioinformatics
- INFO-I 569 Collective Intelligence
- INFO-I 590 Topics in Informatics (topic: Data Visualization)
- INFO-I 601 Introduction to Complex Systems

- INFO-I 606 Network Science

Geospatial Information System
- GEOG-G 535 Environmental Remote Sensing
- GEOG-G 536 Advanced Remote Sensing
- GEOG-G 538 Geographic Information Systems
- GEOG-G 539 Advanced Geographic Information Systems
- GEOG-G 578 Global Change, Food and Farming Systems
- GEOG-G 639 GIS & Environmental Analysis

IoT Systems and Physical Fabrication
- CSCI-B 541 Digital Design
- CSCI-P 535 Pervasive Computing
- CSCI-P 542 Digital Systems
- ENGR-E 514 Embedded Systems
- ENGR-E 537 Rapid Prototyping for Engineers
- INFO-I 527 Mobile and Pervasive Design
- INFO-I 540 Human-Robot Interaction
- INFO-I 549 Advanced Prototyping
- INFO-I 590 Topics in Informatics (topic: Makerspace: Design & Fabrication)

Mobile App Development
- CSCI-P 535 Pervasive Computing
- INFO-I 400 Topics in Informatics (topic: Cross-Platform Mobile Programming)
- INFO-I 527 Mobile and Pervasive Design

Qualitative Methods and Design
- CSCI-P 535 Pervasive Computing
- INFO-I 441 Interaction Design Practices
- INFO-I 516 Informatics in Disasters and Emergency Response
- INFO-I 527 Mobile and Pervasive Design
- INFO-I 528 Participatory Design
- INFO-I 530 Field Deployments
- INFO-I 540 Human-Robot Interaction
- INFO-I 543 Interaction Design Methods
- INFO-I 544 Experience Design
- INFO-I 590 Topics in Informatics (topic: Environmental Policy and Health Design)
- INFO-I 604 Human-Computer Interaction Design Theory
- INFO-I 651 Ethnography of Information

Technology Entrepreneurship
- INFO-I 566 Technology Innovation
- INFO-I 567 Design Strategy
- INFO-I 568 Technology Entrepreneurship

Virtual Reality Platform

- CSCI-B 453 Game Development
- INFO-I 590 Topics in Informatics (topic: Artificial Life in VR)
- INFO-I 590 Topics in Informatics (topic: Building Virtual Worlds)
- INFO-I 590 Topics in Informatics (topic: Creating Virtual Assets)
- INFO-I 590 Topics in Informatics (topic: Intro to Virtual Reality)

Website and Database Design
- CSCI-B 561 Database Concepts
- CSCI-B 661 Database Theory and Systems Design
- CSCI-B 662 Database Systems and Internal Design
- CSCI-P 462 Database Application Design and Implementation
- ILS-Z 511 Database Design
- ILS-Z 515 Information Architecture
- ILS-Z 517 Web Programming
- ILS-Z 532 Information Architecture for the Web
- ILS-Z 556 Systems Analysis & Design
- INFO-I 535 Management, Access, and Use of Big and Complex Data

Thesis Reading and Research (minimum of 21 cr. and a maximum of 30 cr.): A student must complete 21-30 credits of INFO-I 890.

PH.D. IN INFORMATICS – BIOINFORMATICS TRACK REQUIREMENTS

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.

A student must successfully complete ninety (90) credit hours of graduate-level course work. The specific track requirements are listed below.

Informatics Core Requirements (6 cr.): A student must take INFO-I 501 Introduction to Informatics (3 cr.) and INFO-I 502 Human-Centered Research (3 cr.)

Bioinformatics Core Requirements (6 cr.): A student in the Bioinformatics track must take INFO-I 519 Introduction to Bioinformatics and INFO-I 529 Machine Learning in Bioinformatics.

Seminar Requirement (6 cr.): A student must take INFO-I 609 Seminar I in Informatics (3 cr.) and/or INFO-I 709 Seminar II in Informatics (3 cr.).

Research Rotation Requirement (6 cr.): A student must complete two INFO-I 790 Informatics Research Rotation (3 cr.). A third rotation will not count for course credit.

Theory and Methodology Requirement (12 cr.): These courses must be appropriate for a Ph.D. in Informatics (12 credits).

Minor (6-15cr.): A student must complete an internal or external minor approved by the University Graduate School and the School. If a student selects an individualized minor, prior to taking courses, the University Graduate School must approve the proposed minor course list. There is no typical minor; however, students in the Bioinformatics track often pursue a minor in Biology, Computer Science, or Statistics.

Electives (12-30 cr.): A student must have all electives approved by the student's advisor and the Director of Informatics Graduate Studies prior to enrolling in the course.

Thesis Reading and Research (minimum of 21 cr. and a maximum of 30 cr.): A student must complete 21-30 credits of INFO-I 890.

PH.D. IN INFORMATICS – COMPUTING, CULTURE, AND SOCIETY TRACK REQUIREMENTS

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 track coupled with a broad array of projects draws on rich, multidisciplinary backgrounds in anthropology, cognitive science, engineering, history, information science, law, linguistics, music, political science, public policy, robotics, and sociology.

A student must successfully complete ninety (90) credit hours of graduate-level course work. The specific track requirements are listed below.

Informatics Core Requirements (6 cr.): A student must take INFO-I 501 Introduction to Informatics (3 cr.) and INFO-I 502 Human-Centered Research (3 cr.).

Seminar Requirement (6 cr.): A student must take INFO I-609 Seminar I in Informatics (3 cr.) and/or INFO I-709 Seminar II in Informatics (3 cr.).

Research Rotation Requirement (6 cr.): A student must complete two INFO I-790 Informatics Research Rotation (3 cr.). A third rotation will not count for course credit.

Theory and Methodology Requirement (12 cr.): These courses must be appropriate for a Ph.D. in Informatics (12 credits).

Minor (6-15cr.): A student must complete an internal or external minor approved by the University Graduate School and the School. If a student selects an individualized minor, prior to taking courses, the University Graduate School must approve the proposed minor course list. There is no typical minor; however, students have pursued minors in Methods of Inquiry, African Studies, Latin American Studies, and Gender Studies.

Electives (12-30 cr.): A student must have all electives approved by the student's advisor and the Director of Informatics Graduate Studies prior to enrolling in the course.

Thesis Reading and Research (minimum of 21 cr. and a maximum of 30 cr.): A student must complete 21-30 credits of INFO I-890 Thesis Reading and Research.

PH.D. IN INFORMATICS – COMPLEX NETWORKS AND SYSTEMS TRACK REQUIREMENTS

The Complex Systems & Networks 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.

A student must successfully complete ninety (90) credit hours of graduate-level course work. The specific track requirements are listed below.

Informatics Core Requirements (6 cr.): A student must take INFO-I 501 Introduction to Informatics (3 cr.) and INFO-I 502 Human-Centered Research (3 cr.)

Complex Systems & Networks Core Requirements (6 cr.): A student in the Complex Systems & Networks track must take INFO-I 601 – Introduction to Complex Systems and INFO-I 606 – Network Science.

Seminar Requirement (6 cr.): A student must take INFO-I 609 Seminar I in Informatics: Complex Systems (3 cr.) and/or INFO-I 709 Seminar II in Informatics: Complex Systems (3 cr.).

Research Rotation Requirement (6 cr.): A student must complete two INFO-I 790 Informatics Research Rotation (3 cr.). A third rotation will not count for course credit.

Theory and Methodology Requirement (12 cr.): These courses must be appropriate for a Ph.D. in Informatics (12 credits).

Minor (6-15 cr.): A student must complete an internal or external minor approved by the University Graduate School and the School. If a student selects an individualized minor, prior to taking courses, the University Graduate School must approve the proposed minor course list. There is no typical minor; however, students in the Complex Systems & Networks track often pursue a minor in Biology, Computer Science, or Statistics.

Electives (12-30 cr.): A student must have all electives approved by the student's advisor and the Director of Informatics Graduate Studies prior to enrolling in the course.

Thesis Reading and Research (minimum of 21 cr. and a maximum of 30 cr.): A student must complete 21-30 credits of INFO-I 890.

PH.D. IN INFORMATICS – HEALTH INFORMATICS TRACK REQUIREMENTS

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* 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 people outside of the clinical setting where people live, work, and play.

The Health Informatics MS and Ph.D. programs consist of a rigorous course sequence that introduces students to the fundamentals of design, implementation, and evaluation. Students tailor their degree with an emphasis on a particular health domain.

A student must successfully complete ninety (90) credit hours of graduate-level course work. The specific track requirements are listed below.

Informatics Core Requirements (6 cr.): A student must take INFO-I 501 Introduction to Informatics (3 cr.) and INFO-I 502 Human-Centered Research (3 cr.)

Health Informatics Core Requirements (6 cr.)
INFO-I 527 – Mobile and Pervasive Design
INFO-I 530 -- Field Deployments

Seminar Requirement (6 cr.): A student must take INFO-I 609 Seminar I in Informatics (3 cr.) and/or INFO-I 709 Seminar II in Informatics (3 cr.).

Research Rotation Requirement (6 cr.): A student must complete two INFO-I 790 Informatics Research Rotation (3 cr.). A third rotation will not count for course credit.

Theory and Methodology Requirement (12 cr.): These courses must be appropriate for a Ph.D. in Informatics (12 credits).

Minor (6-15cr.): Students must complete a minor of their choice.

Electives (12-30 cr.): A student must have all electives approved by the student's advisor and the Director of Informatics Graduate Studies prior to enrolling in the course.

Thesis Reading and Research (minimum of 21 cr. and a maximum of 30 cr.): A student must complete 21-30 credits of INFO-I 890.

PH.D. IN INFORMATICS – HUMAN COMPUTER INTERACTION TRACK REQUIREMENTS

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.

A student must successfully complete ninety (90) credit hours of graduate-level course work. The specific track requirements are listed below.

Informatics Core Requirements (6 cr.): A student must take INFO-I 501 Introduction to Informatics (3 cr.) and INFO-I 502 Human-Centered Research (3 cr.)

Seminar Requirement (6 cr.): A student must take INFO-I 609 Seminar I in Informatics (3 cr.) and/or INFO-I 709 Seminar II in Informatics (3 cr.).

Research Rotation Requirement (6 cr.): A student must complete two INFO-I 790 Informatics Research Rotation (3 cr.). A third rotation will not count for course credit.

Theory and Methodology Requirement (12 cr.): These courses must be appropriate for a Ph.D. in Informatics (12 credits).

Minor (6-15cr.): Typical minors include inquiry methodology, cognitive science, anthropology, sociology, intelligent and interactive systems, computing, culture, and society.

Electives (12-30 cr.): 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. A student must have all electives approved by the student's advisor and the Director of Informatics Graduate Studies prior to enrolling in the course.

- INFO I528 – Participatory Design
- INFO I530 – Field Deployments
- INFO I541 – Interaction Design Practice (Soon to be renamed Introduction to HCI/d)
- 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; Social Computing; Sustainability in HCI and Design; Visual Foundations for HCI)
- INFO I604 – HCI Design Theory

Thesis Reading and Research (minimum of 21 cr. and a maximum of 30 cr.): A student must complete 21-30 credits of INFO-I 890.

PH.D. IN INFORMATICS – INTELLIGENT AND INTERACTIVE SYSTEMS TRACK REQUIREMENTS

Intelligent and Interactive Systems (IIS) is an interdisciplinary field that studies the interactions between humans and digital systems, and develops intelligent technologies that can interact with humans and the environment. Research and teaching in the field include artificial intelligence, computer vision, music informatics, 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 increasingly important in people's daily lives. For instance, robots cooperate with humans to help perform everyday tasks, pervasive wearable devices monitor 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 developing technological advances to make computers better able to understand, perceive, and interact with the 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, music informatics, culturally-situation technology design, dynamical systems, human-robot interaction, object and activity recognition, social robotics, video and image understanding, and wearable and ubiquitous computing.

A student must successfully complete ninety (90) credit hours of graduate-level course work. The specific track requirements are listed below.

Informatics Core Requirements (6 cr.): A student must take INFO-I 501 Introduction to Informatics (3 cr.) and INFO-I 502 Human-Centered Research (3 cr.)

Seminar Requirement (6 cr.): A student must take INFO-I 609 Seminar I in Informatics (3 cr.) and/or INFO-I 709 Seminar II in Informatics (3 cr.).

Research Rotation Requirement (6 cr.): A student must complete two INFO-I 790 Informatics Research Rotation (3 cr.). A third rotation will not count for course credit.

IIS Breadth Requirement: All IIS track students are 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. The chosen course should be appropriate for the student's professional development. In this way students will have the ability to communicate across the multiple disciplines that compose the domain of IIS research.

Theory and Methodology Requirement (12 cr.): These courses must be appropriate for a Ph.D. in Informatics (12 credits).

Minor (6-15cr.): Typical minors include Cognitive Science, Statistics, Computer Science, Human-Computer Interaction.

Electives (12-30 cr.): A student must have all electives approved by the student's advisor and the Director of Informatics Graduate Studies prior to enrolling in the course.

Thesis Reading and Research (minimum of 21 cr. and a maximum of 30 cr.): A student must complete 21-30 credits of INFO-I 890.

PH.D. IN INFORMATICS – SECURITY INFORMATICS TRACK REQUIREMENTS

Information security has profound implications in all aspects of modern life. To better protect today's computer systems and sensitive data, security professionals must understand the people as well as the technology. The Security Informatics track takes a multi-faceted approach to information security that considers the numerous modern technical challenges, and then goes beyond technology to consider the social and practical aspects of protecting data, privacy, and other assets.

In this program, students receive a technical foundation in designing, implementing, and managing secure information technology systems. Additionally, students gain insight into the social, legislative, and economic considerations that affect the decisions people and businesses make about their own security. Security professionals are in high demand in a wide variety of industries, providing abundant career options for our graduates.

A student must successfully complete ninety (90) credit hours of graduate-level course work. The specific track requirements are listed below.

Informatics Core Requirements (6 cr.): A student must take INFO-I 501 Introduction to Informatics (3 cr.) and INFO-I 502 Human-Centered Research (3 cr.)

Security Core Requirements (6 cr.): A student must take INFO-I 520 Security for Networked Systems (3 cr.) and INFO-I 533 System and Protocol Security & Information Assurance

Seminar Requirement (6 cr.): A student must take INFO-I 609 Seminar I in Informatics (3 cr.) and/or INFO-I 709 Seminar II in Informatics (3 cr.).

Research Rotation Requirement (6 cr.): A student must complete two INFO-I 790 Informatics Research Rotation (3 cr.). A third rotation will not count for course credit.

Theory and Methodology Requirement (12 cr.): These courses must be appropriate for a Ph.D. in Informatics (12 credits).

Minor (6-15cr.): A student must complete an internal or external minor approved by the University Graduate School and the School.

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, public management, complex systems. Computer Science has been the most popular minor.

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. If a student selects an individualized minor, prior to taking courses, the University Graduate School must approve the proposed minor course list.

Electives (12-30 cr.): A student must have all electives approved by the student's advisor and the Director of Informatics Graduate Studies prior to enrolling in the course.

Thesis Reading and Research (minimum of 21 cr. and a maximum of 30 cr.): A student must complete 21-30 credits of INFO-I 890.

PH.D. IN INFORMATICS – VIRTUAL HERITAGE TRACK REQUIREMENTS

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, Unity, 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 Anthropology, Archaeology, Conservation, Exhibition Design, Egyptology, as well as Art and Architectural History.

A student must successfully complete ninety (90) credit hours of graduate-level course work. The specific track requirements are listed below.

Informatics Core Requirements (6 cr.): A student must take INFO I-501 Introduction to Informatics (3 cr.) and INFO I-502 Human-Centered Research (3 cr.)

Virtual Heritage Core Requirements (9 cr.)
INFO-I587 – Introduction to Virtual Heritage
INFO-I588 – Advanced Topics in Virtual Heritage
INFO-I698 – Research in Informatics

Seminar Requirement (6 cr.): A student must take INFO I-609 Seminar I in Informatics (3 cr.) and/or INFO I-709 Seminar II in Informatics (3 cr.).

Research Rotation Requirement (6 cr.): A student must complete two INFO I-790 Informatics Research Rotation (3 cr.). A third rotation will not count for course credit.

Theory and Methodology Requirement (12 cr.): These courses must be appropriate for a Ph.D. in Informatics (12 credits).

Minor (6-15cr.): Typical minors include Archaeology, Art History, Anthropology, Egyptology.

Electives (12-30 cr.): A student must have all electives approved by the student's advisor and the Director of Informatics Graduate Studies prior to enrolling in the course.

Thesis Reading and Research (minimum of 21 cr. and a maximum of 30 cr.): A student must complete 21-30 credits of INFO I-890.