

# Doctor of Philosophy in Informatics

## 2016 Handbook

### 1 INTRODUCTION

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Indiana University established the School of Informatics and Computing as a place where innovative multidisciplinary programs could thrive, a program where students can integrate technological skills and computer science methods with diverse disciplines. The School announced a new Doctor of Philosophy (Ph.D.) degree program in Informatics beginning in the fall of 2005, the first of its kind in the United States, and offered on the Bloomington (IUB) and Indianapolis (IUPUI) campuses.

IMPORTANT: The Doctor of Philosophy in Informatics follows the policies described in this document and the [University Graduate School Bulletin 2015-2016](#) (pages 10-14, in particular).

### 2 AREAS OF RESEARCH (TRACKS)

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Faculty research projects often involve collaborations from several different research areas, working together to develop innovative and even revolutionary new solutions. While students can expect to concentrate in particular areas, they will also be expected to explore the broader significance of their work as well as ways that their expertise can be leveraged to solve problems outside of their own domains. The following lists the approved research tracks in the Informatics Program:

- **Bioinformatics**  
Sequence pattern recognition, comparative genomics, structural genomics, fragment assembly in DNA sequencing, systems biology, models of evolution, molecular modeling and drug design.
- **Chemical Informatics**  
Molecular modeling, computational chemistry, computer-aided drug design, 2D and 3D chemical structure coding and searching systems, analysis of data from high throughput screening and combinatorial chemistry.
- **Complex Networks and Systems**  
Analysis and modeling of complex techno-social, information, and biological networks. Modeling and simulations of complex systems, epidemics of disease and ideas, self-organization, multi-agent systems, computational biology, nonlinear dynamics for chemical and biological systems, adaptive systems, computational intelligence, and artificial life. Bio-inspired systems such as evolutionary computation, neural networks, social computation, and distributed intelligent systems.
- **Health Informatics**  
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**  
Design theory, design methods, experience design, design thinking, humanist approaches to HCI, critical design, socio-cultural computing, feminist HCI, intimacy, interaction culture, interaction criticism, CSCW, sustainable interaction design/HCI, digital imagery, studio-based learning, strategic design planning, slow change interaction design, interaction design practice, digital learning environments, and design pedagogy.
- **Logical and Mathematical Foundations of Informatics**  
Computational complexity theory, mathematical foundations of computation, analysis of algorithms, models of computation, substructural logics such as linear and relevance logic, category theory, proof theory, information based logics, algebraic logic, and relations between computation and logic.
- **Music Informatics**  
Digital music libraries, music recognition (audio, optical, time-sequence), modeling musical expression, musical accompaniment systems, computational music analysis, and music information retrieval.
- **Security Informatics**  
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.
- **Social and Organizational Informatics**  
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.

**NOTE:** Two new tracks – Intelligent Interactive Systems and Virtual Heritage – will likely be added this year to the official list of tracks. Moreover, the Social and Organizational Informatics track will be renamed as “Computing, Culture and Society.”

### 3 PROGRAM OF STUDY

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Students in the doctoral program will explore the connections among technology, theory, social analysis, and application domains in a diverse and multidisciplinary curriculum. This curriculum will include core courses and seminars in informatics; an informatics track (listed above); courses in methodology and theory; electives in related disciplines inside and outside of the School leading to a Ph.D. Minor; and a dissertation. Students will be encouraged to pursue internships as part of the elective courses or independent studies of their program.

### 4 EMPLOYMENT OPPORTUNITIES

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Graduates of this program are expected to enter academic positions in research and teaching universities or to conduct research for industries that use informatics. They should be able to shape the direction of information technology in the scholarly work they do on the social, organizational, and

design environment of technologies as well as in designing solutions for the issues confronting the biological, chemical and health-based scientific communities.

## 5 VALUES

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Ours is the first Ph.D. program (in the U.S.) to carry the label “Informatics.” We expect students to abide by the spirit as well as the requirements of the *Code of Student Rights, Responsibilities, and Conduct* (see: <http://www.indiana.edu/~code/>). This applies to scholarship, any role as an Associate Instructor, relations with colleagues, relations with students, and compliance with academic standards with respect to academic ethics. In particular, if you are not familiar with the concept and best practices to avoid any hint of plagiarism in American universities, please become familiar with these standards before you begin your graduate studies.

## 6 ADVISING

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Students admitted to the Ph.D. Program are assigned an **advisor** who may be consulted for advice. The Associate Dean for Graduate Studies and the Director of Graduate Studies in Informatics (DGS) also are available for general consultation. The student may change advisor upon the consent of the new advisor and by filing documentation with the Informatics Graduate Studies Office (GSO). The student must inform the existing advisor of the change. This advisor is the chair of the student’s **advisory committee**.

*No later than one year after admission to the Ph.D. program*, each student will consult with appropriate faculty members and designate, with their consent, members of a suitable 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 area (track). The advisory committee must by University Graduate School rules include at least two members from the student's major area (track), and at least one from another area (track); at least two must be members of the graduate faculty. The names of the committee members presented by the student will be forwarded to the University Graduate School upon approval by the DGS for the Informatics program.

The advisory committee oversees the student's progress until the passing of the qualifying examination, whereupon the student consults with the committee concerning a **dissertation advisor**. When the student has a dissertation advisor, the student and dissertation advisor identifies members of a suitable **research committee** (and the advisory committee is abolished). After the members have agreed to serve on the research committee, the appropriate form is filed with the Informatics GSO.

The members of the research committee must meet the requirements of the University Graduate School: the committee includes the advisor, normally the professor directing the dissertation, two or more additional faculty members from the School, and must include a representative of any minor. With certain exceptions, the members must belong to the graduate faculty. This committee supervises the dissertation research, conducts the thesis proposal examination, and conducts the Ph.D. thesis defense final examination.

## 7 RESEARCH GROUP ROTATIONS

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Research rotations provide an opportunity for students to engage in substantive research activities with a variety of faculty. They allow the student to explore the different advising styles, research methodologies/theories, projects, and disciplinary cultures of faculty. This achieves two goals. First, students can make an informed decision whether a faculty member may be a potential advisor or committee member for their dissertation work. Second, students will gain a view of research practices from at least two faculty perspectives.

Each student will engage in two semesters of research rotation with different Informatics faculty in their first two years. A research rotation is equivalent to a 3 credit course. Students are expected to invest 10-12 hours a week for a research rotation. Before a research rotation commences, the student and faculty supervisor should mutually decide a topic, research activity, and expected deliverables. The supervisor and student will describe these details in the Research Rotation Agreement Form which must be signed by both parties. The deliverables must be reasonably scoped so that they can be accomplished in one semester. As is expected through the normal course of research, the student may encounter difficulties that may make the originally specified activities undoable in one semester (e.g., IRB approval delays, loss of access to data). In such a case, the supervisor and student should develop an alternative plan to guarantee completion of the rotation within the semester. Incomplete grades are discouraged, but may be given in cases where the student has 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.

## 8 CURRICULUM

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*Credit Hours:*

I501 and I502: The Informatics Core (6 credits)

It is required that each student begin 501 upon entering the program. These two courses should be taken the first year. Exceptions must be granted by the DGS.

Courses in area of study: Seminar I and II (6 credits)

Each track requires their students to take I609 (Seminar I) and I709 (Seminar II), and these are specified in the track requirements document. No other courses will substitute for this requirement. Any exceptions must be approved by the DGS.

Research Group Rotations (6 credits)

Each student is required to complete two one-semester research rotations. Each rotation is for three credits (see section 7 above).

Theory and Methodology (12 credits)

The primary source for guidance for the appropriate courses is the advisor. The advisor may select from the entire range of courses offered at 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. Research lab experience may be substituted for classroom courses upon approval of the advisor and, if extant, the track director.

#### Electives (12 to 21 credits)

Research lab experience may be substituted for classroom courses upon approval of the advisor and the advisory committee.

#### Minor (6 to 12 credits)

This requirement may be met by a minor approved by the University, or specific courses approved by the School as a minor (see below).

#### Dissertation (from 21 to 30 credits)

Dissertation credits as approved by the Advisor.

## 9 MINORS

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All students must have either an approved minor outside of Informatics or pursue a minor inside the School. 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.*

In the case of an **internal minor**, students may choose from one of eight internal school minors. Minors in Computer Science, Bioinformatics, HCI, and Social Informatics are currently advertised in the *University Graduate School Academic Bulletin*. Please refer to the bulletin regarding the requirements for each.

Four additional internal minors exist in Complex Systems, Music Informatics, Security Informatics, and an Individualized minor. Ph.D. students inside the School may obtain a minor in one of the four distinct areas by completing nine credit hours of course work from courses listed 500 and above. The course prescription for the minor must be approved by the student's advisor and the DGS. 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.

To be used for graduate credit, 300 and 400 level courses must receive prior approval by the University Graduate School. See the *University Graduate School Academic Bulletin* for more details.

#### *Classes for the internal minors:*

##### Complex Systems

Both I609 and I709 are required. The student may choose among the remaining courses to obtain the minor. In consultation with both the Area Director and advisor, additional classes can be counted toward the minor.

- I609 Advanced Ph.D. Seminar in Complex Systems I (3 cr.)
- I709 Advanced Ph.D. Seminar in Complex Systems II (3 cr.)

- I585 Biologically-inspired Computing (3 cr.)
- I586 Artificial Life as an Approach to Artificial Intelligence (3 cr.)
- I601 Introduction to Complex Systems (3 cr.)
- I690 Mathematical Methods for Complex Systems (3 cr.)

#### Music Informatics

- I545 Music Information, Search, and Retrieval (3 cr.)
- I546 Music Information Processing: Symbolic (3 cr.)
- I547 Music Information Processing: Audio (3 cr.)
- I548 Music Information Processing: Audio (3 cr.)

#### Security

In consultation with both the Track Director and advisor, CS649 (Networking Security) and CS649 (Trusted Computing) may be substituted for any two of the courses. The minor is obtained from the following list of classes:

- I533 Protocol Analysis and Design (3 cr.)
- I537 Social Information Security (3 cr.)
- I599 Malware (3 cr.)
- I536 Cryptography (3 cr.)
- I525 Economics of Security (3 cr.)

#### Individualized Informatics

Upon consultation with the Director of Graduate Studies and with recommendation by the student's advisor, a suite of classes 500 and above can be obtained for an Informatics minor. The courses taken: twelve (12) credits for a non-Informatics degree, including I501; and nine (9) credits for an internal minor. For an Informatics degree, the three courses must be outside the student's track.

To summarize:

There are eight minors for those inside the School, with 9 credits required and fully controlled by the School. Also, there is an existing School Bioinformatics minor already existing requiring 9 credit hours for Informatics students and 12 credit hours for those outside School. There is an existing campus HCI Minor currently headed by School faculty requiring 12 credit hours for School students. There is also an existing campus Social Informatics minor requiring 12 credit hours for School students. Finally, there is the Computer Science minor. There are many minors approved by the University with requirements ranging from 6 to 12 hours.

## 10 PROGRAM DESCRIPTION

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### *Description of program and its objectives:*

The Ph.D. in informatics encompasses a range of informatics-based options for the student. Informatics is an integrated multidisciplinary field. The doctoral program provides a balance between technological, scientific, and social dimensions involved in the development and application of information technology.

Whatever the specific focus of their informatics doctoral study, students draw on coursework taken from several disciplines. In the science informatics areas, the degree is built on a base of advanced computer programming skills, mathematics, statistics; and scientific disciplines like molecular biology

for bioinformatics and organic chemistry for chemical informatics. Knowledge acquired from the integrated study of these areas is applied to research topics related to the storing, retrieving and analyzing of data in the fields of bioinformatics and chemical informatics.

For the student interested in health informatics, the program offers the resources of one of the largest academic health centers in the country. The School of Informatics and Computing works closely with the School of Medicine (collaboration in and support of bioinformatics, primarily in the Center for Computational Biology and Bioinformatics), School of Nursing (faculty appointments in Health Informatics track), and School of Health and Rehabilitation Sciences (Health Education for the 21st Century Project). The School also collaborates with the Regenstrief Institute, one of the premier research centers for medical informatics, located on the IUPUI campus.

For the student interested in human-computer interaction design, the multidisciplinary program brings together user studies, behavioral science theory, new media theory, criticism, and design principles to allow the student to address research topics related to the design, evaluation and implementation of interactive computing systems in social settings.

For the student interested in computing, culture and society, the program offers a combination of knowledge of computing with the interdisciplinary study of the uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts.

*Qualifying examinations - written (required):*

All students will take a written qualifying examination that consists of a *depth exam*. The qualifying examinations are prescribed by track faculty. Examinations will be offered at the end of August and at the beginning of the second semester in January. Examinations also may be individually scheduled with the permission of all members of the student's advisory committee. Examinations must be completed by the beginning of the student's fourth year in the program. Students who do not successfully complete the examination can retake the exam a second time. The *breadth* component of the student's examination is addressed by completion of the core courses (501 and 502) and by the completion of a minor.

*Qualifying examinations - oral (required):*

The oral qualifying examination covers in-depth knowledge of the student's primary research area. This examination is administered by the student's advisory committee.

The qualifying examinations normally will be completed at the end of course work, before the student embarks on the dissertation; any exceptions are made only by the DGS. The student must pass this examination before passing on to candidacy.

*Dissertation proposal:*

The research proposal for the dissertation must be approved by the student's research committee. That committee may include the same membership as the advisory committee or the student may choose different members. The advisor for the dissertation will be a faculty member in the School of Informatics and Computing and a member of the Graduate Faculty. Consult the University Graduate School bulletin for the committee member requirements. The student will defend the proposal at a public colloquium in the school.

## Ph.D. Degree

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

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

## Major Subject and Minor Subjects

### Major Subject

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

### Minor Subjects

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

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

## Double Majoring

Students may pursue two majors in two departments simultaneously, if so recommended by each department and approved by the dean. Two general requirements pertain to double majors: (1) there must be a substantive relationship between the two major fields, particularly with respect to the topic of the student's dissertation; and (2) all degree requirements for each major must be fulfilled, including the passing of two sets of qualifying examinations. In some instances it may be possible to

count the same work toward requirements in both departments (e.g., a specific foreign language acceptable in both programs). The exact courses of study and examinations required are to be determined by members of the research committee from each of the majors. Any area of substantial overlap in the two courses of study or in the examinations is to be negotiated by the committee as a whole and approved by the dean.

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

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

## Combined Degree Programs

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

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

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

research laboratory and degree program. Information can be obtained from the Graduate Division of the School of Medicine.

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

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

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

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

### Advisory Committee

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

### Qualifying Examinations

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

Normally, the qualifying examination is taken after the student has completed all course work for the Ph.D. All such work offered in partial fulfillment of degree requirements must either have been completed within seven consecutive calendar years of the passing of the qualifying examination or be revalidated according to procedures outlined in this bulletin (see Revalida-

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

### Admission to Candidacy Status

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

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

### Continuing Enrollment

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

A candidate who will be graduated in June, July, or August of any year must enroll in a minimum of 1 hour of credit during the summer semester as described above.

## Dissertation

### Dissertation

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

### Research Committee

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

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

All members of a research committee must be members of the graduate faculty. At least half of the members of the committee must be members of the graduate faculty with the endorsement to direct doctoral dissertations; others may be regular members.

After consultation with and approval by the dissertation director and research committee, the student will submit to the University Graduate School a one- or two-page prospectus of the dissertation research. If the proposed research involves human subjects, animals, biohazards, or radiation, approval from the appropriate university committee must also be obtained. The membership of the research committee and the dissertation prospectus must be approved by the University Graduate School at least six months before the defense of the dissertation. Some

programs may have deadlines which are earlier than those of the University Graduate School; therefore, students should consult with their program office.

### Defense of the Dissertation

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

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

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

Thirty days prior to the scheduled defense of the dissertation, the candidate must submit to the University Graduate School a defense announcement via the electronic document (e-doc) system. (Some programs may have requirements which are earlier than those of the University Graduate School; therefore, students should consult with their program office.) The announcement contains, among other things, a summary of the dissertation (not less than 150 words) which is informa-

tive and contains a brief statement of the principal results and conclusions. The announcement must be approved by the research committee chairperson. If the candidate has published any scholarly articles relevant to the topic of the dissertation, bibliographical references should be included in the summary. A copy of such announcements will be sent to any member of the graduate faculty upon request.

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

At the end of the oral examination, the research committee must vote on the outcome of the examination. Four options are available to the committee: (1) pass, (2) conditional pass, (3) deferred decision, and (4) failure. If the decision to pass is unanimous, the dissertation is approved once it is received by the University Graduate School along with an acceptance page signed by the members of the research committee. If the decision is not unanimous, majority and minority reports should be submitted to the dean who, within 10 working days, will investigate and consult with the research committee. Upon completion of the dean's investigation and consultation, another meeting of the research committee will be held, and if a majority votes to pass, the dissertation is approved when it is received by the University Graduate School with an acceptance page signed by a majority of the members of the research committee.

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

### **Submission of the Dissertation**

Following acceptance by the research committee, the dissertation is submitted to the University Graduate School. For complete guideline information, see the University Graduate School's website ([www.graduate.indiana.edu](http://www.graduate.indiana.edu)) section related to Thesis & Dissertations.

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

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

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

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

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

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

dissertation microfilmed for storage in their database. The required fee for publishing the abstract and microfilming the dissertation is currently \$65 for traditional publishing or \$160 for Open Access Publishing.

## Foreign Language and Research Skills

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

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

1. By achieving an appropriate score on an examination administered on the Bloomington campus by the respective language department. Students should contact the language department for details.
2. By completing, with a grade of B (3.0) or better, the reading course \_492 (e.g., F492 for French, G492 for German). Students may register for the first course in the sequence, \_491, to prepare for \_492; those who feel they have sufficient preparation may register for \_492, though they should consult the language advisor first.
3. By receiving, in the cases of Catalan, French, German, Italian, Portuguese, Russian, or Spanish, a grade of B (3.0) or better in a literature or civilization course at Indiana University numbered 300 or higher (exclusive of individual readings and correspondence courses) in which the reading is done in the foreign language. Courses in Russian offered to meet this requirement must be approved by the Department of Slavics and East European Languages and Cultures.

For details, consult the respective language departments.

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

### Proficiency in Depth

In certain departments, students have the option of substituting proficiency in depth in one language for reading proficiency in two languages. Proficiency in depth in a language is defined as the ability to read rapidly without the aid of a dictionary and the ability to speak, understand, and write in a manner comparable to that expected of students who have successfully completed

fourth-year composition and conversation courses. For information about demonstrating proficiency in depth, students should consult the graduate examiner in the foreign language department concerned.

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

## Financial Aid

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

### Assistantships and Instructorships Associate Instructorships, Graduate Assistantships, and Research Assistantships

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

### Resident Assistantships

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

### Fellowships

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

Indiana University also offers several recruitment fellowship and support programs for students underrepresented in graduate education (ethnic minority, first generation and/or low income college students and women in the sciences). These include the Graduate Scholars Fellowship, Adam W. Herbert