Graduate Program in Health Informatics

Student Handbook

Master of Health Informatics (M.H.I.)
Master of Science, Plan A and Plan B (M.S.)
Doctor of Philosophy (Ph.D.)

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Spring 2012
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I. GENERAL INFORMATION

This handbook includes important and official information about the graduate program in Health Informatics. It should be considered the primary source of information on the rules and regulations concerning that program. General Graduate School requirements are also described. The information found in this guide is specific to the Health Informatics program and is intended as a resource for new and existing students in our graduate program. Details about the Graduate School’s rules and procedures can be found in the Graduate School Transition Catalog and on the Graduate School website – www.grad.umn.edu. Further questions about the Health Informatics program may be directed to your advisor, the Director of Graduate Studies (DGS), the Associate Director of Graduate Studies (ADGS), the program administrative assistant, and other faculty members. You may also refer to the program home page at http://www.bmhi.umn.edu/graduateprograms/index.shtml

Organization

The Health Informatics Graduate program is administered by the Institute for Health Informatics, which is part the Office of Biomedical and Health Informatics in the Academic Health Center of the University of Minnesota. The program has a diverse faculty drawn from multiple departments and divisions throughout the University of Minnesota. The Director of Graduate Studies, assisted by the Associate Director, is responsible for the ongoing operation of the program and reports to the IHI Director in all matters related to the program. The Graduate School provides support and assistance with admissions, student progress, and the granting of degrees.

Director and Associate Director of Graduate Studies

The Director of Graduate Studies (DGS) is appointed by the IHI Director after consultation with the graduate faculty and is responsible for administering all aspects of the graduate program including student recruitment, admissions, student progress evaluations, student support services, curriculum design and implementation, program quality improvement and preparation of all required reporting. The ADGS is also appointed by the IHI Director and undertakes responsibilities directed and delegated by the DGS. Students seeking advice about the program or experiencing any procedural difficulties should seek assistance from either the DGS or ADGS.

The DGS:

1. Oversees the application and admissions process for the program.
2. Assigns an initial advisor to each student at program entry.
3. Is responsible for all Health Informatics graduate courses including:
   a. Assigning teaching responsibilities
   b. Scheduling classes
   c. Selecting teaching assistants
   d. Monitoring course quality
4. Reviews, approves, and signs all master’s and doctoral degree program forms.
5. Is responsible for formulating an annual review of each student’s progress in the program.
6. Chairs the Graduate program Executive Committee (GEC).
7. Reviews and approves all official communications to students regarding the graduate program.
8. Approves and recommends requests for waivers and exceptions to program and University rules to the GEC.
9. Recommends Preliminary Written Examination committee membership for PhD students to the GEC.
10. Reviews and recommends all actions related to student progress including probation and dismissal from the program to the GEC.

**Health Informatics Graduate Program Executive Committee (GEC)**

The GEC, consisting of five graduate faculty members and an elected student representative, oversees the operation of the Health Informatics Graduate Program and helps to ensure that students have access to the highest quality educational experience. The GEC faculty members are named by the IHI Director after consultation with the HI graduate faculty. The GEC is chaired by the DGS.

The GEC:

1. Reviews applicants and recommends students for admission into the program.
2. Routinely reviews the Health Informatics curriculum and makes formal changes as needed.
3. Reviews elective courses and makes recommendations to students.
4. Reviews the recommendations of the DGS concerning student progress to ensure that Health Informatics students are making acceptable progress in their graduate programs.
5. Makes decisions upon recommendation of the DGS regarding academic probation, academic misconduct, and academic dismissal.
6. Makes recommendations to the HI graduate faculty concerning major curriculum changes and changes in program policies.

**Graduate Program Support Staff**

The graduate program support staff members are there to assist students and prospective students with questions about the program. They are often the first point of contact when an issue with which the student needs assistance arises, and they are quite knowledgeable concerning both program and University rules and procedures. The staff also provides support for the work of the DGS and the GEC. If an appointment to meet with the DGS or ADGS is desired, the support staff has full access to their calendars and should be contacted about finding an available time.

**Annual Review of Academic Progress**

The GEC reviews each student’s academic progress on an annual basis to determine if that progress is acceptable and meets the criteria established by the faculty. The results of these evaluations are conveyed to the student in the form of a letter that details the committee’s conclusions. These letters are normally distributed after the completion of each academic year. Concerns about the contents of the letter should be discussed with your faculty advisor or the Director of Graduate Studies.

**Satisfactory Academic Performance**

Students must maintain a 3.0 grade point average for all coursework taken for an HI degree. If a student’s GPA falls below 3.0 at the end of any semester, the student may be placed on academic probation by the GEC. If that should happen, the student will be notified of that status by letter. The student will be required to attain an overall GPA of at least a 3.0 by the end of the next semester in which she or he is registered.
Failure to meet this requirement makes the student eligible for dismissal from the program upon the decision of the GEC and the graduate faculty.

**Satisfactory Academic Progress**

It is expected that all students will make steady and consistent progress toward their degree. While it is recognized that there are exceptional circumstances than can interrupt degree progress, they can be acceptable if the program is notified and approves a mechanism to account for those circumstances. Specifically the GRAD 999 registration can be used to maintain graduate student status when no courses are taken, but this may not satisfy the requirements for international students and others who must conform to enrollment regulations. Please note that GRAD 999 registration is not required for the Summer terms in order to maintain active status in the Graduate School. A student may also request a leave of absence for a period of time from the Graduate School. Information about such a leave is found on the Graduate School website.

**Academic, Ethical, and Professional Responsibilities**

Health informatics professionals and professionals-in-training are held to high academic, ethical and professional standards, since they frequently deal with confidential information pertaining to human health. For the purposes of the following, violations of these standards are all grouped under the term Academic Misconduct, which is grounds for dismissal from the University of Minnesota Graduate Program in Health Informatics.

Ethical guidelines for Graduate Students in Research, Scholarship, and Professional Education at the University of Minnesota are found at [http://www.grad.umn.edu/ethics/ethics_brochure.html](http://www.grad.umn.edu/ethics/ethics_brochure.html)

See also Mutual Responsibilities for Graduate Education at the University of Minnesota: [http://www.grad.umn.edu/faculty-staff/governance/Policies/mutual_responsibilities.html](http://www.grad.umn.edu/faculty-staff/governance/Policies/mutual_responsibilities.html)

The following are examples of ethical misconduct:

1. Misrepresenting the work of others as your own:
   a. Using phrases, sentences, or ideas from the published works of others in your own assignments, projects, or other work and not providing proper citation.
   b. Taking the product of another person’s efforts and claiming it as your own such as a written report, data, or computer code.

2. Lying or making false statements:
   a. Signing your name indicating that you attended a class when you did not do so.
   b. Signing someone else’s name on an attendance sheet.
   c. Submitting recommendations for admission that were not written by the person whose name appears as the recommender.
   d. Falsifying research data.

3. Cheating:
   a. Working on homework assignments in groups, when instructed that the work should be done entirely on your own.
   b. Using references or consulting others in preparing answers to take-home examinations when you were instructed not to do so.
c. Exchanging answers with other students during an in-class examination.
d. Preparing and using written notes during an examination without the expressed consent of the instructor.

4. Theft:
   a. Taking the possessions of others.
   b. Taking materials from the Institute facilities without permission.
   c. Taking copies of licensed software programs without obtaining either permission or an additional license for their use.
   d. Installing and using software that is not properly licensed.
   e. Using another person’s security access (username and/or password).

5. Violating Security Rules:
   a. Allowing someone else to use your username and password.
   b. Loaning any security authentication mechanism assigned to you (e.g. your Ucard, building key, etc.) to others.
   c. Giving or presenting information that may identify an individual patient or human research subject to others who are not authorized to have or do not need this information.

6. Violating Confidentiality:
   a. Accessing the data of a person without legitimate reason as defined by their job responsibilities.
   b. Disseminating such data to others without permission of the person to whom the data belongs.
   c. Adding to, deleting, or altering that data without proper authorization from the owner of that data.

7. Violations of Institutional Review Board guidelines for conduct of research:
   a. Revealing confidential patient data to those not authorized to view it.
   b. Changing experimental procedures involving human subjects without approval of the IRB.
   c. Conducting research of any type (including MHI Capstone projects, MS Thesis and Plan B projects as well as PhD thesis work) that involve human subjects without the review and approval of the IRB.

All students enrolled in the Health Informatics Graduate Program for any of the three degree objectives are required to be familiar with the document “Code of Conduct for Graduate Students in Health Informatics.” All students must sign and date this document indicating that they have read, understood, and agreed to it including the consequences that may follow from behavior that does not fulfill those responsibilities. The signed document must be submitted to the graduate program prior to the beginning of the student’s first graduate class. Refusal to sign and submit the document in a timely manner may result in revocation of admission to the program.

**Academic Misconduct Procedures**

When a student allegedly commits an infraction by not fulfilling his or her ethical responsibilities with respect to academic coursework, degree-related examinations, or theses projects and reports he or she will be subject to the following Health Informatics Graduate Program disciplinary procedure separate and distinct from any other procedures required by the University of Minnesota. These procedures and the individuals involved are and will be guided by considerations of fairness to the student and all other parties involved.
1. If the infraction involves a non-HINF course, the student will first be subject to the process of the offering department for dealing with such matters.

2. If the infraction involves an HINF online course, the student’s account will be frozen to preserve information potentially relevant to the charge, and a new account will be created so the student may continue his or her work until the issue is resolved.

3. The HINF Course Director will document the alleged infraction by:
   a. Obtaining and assembling copies of all relevant materials in printed form.
   b. Preparing a description of the exact nature and extent of the alleged violation.
   c. Describing the recommended course of action.

4. The HINF Course Director will offer the student the opportunity to respond to the allegation of an infraction.

5. If the HINF Course Director is satisfied with the student’s explanation and decides that the matter has been resolved, no further action will be taken; the student’s online account will be unfrozen, and there will be no record of the process included in the student’s record.

6. If the HINF Course Director determines that the infraction likely has occurred, he or she will submit the Report Form for Academic Misconduct to University Office for Student Conduct and Academic Integrity (OSCAI).

7. The case will be referred to the Graduate program Executive Committee (GEC) for further consideration by and of the following mechanisms: the HINF Course Director copying the form to the DGS, by notification from the OSCAI that a complaint has been filed with them or from another collegiate unit where a health informatics graduate student allegedly committed an infraction.

8. Upon notification, the Director will notify the student in writing of the alleged violation and its referral to the GEC for consideration.

9. If the student requests a hearing, by notifying the DGS in writing no more than 30 days after the date of the written notice, the following will apply:
   a. The DGS will expeditiously schedule a time and place for a GEC hearing.
   b. The DGS will notify the student, in writing, of the date and place of the hearing at least ten (10) days before the scheduled date.
   c. The student who is the subject of the hearing may examine the complaint and his or her student file prior to and at the hearing.
   d. The student may present their own case including the testimony of others regarding the allegation.
   e. At least 2/3 of the GEC must be present to conduct the hearing.
   f. The student may challenge the presence of any member of the GEC whose objectivity they feel is in question. The GEC will consider and rule on those challenges.
   g. The GEC will review the case to determine if program action is necessary. Any member of the committee who is involved in filing the complaint or is an advisor to the student involved in the allegation will recuse themselves. If there are sufficient recusals for a given case to reduce the number present to less than 2/3 of the committee membership, additional graduate faculty members will be selected to replace those recusing themselves.

10. The committee will deliberate in executive session and make a recommendation concerning the case. That recommendation may include any of the following:
a. The student is not guilty of the violation, and the case is closed.
b. The student is found to be guilty and one or more of the following is imposed:
   i. Course sanctions (e.g. a grade change)
   ii. Remedial study/actions (e.g. prepare a written report)
   iii. Reprimand (e.g. a formal letter in the student’s permanent file)
   iv. Academic probation
   v. Academic suspension
   vi. Dismissal

11. The DGS will notify the student in writing of the decision of the committee with an explanation of the reasons for that decision.

12. The student has the continuing right to file a written appeal to the GEC based on new information or evidence that was not available at the time that decision was made.

13. The student has the right to file a written appeal of the decision with the graduate faculty within two weeks of its formal delivery to the student by the DGS.

14. The student has the right to appear before the graduate faculty to present an appeal if they so choose. The student must indicate their desire to present an in-person appeal to the graduate faculty within two weeks of formal notification.

15. The Director must then schedule a meeting of the graduate faculty to hear the student’s appeal within the next 30 days following receipt of the student’s notification.

16. If the student chooses to appeal the decision, the graduate faculty will review and determine the action based on the accumulated evidence and the student’s appeal. They may accept the appeal and modify or reject the recommendation in its entirety, or they may reject the student’s appeal, all by a majority vote.

17. The student has the right at the conclusion of this process to file an appeal with the Graduate School or the corresponding body at the University level that handles these matters concerning the outcome of this process.

**Student General Rights of Appeal**

Any student desiring to appeal a decision of the Health Informatics Graduate Program may do so by preparing a letter of appeal and submitting it to the Director of Graduate Studies. The letter should state the specific reasons why the decision should be overturned and if applicable, any steps that the student will take in response to the decision. The DGS will transmit the appeal to a graduate faculty committee for their consideration. If the graduate faculty of the program does not uphold an appeal, the student may then appeal this decision to the Graduate School of the University of Minnesota.
II. PROCEDURES

Course Registration

Students must register online at http://onestop.umn.edu/registration/index.html. All students are encouraged to register for courses as soon as possible because some courses have limited enrollment capacity. This means new students should register as soon as they receive their official notification of admissions from the Graduate School Admissions Office. Continuing students will receive an email notification from the registrar specifying when they may register. All graduate students must register before the first day of the term in order to avoid a late registration fee.

To maintain their active status, graduate students must register every fall and spring term. Those who do not register every fall and spring are considered to have withdrawn and their Graduate School records will be deactivated. These students may not register for courses, take examinations, submit Degree Program or Thesis Proposal forms, file for graduation, or otherwise participate in the University community as Graduate School students. They must apply for re-admission in order to continue with their studies. Students who are not planning to take any coursework in a given semester, must register for the zero-credit, zero-tuition, non-graded GRAD 999 to maintain an active status in the Graduate School. The program has rules about the use of GRAD 999 that are specific to each degree. Please consult the relevant section of each degree description for these rules.

For more information about registration, see the One Stop registration page: http://onestop.umn.edu/registration/index.html.
III. MASTER OF HEALTH INFORMATICS (M.H.I. DEGREE)

The Master of Health Informatics (M.H.I.) is a degree intended for working professionals and others who would like training in understanding, implementing, and evaluating the many information technologies becoming more prevalent in the health care industry. This degree is designed so that it can be completed in as little as one calendar year, but may also be taken part-time over several years to accommodate work schedules.

The M.H.I. program trains students in the following competencies:

1. Knowledge of the breadth and depth of information technology in medical care.
2. Use technologies to disseminate and collect health-related information.
3. Understand the role and function of data communications in health care.
4. Ability to design and build a database application that will support patient care using a systematic software engineering process.
5. Ability to develop an information technology solution to a problem in health care using methods of systems analysis.
6. Ability to design and carry out a project to evaluate the impact and success of introducing an information system into a medical environment.
8. Knowledge of the legal, ethical, and security issues in the use of medical information.

Curriculum Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Informatics I (HINF 5430)</td>
<td>3</td>
</tr>
<tr>
<td>Health Informatics II (HINF 5431)</td>
<td>3</td>
</tr>
<tr>
<td>Health Informatics Seminar -1 cr each for 2 semesters (HINF 5436)</td>
<td>2</td>
</tr>
<tr>
<td>US Health Care System (HINF 5501)</td>
<td>1</td>
</tr>
<tr>
<td>Applied Health Care Databases (HINF 5510) or Principles of Databases (CSC 4707/5707) or Equivalent</td>
<td>3</td>
</tr>
<tr>
<td>Biostatistics (e.g. PubH 6414, equivalent or more advanced)</td>
<td>3</td>
</tr>
<tr>
<td>Clinical Informatics and Patient Safety (HINF 5520)</td>
<td>2</td>
</tr>
<tr>
<td>Health Care Software Management (HINF 5530)</td>
<td>2</td>
</tr>
<tr>
<td>Interprofessional Health Informatics (TBD)</td>
<td>2</td>
</tr>
<tr>
<td>Electives</td>
<td>6</td>
</tr>
<tr>
<td>Capstone Project (HINF 5499)</td>
<td>3</td>
</tr>
<tr>
<td>Total Credits</td>
<td><strong>30 Credits</strong></td>
</tr>
</tbody>
</table>

Advising

Advising program students in their academic program and research projects is a critical aspect of student services in the Health Informatics Graduate Program. In order to ensure that each student has the best possible educational experience, the following policies have been developed to create a personal, professional advising system that meets the needs of each of those students. Accordingly, since the Director of Graduate Studies (DGS) and the graduate program staff are most familiar with course offerings, academic requirements and elective possibilities, we have separated the advising process into two components. The DGS and staff will provide academic advising concerning coursework and related matters. The core and affiliate IHI faculty members will take on the role of Degree Project Advisor for MHI and MS Plan B students.
or Degree Research Advisor for MS Plan A or PhD students within the program. That title will correspond to the advisor of record as designated by the University.

The following policies and procedures will apply to advising:

1. **Academic Advisor** - The DGS and staff will take on the role of Academic Advisor for all students.
   a. The Academic Advisor will provide advice to all students in selecting coursework that meets their degree requirements and will provide assistance in developing a Degree Program Plan that meets their academic goals.
   b. This advising will be in consultation with the student’s Degree Project or Research Advisor to the extent necessary and desired.

2. The Director of the Capstone Course will be the initially designated **Degree Project Advisor for all MHI students**.

   Other core or affiliate IHI faculty members may take on this responsibility if all the following conditions are met:
   a. The student requests a change of degree project advisor.
   b. The designated faculty member selected by the student agrees to take on the responsibility.
   c. The Capstone Director agrees to the student’s request.
   d. The selected faculty has previously advised a student in this capacity (In the event that the faculty member has not previously advised a student in this capacity, the Capstone Course Director will act as a mentor to the advisor)
   e. The Capstone Course Director may choose to contact other IHI Core or Affiliate faculty and encourage them to assume this responsibility according to the above conditions.

3. **Degree Program Forms**
   a. Each MHI student must complete and submit a formal Degree Program listing the courses that have been and are to be taken to complete the MHI degree requires. That form can be found at [http://www.grad.umn.edu/current_students/forms/gs89a.pdf](http://www.grad.umn.edu/current_students/forms/gs89a.pdf) In addition to the required courses, the program includes six elective credits. Students will need to add to their repertory of methodological skills beyond the minimum required courses in order to meet the learning outcomes required by the program. Students’ interests can range from technology management in a health care setting, to applications of artificial intelligence, to improving the safety of drug therapy treatments, just to name a few. The program encourages students to fulfill these elective credits by taking additional courses that correspond to their interests, whether they are in statistics, epidemiology, health services research, computer science, biomedical engineering, decision science courses, or another related field. See the IHI website for a list of recommended elective courses.
   
   b. Students may optionally declare a formal minor as defined by another Graduate program. If students choose to undertake a formal minor, they must meet all of the requirements of the program offering the minor.
c. In order to insure that everyone has an academic plan of coursework in place in a timely fashion a registration Hold will be placed on a student when such a form must be submitted. In order to remove that Hold, the following will be required:

i. MHI – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for his or her 2\textsuperscript{nd} semester.

ii. MS – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for her or his 3\textsuperscript{rd} semester of enrollment.

iii. PhD – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for his or her 4\textsuperscript{th} semester of enrollment.

4. Changing Advisors - A student may select a new Degree Project or Degree Research Advisor if the current and new faculty members involved both agree to the change.

a. If this change takes place prior to filing the Degree Program Form, a simple email to the DGS from each of the parties involved indicating their agreement with the change will be sufficient.

b. If the change takes place after the Degree Program form and the Degree Transmittal form have been filed, the student and the new advisor must jointly prepare a new Degree Transmittal form and submit it to the DGS for review and approval. The old advisor must also inform the DGS of their acceptance of the change via email before the form will be approved by the DGS.

5. Assigning credit for advising students – As part of this advising process it is equally important to be considerate to faculty members involved and to account more accurately for the effort invested. While tracking exact hours committed to advising a student is a difficult matter, it is possible to at least assign some consistent credit for doing so. Accordingly, all of the following courses that are associated with capstone project work, MS projects or PhD research will have sections corresponding to each advising faculty member to track their commitments. Students will register in the section of the relevant course that is associated with their project or degree advisor. The respective courses are:

a. HINF 5499 MHI Capstone Project Course (3 credits)

b. HINF 8770 MS Plan B Project (4 credits)

c. HINF 8777 MS Thesis Credits (10 credits required)

d. HINF 8888 PhD Thesis Credits (24 credits required)

Transfers and Waivers

Students may have previously taken graduate level courses at another university that are equivalent to required courses in the Health Informatics program or that may meet elective credit requirements. Students may transfer up to 40\% (12 graduate semester credits) of their credits (exclusive of thesis credits) from another qualified graduate program that have not already been used to earn a degree in that program. Please note that the University restricts the number of credits transferred (a total of 12 credits maximum) from certain classes of enrollment at the University of Minnesota such as those earned while enrolled as a non-degree seeking student or earned from the College of Continuing Education. No more than eight credits may be counted toward an MHI degree if they have been already applied to an awarded master’s degree from either the University of Minnesota or another institution. Transfer credits must meet the requirements of the program and be approved by the student’s advisor and the DGS. As an alternative, students may request a waiver of one or more of these required courses based on previous educational experiences; the DGS will review all such requests. In the event that a waiver is granted, the student is expected to take other
coursework in order to meet the required number of credits. For the complete and specific details regarding transfers of credit, please refer to the Graduate School at [www.grad.umn.edu](http://www.grad.umn.edu).

**Capstone Project**

The program includes a three-credit Capstone course in which students will have a final opportunity to apply their newly acquired knowledge and skills to a project involving a practical problem in health informatics. Students will learn how to design these projects properly, reviewing past exemplary projects as guides. Then, with the help of their advisors and the Capstone course director, students will design and carry out their own projects which can take a variety of forms, including: developing design and evaluation specifications for software to address a specific health care need; working on, observing, analyzing, and reporting the actions of a team involved in implementing a new information system; or observing and measuring the impact of such a system in a health care setting. Students will submit a written project report in lieu of a final examination. The Capstone Project instructor and the student’s advisor grade the report.

**Overview of MHI Capstone Process**

The MHI Capstone Project is a required independent informatics experience, self-selected to fulfill one or more objectives of the MHI Program. MHI students must register for HINF 5499, 3 credits, during their last semester when finishing up coursework. Students should already have a program advisor, and submitted their Degree Program (coursework only) to DGS and Graduate School. Students then meet with the Capstone Coordinator, separately or together as a group, to determine readiness to start, finish Capstone Projects.

The Capstone process involves:

1. Seek mentor or client allowing access to data or problem exploration.
2. Fulfill any data or site-specific regulatory requirements e.g. IRB (University of Minnesota PLUS User Site), HIPAA, user-system training.
3. Submit for approval by mentor a 1-2 page Project Proposal indicating:
   a. Title
   b. Short problem description
   c. Brief listing of related work
   d. Bulleted plan with one or more intermediate milestone(s)
   e. Completion or evaluation criteria
4. Entire Capstone Project should take no more than 100 hours, plus 20 hours to compose and write the Capstone Report, estimated at 15-30 pages.
5. Capstone Report must have a cover page with project title, date, HINF/MHI program, advisor/coordinaotr signatures.
6. Use scientific report format (may include):
   a. Abstract
   b. Problem Statement
c. Background/Review of Literature
d. Methods
e. Results
f. Discussion
g. Conclusion
h. Acknowledgements
i. Bibliography
j. Appendix if needed (User Manual?)

7. A one-page reflective assessment of the Capstone Project should be attached to the Report, discussing these questions:
   a. What MHI objectives were addressed with the Capstone Project?
   b. How were Capstone objectives achieved; how did you know?
   c. What informatics skills, qualifications were practiced?
   d. What informatics contribution does the Capstone demonstrate?
   e. If UPHI-funded, what role is desired?
   f. What career goal is anticipated in the future?
Sample MHI Programs of Study

The following programs of study provide a sample curriculum to complete the MHI program in a single calendar year (full-time student) and in three years (part-time student). Students are free to follow these suggestions or may complete the program at their own pace.

Full-Time Student

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Informatics I</td>
<td>Health Informatics II</td>
</tr>
<tr>
<td>3 credits</td>
<td>3 credits</td>
</tr>
<tr>
<td>US Health Care System</td>
<td>Clinical Informatics and Patient Safety</td>
</tr>
<tr>
<td>1 credit</td>
<td>2 credits</td>
</tr>
<tr>
<td>Health Informatics Seminar</td>
<td>Health Informatics Seminar</td>
</tr>
<tr>
<td>1 credit</td>
<td>1 credit</td>
</tr>
<tr>
<td>Database Course (HINF 5510/CSC5707)</td>
<td>Health Care Software Management</td>
</tr>
<tr>
<td>3 credits</td>
<td>2 credits</td>
</tr>
<tr>
<td>Biostatistics (PubH 6414)</td>
<td>Interprofessional Health Informatics</td>
</tr>
<tr>
<td>3 credits</td>
<td>(TBD)</td>
</tr>
<tr>
<td>Electives</td>
<td>Electives</td>
</tr>
<tr>
<td>3 credits</td>
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<tr>
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<tr>
<td>14 credits</td>
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Summer Semester

<table>
<thead>
<tr>
<th>Capstone Project</th>
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</table>

Total Credits: 3

Part-Time Student

Year 1 Fall Semester

<table>
<thead>
<tr>
<th>Health Informatics I</th>
<th>3 credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 credits</td>
<td>3 credits</td>
</tr>
</tbody>
</table>

Year 1 Spring Semester

<table>
<thead>
<tr>
<th>Health Informatics II</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Clinical Informatics and Patient Safety</td>
<td>2 credits</td>
</tr>
<tr>
<td>2 credits</td>
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</table>

Year 2 Fall Semester

<table>
<thead>
<tr>
<th>Database Course</th>
<th>3 credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>US Health Care System</td>
<td>1 credit</td>
</tr>
<tr>
<td>4 credits</td>
<td></td>
</tr>
</tbody>
</table>

Year 2 Spring Semester

<table>
<thead>
<tr>
<th>Biostatistics (PubH 6414)</th>
<th>3 credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Informatics Seminar</td>
<td>1 credit</td>
</tr>
<tr>
<td>Health Care Software Management</td>
<td>2 credits</td>
</tr>
<tr>
<td>6 credits</td>
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Year 3 Fall Semester

<table>
<thead>
<tr>
<th>Electives</th>
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<tbody>
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Year 3 Spring Semester

<table>
<thead>
<tr>
<th>Electives</th>
<th>2 credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interprofessional Health Informatics (TBD)</td>
<td>2 credits</td>
</tr>
<tr>
<td>Capstone Project</td>
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<tr>
<td>Total Credits: 7</td>
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</table>
Graduation Requirements

In order to graduate from the program students must complete at least 30 credits of coursework including the Capstone with a GPA of 3.0. The Graduate School will award the M.H.I. degree to students completing these requirements.

Academic Progress

The University places time limits on the time taken to complete a degree. These limits are supplemented by additional requirements imposed by the HI graduate program. If a student is enrolled as a full time MHI student, he or she is expected to complete the degree no more than two years after admission to the program. Only two semesters of GRAD 999 registration are allowed and only in the event that all coursework except the Capstone Course is completed. Students enrolled in a part time MHI program are expected to complete the degree within 5 years. No more than four GRAD 999 semester registrations (not counting summers) are allowed and two of those must be after all coursework except the Capstone course is completed and not GRAD 999 registration is allowed until at least one semester of coursework is completed.

Steps to Complete Your Degree Requirements

The Graduate School requires that students complete a series of steps and associated forms in order to graduate. It is wise to consult this list early as there are deadlines to which you need to pay attention. This list can be found at: http://www.grad.umn.edu/current_students/masters/cwo.html
IV. MASTER OF SCIENCE DEGREE PLAN A (RESEARCH-ORIENTED)

The Plan A program is designed for health professionals who are seeking additional training in health informatics. It requires a total of 42 semester credits including preparation and defense of a Master’s Thesis.

**Required Courses**

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<thead>
<tr>
<th>Course Name</th>
<th>Course Credits</th>
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<tbody>
<tr>
<td>Health Informatics I and II (HINF 5430, 5431)</td>
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<tr>
<td>Seminar—two semesters (HINF 5436)</td>
<td>2</td>
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<tr>
<td>Biostatistics—1 year sequence (6414/6415 or 6450/6451)</td>
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</tr>
<tr>
<td>US HealthCare System HINF 5501</td>
<td>1</td>
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<tr>
<td>Applied Health Care Databases (HINF 5510) or Principles of Databases (CSC 4707/5707) or Equivalent</td>
<td>3</td>
</tr>
<tr>
<td>Clinical Informatics and Patient Safety (HINF 5520)</td>
<td>2</td>
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<tr>
<td>Health Care Software Management (HINF 5530)</td>
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<td>Interprofessional Health Informatics (TBD)</td>
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<tr>
<td>Electives</td>
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<td>HINF Thesis</td>
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<td><strong>Total</strong></td>
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**Full-Time Student**

<table>
<thead>
<tr>
<th>Year 1 Fall Semester</th>
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</thead>
<tbody>
<tr>
<td>Health Informatics I</td>
<td>Health Informatics II</td>
</tr>
<tr>
<td>3 credits</td>
<td>3 credits</td>
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<tr>
<td>US HealthCare System</td>
<td>Clinical Informatics and Patient Safety</td>
</tr>
<tr>
<td>1 credit</td>
<td>2 credits</td>
</tr>
<tr>
<td>Health Informatics Seminar</td>
<td>Biostatistics (PubH 6415)</td>
</tr>
<tr>
<td>1 credit</td>
<td>3 credits</td>
</tr>
<tr>
<td>Database Course (HINF 5510/CSC5707)</td>
<td>Interprofessional Health Informatics (TBD)</td>
</tr>
<tr>
<td>3 credits</td>
<td>2 credits</td>
</tr>
<tr>
<td>Biostatistics (PubH 6414)</td>
<td>Electives</td>
</tr>
<tr>
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<tr>
<td>Total Credits</td>
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<table>
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</thead>
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<tr>
<td>Electives</td>
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<tr>
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<td>2 credits</td>
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<tr>
<td>Health Informatics Seminar</td>
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<td>7</td>
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**Part-Time Student**

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</thead>
<tbody>
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<td>Health Informatics II</td>
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<tr>
<td>3 credits</td>
<td>3 credits</td>
</tr>
<tr>
<td>US HealthCare System</td>
<td>Clinical Informatics and Patient Safety</td>
</tr>
<tr>
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<tr>
<td>Total Credits</td>
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<tr>
<td>4</td>
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## Year 2 Fall Semester

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<th>Course</th>
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<tr>
<td><strong>Total Credits</strong></td>
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## Year 2 Spring Semester

<table>
<thead>
<tr>
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<tbody>
<tr>
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<td>Health Care Software Management</td>
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## Year 3 Fall Semester

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## Year 3 Spring Semester

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## Year 4 Fall Semester

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## Year 4 Spring Semester

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<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>Plan B Project</td>
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<tr>
<td><strong>Total Credits</strong></td>
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## Total Credits Overall

<table>
<thead>
<tr>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>42</strong></td>
</tr>
</tbody>
</table>
**Advising**
Advising program students in their academic program and research projects is a critical aspect of student services in the Health Informatics Graduate Program. In order to ensure that each student has the best possible educational experience, the following policies have been developed to create a personal, professional advising system that meets the needs of each of those students. Accordingly, since the Director of Graduate Studies (DGS) and the graduate program staff are most familiar with course offerings, academic requirements and elective possibilities, we have separated the advising process into two components. The DGS and staff will provide academic advising concerning coursework and related matters. The core and affiliate IHI faculty members will take on the role of Degree Project Advisor for MHI and MS Plan B students or Degree Research Advisor for MS Plan A or PhD students within the program. That title will correspond to the advisor of record as designated by the University.

The following policies and procedures will apply to advising:

1. **Academic Advisor** - The DGS and staff will take on the role of Academic Advisor for all students.
   a. The Academic Advisor will provide advice to all students in selecting coursework that meets their degree requirements and will provide assistance in developing a Degree Program Plan that meets their academic goals.
   b. This advising will be in consultation with the student’s Degree Project or Research Advisor to the extent necessary and desired.

2. **MS Students** - All MS students will be assigned to an affiliate or core faculty member as a Degree Project Advisor for the HI program on a rotating basis among the faculty.
   a. Specific requests filed jointly with the DGS by a core or affiliate faculty member and a student for a Degree Research Advisor assignment will be honored.

3. **Degree Program Forms**
   a. All students are required to develop a Degree Program that lists the courses that have or will be taken to meet the degree requirements. See below for details including transferring credits. Students should prepare this with their advisors to ensure that they are meeting all of the program requirements and achieving their educational objectives. The necessary form can be found at [http://www.grad.umn.edu/current_students/forms/gs89a.pdf](http://www.grad.umn.edu/current_students/forms/gs89a.pdf).
   b. In order to insure that everyone has an academic plan of coursework in place in a timely fashion a registration Hold will be placed on a student when such a form must be submitted. In order to remove that Hold, the following will be required:
      i. MHI – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for his or her 2nd semester.
      ii. MS – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for her or his 3rd semester of enrollment.
      iii. PhD – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for his or her 4th semester of enrollment.

4. **Changing Advisors** - A student may select a new Degree Project or Degree Research Advisor if the current and new faculty members involved both agree to the change.
a. If this change takes place prior to filing the Degree Program Form, a simple email to the DGS from each of the parties involved indicating their agreement with the change will be sufficient.
b. If the change takes place after the Degree Program form and the Degree Transmittal form have been filed, the student and the new advisor must jointly prepare a new Degree Transmittal form and submit it to the DGS for review and approval. The old advisor must also inform the DGS of their acceptance of the change via email before the form will be approved by the DGS.

5. **Assigning credit for advising students** – As part of this advising process it is equally important to be considerate to faculty members involved and to account more accurately for the effort invested. While tracking exact hours committed to advising a student is a difficult matter, it is possible to at least assign some consistent credit for doing so. Accordingly, all of the following courses that are associated with capstone project work, MS projects or PhD research will have sections corresponding to each advising faculty member to track their commitments. Students will register in the section of the relevant course that is associated with their project or degree advisor. The respective courses are:
   a. HINF 5499 MHI Capstone Project Course (3 credits)
   b. HINF 8770 MS Plan B Project (4 credits)
   c. HINF 8777 MS Thesis Credits (10 credits required)
   d. HINF 8888 PhD Thesis Credits (24 credits required)

**Transfers and Waivers**

Students may have previously taken graduate courses at another university that are equivalent to required courses in the Health Informatics program or that may meet elective credit requirements. Students may transfer up to 40% of their credits (17 semester graduate credits exclusive of thesis credits) from another qualified graduate program that have not already been used to earn a degree in that program. Please note that the University restricts the number of credits transferred (a total of 12 credits maximum) from certain classes of enrollment at the University of Minnesota such as those earned while enrolled as a non-degree seeking student or earned from the College of Continuing Education. No more than eight credits may be counted toward an HINF master’s degree if they have been already applied to an awarded master’s degree from either the University of Minnesota or another institution. Transfer credits must meet the requirements of the program and be approved by the student’s advisor and the DGS. As an alternative, students may request a waiver of one or more of these required courses based on previous educational experiences; the DGS will review all such requests. In the event that a waiver is granted, the student is expected to take other coursework in order to meet the required number of credits. For the complete and specific details regarding transfers of credit, please refer to the Graduate School at [www.grad.umn.edu](http://www.grad.umn.edu).

**Examining Committee**

At the same time, students are required to formally identify their advisor and two other individuals who will serve on their thesis Examining Committee. The Examining Committee consists of the student’s advisor, one other Health Informatics faculty member, and one individual approved by the GEC from...
outside the program. The student’s advisor must be a member of the Health Informatics graduate faculty. The outside member is most often from the minor area or area of specialization. The committee members are nominated by the student and his or her advisor, approved by the DGS and GEC, and reviewed by the Graduate School. The committee also serves in an advisory role during the execution of the master’s thesis project.

Research Project

Students are required to prepare and defend a master’s thesis. Students should explore and discuss research topic possibilities with their academic advisors as well as other faculty members. They should look beyond their courses, attend seminars, and read pertinent journals so they are well informed when they pick their thesis topic. The first step is the preparation of a brief proposal (4-5 pages) that describes the intended project. That proposal must be reviewed and approved by the student’s Examination Committee before the research begins. The proposal should contain a research hypothesis, a statement of significance, background material, a current bibliography, a possible methodology to be used or developed, and the anticipated results. Students should discuss specific details regarding proposed format, length, and level of detail with their advisors. It is beyond the scope of this handbook to attempt a comprehensive description of thesis efforts. Bound copies of M.S. - Plan A theses may be found in the Collaboratory, Room 330, Diehl Hall.

Examination

A final oral examination in which the student makes a formal presentation of his or her thesis is required. Students are responsible for both the content of the thesis and the coursework listed on their approved program of study. The examination meeting is normally scheduled for two hours, but the committee is not obligated to use all of that time. All members of the Examination Committee must be present in some form – face-to-face, videoconference or teleconference are all acceptable. The committee will make a judgment determined by a majority of the Examination Committee and will consist of one of the following: Pass, Pass with Revisions, Fail or Recess. A grade of Pass indicates that the student has successfully defended his or her M.S. Thesis. A grade of Fail means that the M.S. Thesis is rejected by the committee. In the event of a judgment of Pass with Revisions, the committee must provide guidance to the student as to the nature of the revisions that are required. Approval of those revisions may be delegated to the advisor. In the event of a Recess, the Examination Committee will convene at a later time to complete the process. Upon completion of the examination, the results must be reported to the Graduate School on the Final Examination Report form.

Graduation Requirements

In order to graduate from the program with a M.S. Plan A degree, students must have completed at least 42 credits of coursework as identified in the program plan with a GPA of at least 3.0 and must have successfully defend their master’s thesis as indicated on the Final Examination form by the signatures of the committee members. A successful defense is defined as either a majority of examining committee member signatures associated with a grade of Pass or a majority of such signatures associated with Pass with Revisions and written consent of either a majority of the examining committee or the advisor (if the responsibility for review and approval of revisions has been delegated to the advisor).
In addition, the Graduate School requires that you complete a series of steps and associated forms in order to graduate. It is wise to consult this list early as there are deadlines to which you need to pay attention. This list can be found at: http://www.grad.umn.edu/current_students/masters/plana.html

**Academic Progress**

The University places time limits on the time taken to complete a degree. These limits are supplemented by additional requirements imposed by the HI graduate program. The University of Minnesota requires that a student take no more than seven (7) years from date of first enrollment to complete a course of study leading to an MS degree. In addition, the HI program requires that at least one year of coursework be completed before a GRAD 999 registration (not counting summers). A student may register for no more than a total of six semesters of GRAD 999 (not counting summers) with no more than 4 such registrations taking place after all coursework except the MS Thesis credits is completed.
V. MASTER OF SCIENCE DEGREE PLAN B (COURSE-ORIENTED)

The Plan B program is intended for non-health professionals who wish to be trained in the area of Health Informatics but need additional coursework to become fully qualified. It is characterized by more course work but does not require a formal master’s thesis and substitutes a Plan B project instead.

Required Courses

New Curriculum – Starting Fall 2010

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Credits</th>
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<tbody>
<tr>
<td>Health Informatics I and II (HINF 5430, 5431)</td>
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</tr>
<tr>
<td>Seminar—two semesters (HINF 5436)</td>
<td>2</td>
</tr>
<tr>
<td>Biostatistics—1 year sequence (6414/6415 or 6450/6451)</td>
<td>6-8</td>
</tr>
<tr>
<td>US HealthCare System HINF 5501</td>
<td>1</td>
</tr>
<tr>
<td>Applied Health Care Databases (HINF 5510) or Principles of</td>
<td>3</td>
</tr>
<tr>
<td>Databases (CSC 4707/5707) or Equivalent</td>
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</tr>
<tr>
<td>Clinical Informatics and Patient Safety (HINF 5520)</td>
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<td>Health Care Software Management (HINF 5530)</td>
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Full-Time Student

<table>
<thead>
<tr>
<th>Year 1 Fall Semester</th>
<th>Year 1 Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Informatics I</td>
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<tr>
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Total Credits Overall 42
# Part-Time Student

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<tr>
<td>Database Course</td>
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<td>4 credits</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>2 credits</td>
</tr>
<tr>
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<td>4 credits</td>
<td>6 credits</td>
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<th>Year 4 Fall Semester</th>
<th>Year 4 Spring Semester</th>
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<tr>
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<td>Plan B Project</td>
</tr>
<tr>
<td>9 credits</td>
<td>4</td>
</tr>
<tr>
<td>Total Credits</td>
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</tr>
<tr>
<td>9 credits</td>
<td>4</td>
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</table>

<table>
<thead>
<tr>
<th></th>
<th>Total Credits Overall</th>
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</thead>
<tbody>
<tr>
<td>Total Credits Overall</td>
<td>42</td>
</tr>
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</table>
Advising

Advising program students in their academic program and research projects is a critical aspect of student services in the Health Informatics Graduate Program. In order to ensure that each student has the best possible educational experience, the following policies have been developed to create a personal, professional advising system that meets the needs of each of those students. Accordingly, since the Director of Graduate Studies (DGS) and the graduate program staff are most familiar with course offerings, academic requirements and elective possibilities, we have separated the advising process into two components. The DGS and staff will provide academic advising concerning coursework and related matters. The core and affiliate IHI faculty members will take on the role of Degree Project Advisor for MHI and MS Plan B students or Degree Research Advisor for MS Plan A or PhD students within the program. That title will correspond to the advisor of record as designated by the University.

The following policies and procedures will apply to advising:

6. **Academic Advisor** - The DGS and staff will take on the role of Academic Advisor for all students.
   a. The Academic Advisor will provide advice to all students in selecting coursework that meets their degree requirements and will provide assistance in developing a Degree Program Plan that meets their academic goals.
   b. This advising will be in consultation with the student’s Degree Project or Research Advisor to the extent necessary and desired.

7. The Director of the Capstone Course will be the initially designated **Degree Project Advisor for all MHI students**.

Other core or affiliate IHI faculty members may take on this responsibility if all the following conditions are met:

   a. The student requests a change of degree project advisor.
   b. The designated faculty member selected by the student agrees to take on the responsibility.
   c. The Capstone Director agrees to the student’s request.
   d. The selected faculty has previously advised a student in this capacity (In the event that the faculty member has not previously advised a student in this capacity, the Capstone Course Director will act as a mentor to the advisor)
   e. The Capstone Course Director may choose to contact other IHI Core or Affiliate faculty and encourage them to assume this responsibility according to the above conditions.

8. **Degree Program Forms**

   a. Each MHI student must complete and submit a formal Degree Program listing the courses that have been and are to be taken to complete the MHI degree requires. That form can be found at [http://www.grad.umn.edu/current_students/forms/gs89a.pdf](http://www.grad.umn.edu/current_students/forms/gs89a.pdf) In addition to the required courses, the program includes six elective credits. Students will need to add to their repertory of methodological skills beyond the minimum required courses in order to meet the learning outcomes required by the program. Students’ interests can range from technology management in a health care setting, to applications of artificial intelligence, to improving the safety of drug therapy treatments, just to name a few. The program encourages students to fulfill these elective credits by taking additional courses that...
correspond to their interests, whether they are in statistics, epidemiology, health services research, computer science, biomedical engineering, decision science courses, or another related field. See the IHI website for a list of recommended elective courses.

b. Students may optionally declare a formal minor as defined by another Graduate program. If students choose to undertake a formal minor, they must meet all of the requirements of the program offering the minor.

c. In order to insure that everyone has an academic plan of coursework in place in a timely fashion a registration Hold will be placed on a student when such a form must be submitted. In order to remove that Hold, the following will be required:
   i. MHI – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for his or her 2nd semester.
   ii. MS – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for her or his 3rd semester of enrollment.
   iii. PhD – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for his or her 4th semester of enrollment.

9. **Changing Advisors** - A student may select a new Degree Project or Degree Research Advisor if the current and new faculty members involved both agree to the change.
   a. If this change takes place prior to filing the Degree Program Form, a simple email to the DGS from each of the parties involved indicating their agreement with the change will be sufficient.
   b. If the change takes place after the Degree Program form and the Degree Transmittal form have been filed, the student and the new advisor must jointly prepare a new Degree Transmittal form and submit it to the DGS for review and approval. The old advisor must also inform the DGS of their acceptance of the change via email before the form will be approved by the DGS.

10. **Assigning credit for advising students** – As part of this advising process it is equally important to be considerate to faculty members involved and to account more accurately for the effort invested. While tracking exact hours committed to advising a student is a difficult matter, it is possible to at least assign some consistent credit for doing so. Accordingly, all of the following courses that are associated with capstone project work, MS projects or PhD research will have sections corresponding to each advising faculty member to track their commitments. Students will register in the section of the relevant course that is associated with their project or degree advisor. The respective courses are:
   a. HINF 5499 MHI Capstone Project Course (3 credits)
   b. HINF 8770 MS Plan B Project (4 credits)
   c. HINF 8777 MS Thesis Credits (10 credits required)
   d. HINF 8888 PhD Thesis Credits (24 credits required)
Transfers and Waivers

Students may have previously taken graduate courses at another university that are equivalent to required courses in the Health Informatics program or that may meet elective credit requirements. Students may transfer up to 40% of their credits (17 semester graduate credits exclusive of thesis credits) from another qualified graduate program that have not already been used to earn a degree in that program. Please note that the University restricts the number of credits transferred (a total of 12 credits maximum) from certain classes of enrollment at the University of Minnesota such as those earned while enrolled as a non-degree seeking student or earned from the College of Continuing Education. No more than eight credits may be counted toward an HINF master’s degree if they have been already applied to an awarded master’s degree from either the University of Minnesota or another institution. Transfer credits must meet the requirements of the program and be approved by the student’s advisor and the DGS. As an alternative, students may request a waiver of one or more of these required courses based on previous educational experiences; the DGS will review all such requests. In the event that a waiver is granted, the student is expected to take other coursework in order to meet the required number of credits. For the complete and specific details regarding transfers of credit, please refer to the Graduate School at www.grad.umn.edu.

Examining Committee

At the same time, students are required to formally identify their advisor and two other individuals who will serve on their thesis Examining Committee. The Examining Committee consists of: the student’s advisor, one other Health Informatics faculty member, and one individual approved by the GEC from outside the program. The student’s advisor must be a member of the Health Informatics graduate faculty. The outside member is most often from the minor area or area of specialization. The committee members are nominated by the student and his or her advisor, approved by the DGS and GEC, and reviewed by the Graduate School. The committee also serves in an advisory role during the execution of the master’s thesis project.

Research Project

Students must complete an independent project focused on a health informatics application, culminating in a written report. The general Graduate School requirement is that “students must demonstrate familiarity with the tools of research or scholarship in the field, the ability to work independently, and the ability to present the results of investigation effectively, by completing at least one Plan B project. The graduate faculty in each major field may require as many as three such projects, equivalent to approximately 120 hours of work.” Copies of previous Plan B papers are available in the Collaboratory, Room 330, Diehl Hall. In general, advisors are responsible for approving the project(s), determining relative worth for satisfying the entire requirement, and specifying how students will share their findings with their Examining Committee.

Examination

A final oral examination, in which the student makes a formal presentation of his or her project(s), is required. Students are responsible for both the content of the Plan B project(s) and the course work listed on their approved program of study. The examination meeting is normally scheduled for two hours, but the committee is not obligated to use all of that time. All members of the Examination Committee must be present in some form – face-to-face, videoconference, and teleconference are all
acceptable. The committee will make a judgment determined by a majority of the Examination Committee and will consist of one of the following: Pass, Pass with Revisions, Fail, or Recess. In the event of a judgment of Pass with Revisions, the committee must provide guidance to the student as to the nature of the revisions that are required. Approval of those revisions may be delegated to the advisor. In the event of a Recess, the Examination Committee will convene at a later time to complete the process. Upon completion of the examination, the results must be reported to the Graduate School on the Final Examination Report form.

**Graduation Requirements**

In order to graduate from the program with a M.S. Plan B degree, students must have completed at least 42 credits of coursework as identified in the program plan with a GPA of at least 3.0 and must have successfully defend their Plan B Project, as indicated on the Final Examination form by the signatures of the committee members. A successful defense is defined as either a majority of examining committee member signatures associated with a grade of Pass or a majority of such signatures associated with Pass with Revisions and written consent of either a majority of the examining committee members or the Advisor (if the responsibility for review and approval of revisions has been delegated to the Advisor).

In addition, the Graduate School requires that students complete a series of steps and associated forms in order to graduate. It is wise to consult this list early as there are deadlines to which you need to pay attention. This list can be found at: [http://www.grad.umn.edu/current_students/masters/planb.html](http://www.grad.umn.edu/current_students/masters/planb.html)

**Academic Progress**

The University places time limits on the time take to complete a degree. These limits are supplemented by additional requirements imposed by the HI graduate program. The University of Minnesota requires that a student take no more than seven (7) years from date of first enrollment to complete a course of study leading to an M.S. degree. In addition, the HI program requires that at least one year of coursework be completed before a GRAD 999 registration (not counting summers). A student may register for no more than a total of six semesters of GRAD 999 (not counting summers) with no more than 4 such registrations taking place after all coursework is completed.
VI. DOCTOR OF PHILOSOPHY DEGREE (Ph.D.)

The Ph.D. program of study is designed for students seeking the highest level of advanced training in the area of health informatics. It is a degree where students apply their knowledge and skills to an original research project that is reported in the doctoral thesis. Progress toward the Ph.D. requires that the student first apply and be admitted to the Ph.D. program. At a suitable time, determined by the student in consultation with the advisor after completing most or all of the required Ph.D. coursework, the student should take the Preliminary Written Examination (PWE). If successfully completed, then the student should take the Preliminary Oral Examination (POE). Successful completion of both these examinations will admit the student to Candidacy for the Doctor of Philosophy degree. Once candidacy is attained, the student undertakes the research and writing activities that lead to the doctoral thesis. After the thesis is approved for defense by the examining committee and successfully defended in a public oral defense, the doctoral degree is granted.

Program Requirements

It is expected that Ph.D. students will normally have completed all of the core courses for the Master of Science degree or will have engaged in coursework at other institutions that is equivalent to these core courses.

Required Courses

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Course Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health Informatics I (HINF 5430)</td>
<td>3</td>
</tr>
<tr>
<td>Health Informatics II (HINF 5431)</td>
<td>3</td>
</tr>
<tr>
<td>Health Informatics Seminar (HINF 5436)</td>
<td>2</td>
</tr>
<tr>
<td>US HealthCare System (HINF 5501)</td>
<td>1</td>
</tr>
<tr>
<td>Database Course (5510/4707/5707)</td>
<td>3</td>
</tr>
<tr>
<td>Statistics (PUBH 6450, 6451)</td>
<td>8</td>
</tr>
<tr>
<td>Clinical Informatics and Patient Safety (HINF 5520)</td>
<td>2</td>
</tr>
<tr>
<td>Health Care Software Management (HINF 5530)</td>
<td>2</td>
</tr>
<tr>
<td>Interprofessional Health Informatics (TBD)</td>
<td>2</td>
</tr>
<tr>
<td>Informatics Research Study Design or equivalent</td>
<td>3</td>
</tr>
<tr>
<td>Health Informatics Teaching</td>
<td>2</td>
</tr>
<tr>
<td>Electives</td>
<td>15</td>
</tr>
<tr>
<td>Thesis Credits</td>
<td>24</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>70 Credits</strong></td>
</tr>
</tbody>
</table>

In addition, the 15 elective credits must constitute either a formal minor or a supporting program. A supporting program is defined as a coherent pattern of related courses outside of the health informatics graduate program whose content will enhance the students’ knowledge and skills and better prepare them to complete their doctorate.

Waivers of Course Requirements

If the student has a related master’s degree from another institution, the core requirements can be waived to the extent that the coursework matches the required core. The determination of what
courses can be waived will be carried out by the GEC at the time of admission to the program. It is the responsibility of the student to present sufficient evidence concerning each of those courses that justifies granting a waiver.

In certain circumstances, a student entering the program may, as a result of their previous training and/or experience, be exceptionally well qualified to undertake their dissertation work without further coursework. In these cases, the program may choose to waive all required coursework for the student and allow them to proceed immediately to the Preliminary Written Examination where the individual may demonstrate their competence to proceed.

**Advising**

Advising program students in their academic program and research projects is a critical aspect of student services in the Health Informatics Graduate Program. In order to ensure that each student has the best possible educational experience, the following policies have been developed to create a personal, professional advising system that meets the needs of each of those students. Accordingly, since the Director of Graduate Studies (DGS) and the graduate program staff are most familiar with course offerings, academic requirements and elective possibilities, we have separated the advising process into two components. The DGS and staff will provide academic advising concerning coursework and related matters. The core and affiliate IHI faculty members will take on the role of Degree Project Advisor for MHI and MS Plan B students or Degree Research Advisor for MS Plan A or PhD students within the program. That title will correspond to the advisor of record as designated by the University.

The following policies and procedures will apply to advising:

1. **Academic Advisor** - The DGS and staff will take on the role of Academic Advisor for all students.
   a. The Academic Advisor will provide advice to all students in selecting coursework that meets their degree requirements and will provide assistance in developing a Degree Program Plan that meets their academic goals.
   b. This advising will be in consultation with the student’s Degree Project or Research Advisor to the extent necessary and desired.

2. **PhD Students** - All PhD students will be assigned to a core faculty member as a Degree Research Advisor for the HI program on a rotating basis among the core faculty. **All such advisors must be IHI Core faculty members.** These assignments are subject to the following:
   a. Specific requests for a Degree Research Advisor assignment filed jointly with the DGS by a core faculty member and a student will be honored.
   b. Such requests submitted as part of the student’s application for admission to the PhD program will result in a higher priority for admission to the program.
   c. Before a core faculty member is qualified to be the Degree Research Advisor to a PhD student they must have:
      i. Served on a PhD Final Examination Committee either in the Health Informatics graduate program, in another graduate program at the University of Minnesota or other equivalent doctoral programs at other Universities.
      ii. Advised a PhD student through to completion of their doctorate under the mentorship of a faculty member who is already qualified as a PhD Degree Research Advisor.
3. **Degree Program Forms**

   a. All students are required to develop a Degree Program that lists the courses that have or will be taken to meet the degree requirements. See below for details including transferring credits. Students should prepare this with their advisors to ensure that they are meeting all of the program requirements and achieving their educational objectives. The necessary form can be found at [http://www.grad.umn.edu/current_students/forms/gs89a.pdf](http://www.grad.umn.edu/current_students/forms/gs89a.pdf).

   b. In order to ensure that everyone has an academic plan of coursework in place in a timely fashion a registration Hold will be placed on a student when such a form must be submitted. In order to remove that Hold, the following will be required:

      i. MHI – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for his or her 2nd semester.

      ii. MS – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for her or his 3rd semester of enrollment.

      iii. PhD – The Degree Program Form and Degree Transmittal Form must be submitted to the DGS before the student can register for his or her 4th semester of enrollment.

4. **Changing Advisors** - A student may select a new Degree Project or Degree Research Advisor if the current and new faculty members involved both agree to the change.

   a. If this change takes place prior to filing the Degree Program Form, a simple email to the DGS from each of the parties involved indicating their agreement with the change will be sufficient.

   b. If the change takes place after the Degree Program form and the Degree Transmittal form have been filed, the student and the new advisor must jointly prepare a new Degree Transmittal form and submit it to the DGS for review and approval. The old advisor must also inform the DGS of their acceptance of the change via email before the form will be approved by the DGS.

5. **Assigning credit for advising students** – As part of this advising process it is equally important to be considerate to faculty members involved and to account more accurately for the effort invested. While tracking exact hours committed to advising a student is a difficult matter, it is possible to at least assign some consistent credit for doing so. Accordingly, all of the following courses that are associated with capstone project work, MS projects or PhD research will have sections corresponding to each advising faculty member to track their commitments. Students will register in the section of the relevant course that is associated with their project or degree advisor. The respective courses are:

   a. HINF 5499 MHI Capstone Project Course (3 credits)

   b. HINF 8770 MS Plan B Project (4 credits)

   c. HINF 8777 MS Thesis Credits (10 credits required)

   d. HINF 8888 PhD Thesis Credits (24 credits required)
Transfers and Individual Course Waivers

Students may have previously taken graduate courses at another university that are equivalent to required courses in the Health Informatics program or that may meet elective credit requirements. There is currently no limit on the number of credits a student may transfer from another qualified graduate program. Please note that the University restricts the number of credits transferred (a total of 12 credits maximum) from certain classes of enrollment at the University of Minnesota such as those earned while enrolled as a non-degree seeking student or earned from the College of Continuing Education. All transfer credits must meet the requirements of the program and be approved by the student’s advisor and the DGS. As an alternative, students may request a course waiver of one or more of these required courses based on previous educational experiences; the DGS will review all such requests. In the event that a waiver is granted, the student is expected to take other coursework in order to meet the required number of credits. For the complete and specific details regarding transfers of credit, please refer to the Graduate School at www.grad.umn.edu.

Examining Committee

At the same time, the student is required to submit a list of at least four graduate faculty members who will serve on his or her preliminary examining committee. One individual, other than the student’s advisor, is appointed as chair, and one member of the committee must be a member of a graduate program other than Health Informatics. The advisor must be a member of the Health Informatics faculty.

Preliminary Examinations

The purpose of the preliminary examinations is to assess whether the student has achieved the necessary level of knowledge and skills to successfully complete an original research project in the field of health informatics. They are designed to evaluate what the student has learned from the course work listed on the Degree Program and how well he or she has mastered that learning (the Preliminary Written Examination – PWE) as well as whether or not his or her proposed research meets the criteria for an original, high quality research project (the Oral Preliminary Examination – POE). The student must successfully pass both of these examinations in order to be admitted to Candidacy for the Doctoral degree.

Preliminary Written Examination (PWE)

Any student enrolled in the Health Informatics PhD program, who is in good academic standing, has an approved Program Plan and an appointed Examining Committee on file with the Graduate School may elect to start the process by notifying the DGS of their intent to take the PWE. While any student may do so at any time, it is strongly recommended that work on the PWE start only when all or almost all of the coursework on the Program Plan has been completed in order to ensure the best chance of passing the examination.

PWE Structure and Content:

The PWE will consist of an original research proposal which should include 1) an original hypothesis about a problem in the field of health informatics; 2) a critical review of relevant literature leading to the stated hypothesis; 3) a statement regarding the significance of the problem; 4) a process or procedures for data collection to test this hypothesis; and 5) a discussion of anticipated results and alternative
possibilities. Students are encouraged to consider a wide range of techniques and methodologies to evaluate the validity of the hypothesis. The scope should represent a project that can be completed by an individual within a reasonable period of time. The total length of the proposal is limited to 30 pages of double-spaced, 12 point Times New Roman font with 1 inch margins (excluding references). The following format (approximate page count in parentheses) should be used:

I. Background and Significance (10 pages)  
II. Specific Aims, including statement of hypothesis (2 pages)  
III. Experimental Design & Data Collection (14 pages)  
IV. Anticipated Results and Alternatives (2 pages)  
V. Summary and Future Directions (2 pages)  
VI. References  

Rules to be followed when Writing the PWE:

It is the student’s responsibility to choose the topic of the proposal. The topic may be the student’s intended thesis research, related to that research, or some unrelated topic. The proposal must be of the student’s own creation. Students are encouraged to consult with members of their advisor and examining committee in developing the general ideas however the specifics of the PWE must be the student’s own work. Students may not use any research grant application written by their advisor in preparing the proposal. Students must conform to the ethical guidelines promulgated in the Health Informatics Program Code of Conduct and may not consult with other students or others outside the University of Minnesota in preparing the PWE.

The PWE Process is as follows:

1. Submit an “Intent to take the PWE” letter 30 days before submission of the PWE to the DGS that lists:
   a. The student’s name.  
   b. A copy of the student’s Degree Program and Examinining Committee Appointment forms.  
   c. The title and a brief abstract of the intended PWE.  
   d. One or more suggestions for an outside PWE committee member (see Grading for further explanation).  
2. Submit the completed PWE 30 days after the submission date of the “Intent to take the PWE” letter.  
3. The student’s PWE committee will grade the examination and report back within 30 days of the PWE submission date.  
4. If the final outcome is Acceptable, the student’s advisor will prepare the Preliminary Written Examination Report form and submit it to the DGS, who will forward it to the Graduate School.  
5. If the final outcome is Unacceptable, the student’s academic record and PWE performance will be submitted for review by Graduate Faculty and the student is subject to dismissal from the program.  

Grading:

The PWE will be graded by an ad hoc PWE committee of three Health Informatics graduate faculty members in up to three rounds of review as described below. The committee will include the two faculty members from the student’s Examining Committee (excluding the advisor) and one health informatics graduate faculty member chosen by the PWE Committee. The GEC will review and approve all PWE committees. The ad hoc committee will review the PWE and assign it one of two outcomes:

- **Acceptable** – the student passes the preliminary written examination.
• **Unacceptable** – the student does not pass the preliminary written examination.

There is an opportunity for a second and third review (round 2 and 3) for students who receive a grade of **Unacceptable** in the first round.

**Grading Processes:**

Round 1, Grade is **Acceptable**: The student has successfully completed the PWE and can proceed on to the Preliminary Oral Examination.

Round 1, grade is **Unacceptable**: Student can choose to revise the PWE based upon advice for the committee or can create a new PWE and submit it for Round 2.

Round 2, grade is **Acceptable**: The student has successfully completed the PWE and can proceed on to the Preliminary Oral Examination.

Round 2, grade is **Unacceptable**: The student may revise the PWE according to the directions of the committee and submit the revised PWE for evaluation.

Round 3, resubmission, grade is **Acceptable**: The student has successfully completed the PWE and can proceed on to the Preliminary Oral Examination.

Round 3, grade is **Unacceptable**: The student has failed the PWE and is subject to dismissal from the program.

**Preliminary Oral Examination (POE)**

Once the student successfully completes the PWE with a grade of Acceptable, he or she is eligible to take the Preliminary Oral Examination (POE). After notification from the DGS that the student has passed the PWE, the student must schedule the Preliminary Oral Examination with the Graduate School online. [http://www.grad.umn.edu/current_students/prelimschedule/](http://www.grad.umn.edu/current_students/prelimschedule/). This must be *no later than* one week prior to the actual examination.

In the POE, the student presents his or her thesis proposal to the Examining Committee and is also responsible for the material covered in the approved program of student coursework already completed, including the courses in the minor or related field section of the program. The student is encouraged to solicit comments from all members of the POE committee concerning the proposal. The POE is a private session with only the student and the Examining Committee present.

The examination meeting is normally scheduled for two hours but the committee is not obligated to use all of that time. All members of the Examination Committee must be present in some form – face-to-face, videoconference, and teleconference are all acceptable. The examination will commence with a defense of the PWE proposal. If the PWE proposal is unrelated to the thesis proposal, the POE must also include a defense of the thesis proposal. However, the examination is intended to be open-ended and may delve into other areas. In particular, members of the examining committee representing the minor or other supporting program may evaluate the student for his/her breadth of knowledge.

The student must schedule her or his POE for a date within a period of one year from the PWE completion, and he or she must inform the DGS of this date. If the POE is not scheduled within one year
from date of passing the PWE, the student’s advisor must request an extension from the DGS. If one year elapses and no such request is received the student’s academic progress will be reviewed by the GEC. It is the student’s responsibility to consult the committee members to schedule a suitable date for the examination and to reserve a room through the IHI Office. At least one week prior to the POE, the student needs to file the Doctoral Preliminary Oral Examination Scheduling form with the Graduate School.

The following steps are required:

1. The student should distribute the proposal to his or her advisor and any other members of the POE committee who have not participated in the grading of the PWE.
2. The student will consult with members of the POE committee to schedule a two hour time block during which all members must be present – either face-to-face or by video- or teleconference.
3. Notify the Graduate School of the date of the POE at least one week prior to the scheduled date. Please note that an approved Degree Program must be on file with the Graduate School before the POE can be scheduled.
4. Take the Preliminary Oral Examination.
5. Submit the Report of the Preliminary Oral Examination to the Graduate School.

The result of the POE is one of the following:

- **Pass** – the student passes the POE and is admitted to Candidacy for the Ph.D.
- **Pass with Reservations** – The student is informed immediately of the decision and will receive within one week a letter detailing the actions the student must take to remove those reservations. When, in the judgment of the committee, the student has satisfactorily completed those actions, the student receives a grade of Pass.
- **Fail** – the student will be excluded from candidacy unless the committee unanimously recommends that the student retake the POE.
- **Recess of the POE** – The committee may elect to recess the POE and resume again at a later date. See the Graduate Catalog for the rules concerning such a recess.

**Research Project**

For the Ph.D. thesis, the research project is based on the proposal approved by the Examining Committee during the Preliminary Oral Examination. The results of this project are prepared in written form in the Doctoral Thesis. Specific details regarding proposed format, length, and level of detail should be developed with the student’s advisor. Bound copies of Ph.D. theses may be found in the Biomedical Library. Formatting instructions can be found at [http://www.grad.umn.edu/current_students/forms/gs16.pdf](http://www.grad.umn.edu/current_students/forms/gs16.pdf).

**Final Oral Examination**

The format of this examination as required by the Graduate School is fully described in the [Graduate School Transition Catalog](http://www.grad.umn.edu/current_students/forms/gs16.pdf). Students are strongly urged to consult frequently with the members of their committee during the research and writing process that leads to the thesis. The Final Oral Examination takes the form of a seminar in which the candidate presents the thesis and to which the scholarly community is invited. The examination is limited to the candidate’s thesis topic and related areas.

The following is a summary of the Final Oral Examination process:
1. The Graduate School will appoint the Final Oral Examining Committee that will include three thesis reviewers – the student’s advisor, a representative of the program major, and a representative of the minor program or field of specialization.

2. The student is responsible for arranging a date for the thesis defense with the members of the committee at which all members must be present, but that presence may be face-to-face, by telephone or by videoconference.

3. The student will advise all members of the committee of the date on which the thesis will be delivered to them. The notification should take place at least two weeks prior to that delivery and at least five weeks before the defense.

4. On the delivery date, the student must deliver the thesis to all members of the committee. The thesis reviewers will have three weeks to review the thesis and make a determination as to its readiness for the defense.

5. The student will deliver the approved Thesis Reviewers’ Report form to the Graduate School.

6. The Graduate School will appoint a chair of the committee who is not the student’s advisor and deliver the examination forms to that person.

7. At the completion of the Final Oral Examination, the committee will complete the required forms and submit them to the Graduate School within 24 hours of the examination.

8. The copies of the thesis required by the Graduate School are delivered to the Graduate School after the advisor signs the cover page approving the final copy, indicating that all corrections have been made.

**Academic Progress**

The University places time limits on the time take to complete a degree. These limits are supplemented by additional requirements imposed by the HI graduate program. These restrictions are described below:

The University of Minnesota requires that students complete the work for their PhD no more than five (5) years after passing the Preliminary Oral Examination. In addition the HI Program requires that a student enrolled in the PhD program will take no more than four years to pass the Preliminary Oral Examination. During that period of time no more than one semester of registration for GRAD 999 (not counting summers) is allowed.

**Graduation Requirements**

In order to graduate from the program with a PhD degree, students must have completed at least 46 credits of coursework as identified in the Degree Program with a GPA of at least 3.0, completed 24 thesis credits, and must have successfully defended their PhD thesis as indicated on the Final Examination form by the signatures of the committee members.

In addition, the Graduate School requires that students complete a series of steps and associated forms in order to graduate. It is wise to consult this list early as there are deadlines to which you need to pay attention. This list can be found at: [http://www.grad.umn.edu/current_students/doctoral/phdeddchecklist.html](http://www.grad.umn.edu/current_students/doctoral/phdeddchecklist.html)
APPENDIX A
Recommended Electives

**Bioinformatics**
- BINF 5480- Bioinformatics Journal Club

**Computer Science**
- CSCI 4061- Introduction to Operating Systems
- CSCI 4131- Internet Programming
- CSCI 4211- Introduction to Computer Networks
- CSCI 5106- Programming Languages
- CSCI 5115- User Interface Design, Implementation, and Evaluation
- CSCI 5271- Introduction to Computer Security
- CSCI 5461- Functional Genomics, Systems Biology, and Bioinformatics
- CSCI 5481- Computational Techniques for Genomics
- CSCI 5521- Pattern Recognition
- CSCI 5523- Introduction to Data Mining
- CSCI 5525- Machine Learning
- CSCI 5801- Software Engineering I
- CSCI 8115- Human-Computer Interaction and User Interface Technology
- CSCI 8725- Databases for Bioinformatics

**Educational Psychology**
- EPSY 5244- Survey Design, Sampling, and Implementation
- EPSY 8262- Statistical Methods II: Regression and the General Linear Model

**Information and Decision Sciences**
- IDSC 4401- Information Security
- IDSC 6040- Information Technology Management
- IDSC 6050- Information Technologies and Solutions
- IDSC 6471- Knowledge Management
- IDSC 8711- Cognitive Science
- IDSC 8721- Behavioral Decision Theory

**Industrial Engineering**
- IE 8541 - Decision Support Systems

**Information Networking**
- INET 4011- Network Administration
- INET 4031- System Administration
- INET 4061- Introduction to Data Warehousing
- INET 4082- IT Infrastructure Projects and Processes
- INET 4131- Advanced Database Design

**Kinesiology**
- KIN 5001- Foundations of Human Factors/Ergonomics

**Linguistics**
- LING 5001- Introduction to Linguistics
- LING 5205- Semantics
- LING 5801- Introduction to Computational Linguistics

**Master of Business Administration**
- MBA 6240 - Information Technology Management

**Medical Industry Leadership Institute**
- MILI 6562- Information Technology in Health Care

**Nursing**
- NURS 5115- Interprofessional Health Care Informatics
- NURS 5116- Consumer Health Informatics
- NURS 8115- Integrated Seminar in Nursing Informatics
- NURS 8116- Clinical Decision Support: Theory and Application

**Pharmacology**
- PHCL 5111- Pharmacogenomics

**Public Health**
- PUBH 6320- Fundamentals of Epidemiology
- PUBH 6420- Introduction to SAS Programming
- PUBH 6556- Health and Health Systems
- PUBH 6560- Operations Research and Quality in Healthcare
- PUBH 6562- Information Technology in Health Care
- PUBH 6617- Practical Methods for Secondary Data Analysis
- PUBH 6711- Public Health Law
- PUBH 6717- Decision Analysis for Health Care
- PUBH 6802- Managing Electronic Health Information
- PUBH 6806- Principles of Public Health Research
- PUBH 6810- Survey Research Methods
- PUBH 6862- Cost-Effectiveness Analysis in Health Care
- PUBH 7430- Statistical Methods for Correlated Data
- PUBH 7435- Latent Variable Models
- PUBH 7460- Advanced Statistical Computing
- PUBH 7475- Statistical Learning and Data Mining
- PUBH 8801- Health Services Policy Analysis
- PUBH 8810- Research Studies in Healthcare