2012-2013 LONG SIGNATURE SHEET

UNC CHARLOTTE

Proposal Number: HCIP 2013-10-5

Proposal Title: Revision of the Professional Science Master's in Health Informatics

Originating Department: College of College of Health and Human Services

TYPE OF PROPOSAL: UNDERGRADUATE_____ GRADUATE___X___
UNDERGRADUATE & GRADUATE____

(Separate proposals sent to UCCC and Grad. Council)

DATE RECEIVED	DATE CONSIDERED	DATE FORWARDED	ACTION	SIGNATURES
10/17/13	10/18/13	10/18/13	*Approved*	**DEPARTMENT CHAIR** Gary Silverman
11-4-13	11-14-13	11-14-13	*Approved* Contingent on changes emailed to J. Hertel 11-14-13	**COLLEGE CURRICULUM COMMITTEE CHAIR** Meredith Troutman-Jordan Meredith Troutman-Jordan
12-2-13	12-9-13	12-10-13	*Approved*	**COLLEGE FACULTY CHAIR (if applicable)** Erik Wikstrom
12/10/2013	12/11/2013	12/11/2013	*Approved*	**COLLEGE DEAN** Nancy Fey-Yensan / Jane B. Neese
12-11-13	1-14-14	2-10-14	Approved	Alan R. Freitag ALAN R. FREITAG

Revised 12/18/12
OAA/mjw

2012-2013 LONG SIGNATURE SHEET

UNC CHARLOTTE

Proposal Number: HCIP 2013-10-5

Proposal Title: Revision of the Professional Science Master's in Health Informatics

Originating Department: College of Computing and Informatics and College of Health and Human Services

TYPE OF PROPOSAL: UNDERGRADUATE_____ GRADUATE___X___
UNDERGRADUATE & GRADUATE____

(Separate proposals sent to UCCC and Grad. Council)

DATE RECEIVED	DATE CONSIDERED	DATE FORWARDED	ACTION	SIGNATURES
9/20/2013	9/21/2013	9/30/2013	*Approved*	**COLLEGE CURRICULUM COMMITTEE CHAIR** A. Srinivas. Srinivas Akella
			Approved	**COLLEGE FACULTY CHAIR (if applicable)** K. R. Subramanian
			Approved	**COLLEGE DEAN** Yi Deng
12-11-13	1-14-14	2-10-14	*Approved*	**GRADUATE COUNCIL CHAIR** (for graduate courses only) Alan R. Freitag ALAN R. FREITAG
			Approved	**FACULTY GOVERNANCE ASSISTANT** (Faculty Council approval on Consent Calendar)
			Approved	**FACULTY EXECUTIVE COMMITTEE** (if decision is appealed)

Revised 12/18/12
OAA/mjw

UNC CHARLOTTE

LONG FORM
COURSE AND CURRICULUM PROPOSAL

---

*To: Graduate Council Chair

From: College of Computing & Informatics and College of Health and Human Services Health Informatics Planning Committee

Date: September 17, 2013

Re: Revision of the Professional Science Master's in Health Informatics

---

The Long Form is used for major curriculum changes. Examples of major changes can include: creation of a new major, creation of a new minor, creation of a new area of concentration, or significant changes (more than 50%) to an existing program (Note: changing the name of an academic department does not automatically change the name(s) of the degree(s). The requests must be approved separately by the Board of Governors.)

Submission of this Long Form indicates review and assessment of the proposed curriculum changes at the department and collegiate level either separately or as part of ongoing assessment efforts.

*****Proposals for undergraduate courses should be sent to the Undergraduate Course and Curriculum Committee Chair. Proposals related to both undergraduate and graduate courses, (e.g., courses co-listed at both levels) must be sent to both the Undergraduate Course and Curriculum Committee and the Graduate Council.

University of North Carolina at Charlotte **HCIP 2013-10-5**

New Graduate Course and Curriculum Proposal from The Graduate School

Title: Revision of Program Requirements for M.S in Health Informatics Program

II. Proposal Content

A. Proposal Summary

The Graduate School proposes to revise the program requirements necessary to complete the M.S. in Health Informatics degree program and related changes. Specifically:

- The credits for the degree will be reduced from a minimum of 39 to a minimum of 35
- The four concentration offerings will be restructured to 2 concentrations:
    - Data Science and Analytics
    - Business of Healthcare
- The university required professional/research ethics course (GRAD 6002, 2 credits) is incorporated into the curriculum
- The program's student learning outcomes are revised and aligned for both the HI PSM and HI Certificate to reflect the proposed changes
- Syllabi for a proposed new core course are provided
- Associated changes in the related graduate certificate program are presented including renaming the graduate certificate to Health Informatics to align with the PSM
- Formalized dual degree options with the MHA and MSPH programs that incorporate the revised PSM curriculum are presented.
- Associated revised catalog text and course descriptions (to include changes in pre-requites, etc.) are provided

B. Justification

1. Need – The curricular structure for the recently established M.S. in Health Informatics (HI PSM) was developed in 2009-2010. The program was launched in fall 2012. Health Informatics as a master's-level disciplinary focus is relatively recent. Educational needs and best practices for curricula in the field continue to evolve rapidly. Initial implementation of the program has demonstrated three primary bases for streamlining program requirements.
    - First, the program's advisory board has recommended changes to better fit our training to identified needs in practice. Since the program is conceived as a Professional Science Master's and is intended to create strong links with industry, this is a particularly important concern. And this is also seen as an opportunity to sharpen the unique identity of the program.

- Second, participating academic units that deliver core and supporting courses have evolved their respective course offerings since the original proposal. Furthermore, we have identified areas for strategic restructuring, particularly in the concentrations, since implementing the program.
- Third, throughout the initial year, program staff members have engaged in dialogue with faculty members and upper administration in participating departments, and students on deployment, practical program needs, and strategic next steps. These consultations identified the need for streamlining program requirements. Specific recommendations were to reduce the overall number of credit hours required and to simplify the number of concentrations in the baseline program.

This proposal addresses these recommendations.

2. Prerequisites/Corequisites – The proposal includes the following prerequisite change:
   HCIP 6102 now requires the program foundation coursework to be completed (either HCIP 5370 -or- HCIP 5375, depending on entry track).
3. Course Numbering – The 6000 level numbering (6102) is consistent with the university numbering system and reflects a core Master's level course in our program.
4. Improvement – This proposal addresses identified needs for program efficiency by reducing the overall number of credit hours and focusing the program's scope by streamlining concentrations to more closely align with practical needs identified in consultation with the advisory board.
5. Previous Offering – HCIP 6102 has not been offered previously.

The streamlined HI PSM program (and subsequently the HI certificate) includes: (a) reduced number of required Foundation courses, (b) reduced number of Core courses, (c) added flexibility in the selection of Core courses, (d) increased flexibility and selection of Concentration courses, and (e) increased number of Concentration courses, leading to the overall reduction in the number of hours required for the completion of the HI PSM program. These changes have increased program's responsiveness to the needs of industry, introduced flexibility that allows the program to remain nimble in tracking the needs of students, and reduced the number of hours required to complete the degree requirements, thus increasing the likelihood of improved graduation rates

C. Impact

The impact of revised program requirements is expected to be minimal. First, since the program is relatively new, overall student numbers are ramping up, but are comparatively low at this stage. Second, as a cross-disciplinary degree program, HI PSM draws on regular course offerings from programs in the Colleges of Health and Human Services and Computing and Informatics. Streamlining requirements will slightly reduce pressure from HI PSM students on high-demand courses, such as core

requirements for the MHA and MSIT programs. Program-specific HI PSM offerings target primarily HI PSM students and remain essentially in place within the curricular structure. Students who matriculated under the prior curriculum will be given the option of graduating under the revised curriculum.

As noted below, this revision proposal was finalized following consultation, review, and concurrence of all of the participating academic units.

1. Student Constituency – The proposed revision of requirements for the M.S. in Health Informatics serves primarily graduate majors in the program. Students in the Health Informatics Graduate Certificate program who want to pursue the masters program may benefit from streamlined program requirements. The 6000-level course is core for all M.S. program students. Students in the Health Informatics Graduate Certificate program may take advantage of this course to meet elective requirements.
2. Effect on Existing Courses and Curricula

Revised HI curriculum. The HI PSM is revised and restructured from a 39-credit program presented as having 4 concentrations to a 35-credit program with 2 concentrations. Appendix 7 presents a detailed summary and depiction relating the current to the revised curriculum. The revised catalog copy (HI PSM program, HI Graduate Certificate, course offerings), in tracked changes format is presented in Appendix 3 and the 'clean version' in Appendix 3 as well. A clean MS word version also is attached.

These changes require revision of the program's student learning outcomes. Appendix 5 presents the SLO revisions in tracked changes format, taking into account the reduced number of concentrations.

Formalization of Dual Degree Offerings. In tandem with the program's curricular revision, we are proposing to formalize several dual degree configurations. These arrangements reflect the cross-cutting interest served by this program and already present student demand. To date, we have had students declare their desire (through the ad hoc dual mechanism) in such programs, interest we anticipate will grow after formalizing these options, an outcome that will strengthen all the involved programs.

The dual degree proposals conform to Graduate School requirements that students must complete at least 75% of the total credits required if pursuing the programs consecutively. The proposals take advantage of the natural overlap in the programs due to cross-listed courses and synergies afford by articulating internships and capstones that serve the interests of both programs. Consequently, students complete all core and concentration requirements found in each program.

Dual MHA/HI PSM. The proposed dual MHA/HI PSM curriculum is presented in Appendix 8. The appendix shows the individual program curricula and their blended

formulation. The proposed catalog copy appears in the catalog copy appendices cited previously. A letter of support from the Department of Public Health Sciences and MHA program is included as Appendix 8.

Dual MSPH/HI PSM. The proposed dual MHA/HI PSM curriculum is presented in Appendix 8. The appendix shows the individual program curricula and their blended formulation. The proposed catalog copy appears in the catalog copy appendices cited previously. A letter of support from the Department of Public Health Sciences and the MSPH program is included as Appendix 8.

New Course Proposal. The curriculum revision calls for the creation of HCIP 6102 as a core requirement. Its syllabus is included as Appendix 2.

a. Offering – HCIP 6102 is expected be offered once per year, in the spring semester.
b. Affect on Other Course Offering – The HI PSM Program Director coordinates with counterparts from supporting cross-disciplinary degree programs, such as MHA and MSIT, in order to manage enrollment in required HI PSM course offerings from those programs. To date, HI PSM offerings have largely been managed within the scope of existing course offerings from those programs. Streamlining HI PSM requirements will slightly reduce pressure from HI PSM students on high-demand courses, such as core MHA and MSIT requirements. Based on Program Director experience in the first year of the program, proposed changes in HI PSM program requirements are not expected to significantly impact existing course offerings for other programs. The proposed new course is not specifically intended as a complement or replacement for existing offerings in other programs. As such, it is not expected to significantly impact existing course offerings for other programs.
c. Anticipated Course Enrollment – In line with HI PSM program enrollment projections for the first four years, core course enrollment is expected to grow to an average of 30-35 students.
d. Effect on Enrollment in other Courses – Streamlining HI PSM requirements will slightly reduce pressure from HI PSM students on high-demand courses, such as core MHA and MSIT requirements. Based on Program Director experience in the first year of the program, proposed changes in HI PSM program requirements are not expected to significantly impact existing course offerings for other programs.
e. Other Areas of Catalog Copy Affected – Please see Appendix 3 for proposed Catalog copy.

III. Resources Required To Support Proposal

Overall, streamlining requirements may marginally reduce resource requirements.

A. Personnel

Per the HI PSM M.S. program approval, no additional faculty, part-time teaching, student assistants and/or increased load are required in the first four years of the program.

List by name qualified faculty members interested in teaching the course(s).

HCIP 6102 likely will be taught by:
Jim Laditka, DA, PhD
Dipti Patel-Misra, PhD

B. Physical Facility

None. Adequate space is available.

C. Equipment and Supplies

None. No additional special equipment or supplies will be required.

D. Computer

None. No significant additional or specialized computer usage will be required by students and/or faculty beyond existing campus computing facilities, and current resources already dedicated to the program.

E. Audio-Visual

None. The revised program will be fully served by existing classroom audio/visual infrastructure.

F. Other Resources.

None.

G. Source of Funding

None.

IV. Consultation with the Library and Other Departments or Units

A. Library Consultation – Written consultation with the Library Reference Staff was made to ensure that library holdings are adequate to support the proposed new course. See attached Consultation on Library Holdings (Appendix 1).

V. Initiation, Attachments and Consideration of the Proposal

A. Originating Unit

This proposal is a joint proposal between the College of Computing and Informatics (CCI) and the College of Health and Human Services (CHHS). The CCI College Faculty approved the proposal on October 15, 2013. The CHHS College Faculty approved the proposal on November 4th, 2013.

B. Credit Hour

The appropriate faculty committee has reviewed the course outline/syllabus and has determined that the assignments are sufficient to meet the University definition of a credit hour.

C. Attachments

1. Consultation – Attached.
2. Course Outline / Syllabus – Attached.
3. Proposed Catalog Copy – Attached.
4. Academic Plan Of Study (Undergraduate Only) – N/A
5. Student Learning Outcomes – Attached.
6. Textbook Costs – Electronic textbooks, textbook rentals, and the buyback program have been considered and recommended as part of the program, but remain the purview of the faculty member offering the course.
7. Overview of program requirement changes – Attached.
8. Suggested structure for proposed dual degree programs, including MHA-HI PSM and MSPH-HI PSM

APPENDIX 1

Library Consultation

UNC CHARLOTTE

J. Murrey Atkins Library

Consultation on Library Holdings

To: Dr. Jim Laditka

From: Dr. Melanie Sorrell

Date: 9/10/13

Subject: HCIP 6102: Health Care Data Analysis

Summary of Librarian's Evaluation of Holdings:

Evaluator: Dr. Melanie Sorrell Date: 9/10/13

Check One:

1. Holdings are superior _____
2. Holdings are adequate __**x**__
3. Holdings are adequate only if Dept. purchases additional items. _____
4. Holdings are inadequate _____

Comments:

This is a proposal for a course, HCIP 6102: Health Care Data Analysis. The course includes a data analysis project and subsequent presentation. Library holdings should be adequate to support student research for this course (see list of items held by subject headings below). Students will have access to relevant databases including INSPEC, Web of Science, Compendex, ACM Digital Library, PubMed, and the Wiley Online Library.

LC Subject Heading	Total items held
Information Systems	293 monographs
Big data	8 monographs
Database Management	426 monographs
Information storage and retrieval systems -- Medical care	73 monographs
International Journal of Medical Informatics	Journal title
Journal of Medical Systems	Journal title
Medical Economics	Journal title

Melanie Sorrell

_____

Evaluator's Signature

9/10/13

_____

Date

APPENDIX 2

University of North Carolina at Charlotte
College of Computing and Informatics
And
College of Health and Human Services
Department of Public Health Sciences

Spring, 2014

Course Number and Title: HCIP 6102, Health Care Data Analysis

Credits, Days/Time, Location: 3 Grad Credits; Wednesday, 5:30-8:15, CHHS (TBA)

Faculty Information: Jim Laditka, DA, PhD, MPA
CHHS 423C
jladitka@uncc.edu
Office Phone: 704.687.7035
Office Hours: Tuesday 3:15 – 5:15, and by appointment

Catalog Description:

HCIP 6102, Health Care Data Analysis. Prerequisites: enrollment in the Professional Science Masters in Health Informatics or the Graduate Certificate in HI. This course develops skills in the management, analysis, and reporting of health data using SAS, including introductory applied statistical analysis. Students use SAS in exercises to control costs, improve quality, adjust for risk, quantify access, target marketing, measure population health, and evaluate policies and programs. The course focuses on using base SAS and SAS STAT, and introduces SAS Maps, Enterprise Miner, and Visual Analytics to generate reports, develop clinical, financial, and operational recommendations for managerial action, and communicate with stakeholders. It also introduces SPSS, Stata, SQL, IML/R, qualitative methods, and managerial, legal, and ethical concepts in health care data analysis.

Course Objectives:

In three domains, after completing this course the student should be able to:

Domain: Data Management

- Configure the SAS environment
- Ensure health data confidentiality, integrity, and availability
- Transfer data among programs commonly used to create and analyze health data

- Describe essential features of clinical, financial, and operational datasets commonly used by health care analysts, including: Medicare; Medicaid; hospital discharge data; national, state, and local survey data representing health care needs and use, service providers, and employees; and sources for spatial analysis of health and health care
- Understand how to contribute to and manage health care informatics teams
- Discuss legal and ethical issues relevant to health care data analysts
- Discuss benefits and limitations of data management and analysis using SAS and related software

Domain: Data Analysis

- Understand and apply basic and moderately advanced data structures
- Know how to find, understand, and use SAS help files, online resources, and texts
- Understand and use common classification systems such as ICD-9-CM, CPT
- Write SAS programs for using data sets of any size, including the ability to
    1. write professional SAS programs
    2. sort, merge, append, and collapse datasets
    3. generate new variables
    4. label variables and data sets
    5. produce graphs and other figures
    6. clean data and address missing values
    7. test the validity of SAS programs
    8. write simple macros
    9. use SAS's Output Data System
    10. analyze "Big Data" efficiently
    11. link data from a variety of sources
- Understand and use the essential syntax and commands of SAS analysis procedures and conduct basic data analysis (frequency tabulations, means, t-tests & Chi-Square, OLS and logistic regression)
- Demonstrate basic understanding of database query syntax (such as SQL) by generating reports responding to data requests using database programs such as Access or SQL Server

Domain: Data Reporting

- Interpret basic statistical results in SAS STAT procedure outputs
- Present results of data analysis to health informatics analysts and managers both orally and in writing
- Use and present visual data analytics
- Identify, understand, and be responsive to the needs, values, and interests of stakeholders within and outside the health care organization when designing, conducting, or reporting health data analysis

Syllabus Subject to Change: The instructor reserves the right to alter this syllabus based on best practices that fit changing circumstances.

Teaching Strategies: Teaching methods will include a combination of lectures and audiovisual presentations by faculty. Student participation in discussions, demonstration of problem solving (e.g. programming in SAS), critical thinking exercises, group /team collaboration. All students are expected to contribute meaningfully to team efforts.

Required Texts and Data: There is no required textbook for this course. The instructor will provide all materials and datasets required for the course through the course Moodle site. You must use the datasets supplied for the course. The instructor will also provide a set of optional resources specific to health data analysis using SAS.

Evaluation Methods:

Midterm Exam	20%
Data Analysis Project and Report	30%
Group Presentation	10%
Contributions to class and group discussions	20%
Final Exam	20%

Grade Scale:
A = 90-100%
B = 80 - 89%
C = 70 - 79%
U = <70%

Contributions to class will be graded holistically—i.e., everything counts—without predetermined weighting for various aspects of the participation. Particularly strong performance in some activities or areas may counterbalance weaker performance in other activities or areas. The overall evaluation for class participation will indicate commendable (A), satisfactory (B), marginal (C), or unsatisfactory (U) performance in this area. A student with more than a few absences will be at risk of a marginal (C) grade for class participation, and therefore a marginal or unsatisfactory grade for the course, unless her or his performance in other aspects of class participation is consistently at the “commendable” (A) level.

You must attain at least a Satisfactory grade for Contributions to Class & Presentations, and for the Project Report, to receive a Satisfactory grade or higher for the final course grade. For example, a student with a Marginal or Unsatisfactory grade in class participation and presentations will not be eligible for a final course grade higher than Marginal.

Class participation includes:

- Regular attendance,
- Voluntary participation by offering relevant questions or comments,
- Regularly demonstrating that you have completed the assigned readings and have critically evaluated them in the context of the course to-date,
- Participating as an active listener when students or guest lecturers are presenting,
- Actively and productively participating in small-group learning activities,
- Responding to questions from the instructor, guest lecturers, or other students.

Actively listening and regularly contributing to the success of a group's activities are valuable career skills.

Health Care Data Analysis Project

All students must complete a data analysis project. You may work individually or in a group with up to 3 students. You will identify a question or hypothesis to guide your analysis or select from among those provided by the instructor. You must analyze the data using SAS and the approaches introduced in our course. You will submit your SAS code with appropriate documentation and a written report with about 5 pages of text plus exhibits that present your analysis results. Your report should be written for readers who are health informatics managers and health data analysts. Details about the reports will be provided. Please feel comfortable to share your SAS code and drafts of your project paper with the instructor to obtain feedback, and to revise accordingly before submitting your project paper for grading.

Project Presentation

You will present your methods and results to our class in a formal presentation. Each project will be presented in 15 minutes.

The presentation should be organized as a business presentation. You should clearly state your major point(s), substantiate them with evidence, summarize your conclusions, and describe your recommendations. You may use a PowerPoint presentation or another format, keeping in mind that the presentation should be appropriate for an audience of managers and health informatics professionals.

Presentation Guidelines

1. Your presentation should be 15 minutes.

2. If you work in a team, all group members must actively participate in some aspect of the presentation.

3. Use of some form of visual aid (e.g., a PowerPoint presentation, a video by the group) is required. Your visual aid must be easily visible to all members of your audience. For PowerPoint presentations, use a minimum font size of 18 pt. (usually larger is better); keep the number of words on each slide to a minimum; it is easier for your audience to read bulleted ideas than complete sentences. Be sure to use colors that provide strong contrasts between text and background, keeping in mind that almost every audience will include individuals who do not see as well as you may.

4. You should speak from a speaking outline, and practice until you feel comfortable with the material. Do not read your presentation (students who do so will be penalized in grading). Typically it is best to incorporate your speaking outline directly in your PowerPoint presentation, if you use that medium, so that you do not refer to a separate paper outline.

5. Business attire appropriate for health data analysts or health care managers is required for presenters. Criteria for business attire will be discussed in class, as this is a meaningful aspect of leadership and success in most health care and public health organizations.

University and College Policies

Code of Student Responsibility: The *UNC Charlotte Code of Student Responsibility* (the Code) sets forth certain rights and responsibilities in matters of student discipline. The Code defines these responsibilities and guarantees you certain rights that ensure your protection from unjust imposition of disciplinary penalties. You should familiarize yourself with the provisions and procedures of the Code" (Introductory statement from the UNC Charlotte brochure about the Code of Student Responsibility). The entire document may be found at this Internet address: http://legal.uncc.edu/policies/up-406

Academic Integrity: All students are required to read and abide by the Code of Student Academic Integrity. Violations of the Code of Student Academic Integrity, including plagiarism, will result in disciplinary action as provided in the Code. Students are expected to submit their own work, either as individuals or contributors to a group assignment. Definitions and examples of plagiarism and other violations are set forth in the Code. The Code is available from the Dean of Students Office or online at: http://www.legal.uncc.edu/policies/ps-105.html

Course Credit Workload: This 3-credit course requires three hour of classroom or direct faculty instruction and six hours of out-of-class student work each week for approximately 15 weeks. Out-of-class work may include but is not limited to: programming in SAS, required reading, library research, written assignments, and studying for quizzes and exams.

Special Needs: If you have a documented disability and require accommodation in this course, contact Disability Services, Fretwell 230, phone: 687 4355 voice/TDD) the first

week of the semester. Information about available services may be found at http://legal.uncc.edu/policies/up-501. Accommodations for learning will be arranged by that office and communicated to the Instructor. If you speak English as a second language, please inform the instructor.

Diversity Statement: UNC Charlotte strives to create an academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

All students are required to abide by the UNC Charlotte Sexual Harassment Policy (http://legal.uncc.edu/policies/up-502) and the policy on Responsible Use of University Computing and Electronic Communication Resources (http://legal.uncc.edu/policies/up-307). Sexual harassment, as defined in the UNC Charlotte Sexual Harassment Policy, is prohibited, even when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards.

Religious Accommodation: It is the obligation of students to provide faculty with reasonable notice of the dates of religious observances on which they will be absent by submitting a Request for Religious Accommodation Form to their instructor prior to the census date for enrollment for a given semester http://legal.uncc.edu/policies/ps-134.html . The census date for each semester (typically the tenth day of instruction) can be found in UNC Charlotte's Academic Calendar (http://registrar.uncc.edu/calendars/calendar.htm).

Health Care Data Analysis – Topic Outline	
Week	Topics
1	Introduction to health care data analysis • Overview of computer languages and analytic methods used for health care data analysis • Organizing the analytic environment: hardware & network issues; catalogues, libraries • Ensuring data confidentiality, integrity, and availability • Understanding how analysis software processes data • Records and variables • Creating & rebuilding datasets • Writing readable code • Transferring data among formats and programs • Team-based programming
2	Working with datasets and records • Creating and rebuilding datasets, II • Working with multiple datasets • Sorting and merging datasets • Processing data by subgroups

	• Record selection (subsetting, outputting) • Variable selection (keeping, dropping) • Utility procedures • Strategies for analyzing large datasets (“Big Data”) • Ethical & legal issues in data acquisition and use • Working with colleagues in data analysis
3	<u>Working with variables</u> • Variable attributes (type, length, and labels) • Assigning variable values • Identifying and addressing missing values and data anomalies • Basic applied statistical analysis in SAS (frequency distributions, measures of central tendency and variation, t-tests and Chi-square)
4	<u>Advanced merging and dividing of datasets</u> • Selecting, summarizing, transposing observations • Combining, dividing, updating observations • Complex data merging • Basic applied statistical analysis 2 (ordinary least squares and logistic analysis)
5	<u>Formatting and describing data</u> • Data formats (numeric, character, date/time, user-defined) • Functions for data of various formats (numeric functions, statistical functions, character functions, data/time functions) • Describing & summarizing data • Displaying data • Planning successful reports of data analysis results • **Exam 1**
6	<u>Flow of control</u> • Conditional choice of action • Repeated action • Processing arrays • Transferring control • Modular programming • Introduction to longitudinal data analysis
7	<u>Advanced data preparation</u> • Identifying and addressing errors and anomalies • Program testing • Writing effective reports of data analysis
8	<u>Summarizing and analyzing data</u> • Using procedures to summarize and analyze data • Presenting results in tables, figures, and other exhibits • Preparing the effective research presentation
9	<u>Multi-dimensional arrays & matrices</u> • Applications in base SAS and SAS/STAT • Applications in IML and R

	• **Project Paper Draft Due**
10	Combining and analyzing individual, hospital, and area measures • Methodological issues involved in combining and analyzing data from multiple levels • Effective technical presentations
11	Automating control • SAS macro programming
12	SAS Maps • Mapping disease rates • Using GIS for hospital infection control • Review & critique of student draft reports
13	Qualitative methods for health management and outcomes research, health services research, and clinical epidemiology
14	SPSS, Stata, SQL, Access and other relational databases Review & critique of student draft presentations **Completed Project Paper Due**
15	Project presentations with class evaluation and discussion
16	Project presentations with class evaluation and discussion
	Final exam

About Your Instructor

Dr. Jim Laditka earned his PhD in Public Administration from The Maxwell School at Syracuse University, with focus areas in research methods, health care policy, and management. His MPA, also from the Maxwell School, focused on health care management and policy. He also earned a BS in Computer Science at SUNY Institute of Technology. He uses skills from bachelor's, master's, and doctoral degrees in English to help students communicate simply, clearly, and effectively.

Dr. Laditka's expertise in informatics includes software engineering and systems analysis, and the management of large scale information systems. He is an expert SAS programmer and data analyst, and teaches a variety of research methods classes to masters and doctoral students.

In professional practice, Dr. Laditka has held both management and clinical roles in large urban and small rural hospitals, and has experience in long-term care. He has been an IT manager, where he led the acquisition and implementation of multi-million dollar database, office automation, and telecommunications systems, and provided IT services to a widely distributed network.

In public health surveillance, Dr. Laditka was the Research Director of the South Carolina Alzheimer's Disease Registry, one of only 3 state-wide population-based dementia registries in the United States. He has also worked with a CDC-funded state registry on traumatic brain injury, and participated on a grant from the Duke Endowment to build a data cube representing healthcare, social services, and other data about older persons in South Carolina. As Principal

Investigator of the 5-year Healthy Brain Study, one of the largest formal qualitative research studies ever conducted, Dr. Laditka helped establish national policies on brain health, including policy on research, surveillance, and health promotion. The policies helped to improve public health informatics in the United States.

In service to state governments, Dr. Laditka has given substantial research and policy assistance to several state agencies that provide health care, public health, social services, and both institutional and community-based long term care, and has conducted numerous program evaluations and management consultations for those agencies focused on information technology, access to services, quality of care, and cost control. In South Carolina, he was appointed by the Governor to the state's lead organization that develops policy and programming for Alzheimer's disease. He also provided substantial research and policy assistance to the state's principal agency for health informatics, The Office of Research and Statistics, a national leader in developing integrated health care information systems.

In academic research, Dr. Laditka has published over 100 peer-reviewed research studies since completing his PhD in 2002, the majority of which analyze health information. Researchers have cited this research in over 2,000 studies. His research has been funded by the CDC, the Duke Endowment, NIH, HRSA, CMS, and ASPE, with funding as principal investigator or co-investigator over $26 million. His research now focuses on recovering embedded Markov models from longitudinal data, estimating parameters for disability and death, using those parameters to conduct micro simulations that create large populations, and then using those populations to estimate Active Life Expectancy, a central measure of public health.

In community and professional service, Dr. Laditka has served on national expert panels on aging, cognitive health, and health disparities, and has provided service to the national Alzheimer's Association, helping to design and evaluate brain health promotion campaigns. He has served on the Board of Directors of the Alzheimer's Association in North Carolina and South Carolina.

APPENDIX 3

Proposed Catalog Copy

Health Informatics

- **M.S. in Health Informatics**
- **Graduate Certificate in Health Informatics**

Professional Science Master's Degree in Health Informatics
hi.uncc.edu

Graduate Certificate in Health Informatics
hit.uncc.edu

The program in Health Informatics is a joint venture between the College of Computing and Informatics, the College of Health and Human Services, and the Graduate School. The program offers both a Certificate and a Master of Science degree designed to prepare students for the complex and rapidly changing healthcare and technology sectors.

Faculty Director
Dr. Mirsad Hadzikadic
343-A Woodward Hall

Graduate Program Director
Joshua Hertel, Graduate School
Denny 212
704-687-8763

College of Computing and Informatics
cci.uncc.edu

College of Health and Human Services
health.uncc.edu

Graduate School
graduateschool.uncc.edu

Deans
Dr. Yi Deng, College of Computing and Informatics
Dr. Nancy Fey-Yensan, College of Health and Human Services
Dr. Tom Reynolds, Graduate School

M.S. IN HEALTH INFORMATICS

The Professional Science Master's (PSM) program in Health Informatics is an interdisciplinary program focused on the complex issues surrounding the management and analysis of electronic medical information. The program is designed to develop future leaders in the areas of health data management and analysis, including programming, security, health information exchange and healthcare analytics. Graduates of the PSM in Health Informatics will earn an M.S. in Health Informatics and be prepared to meet the urgent need for professionals capable of creating, implementing, evaluating, and modifying the next generation of medical information systems.

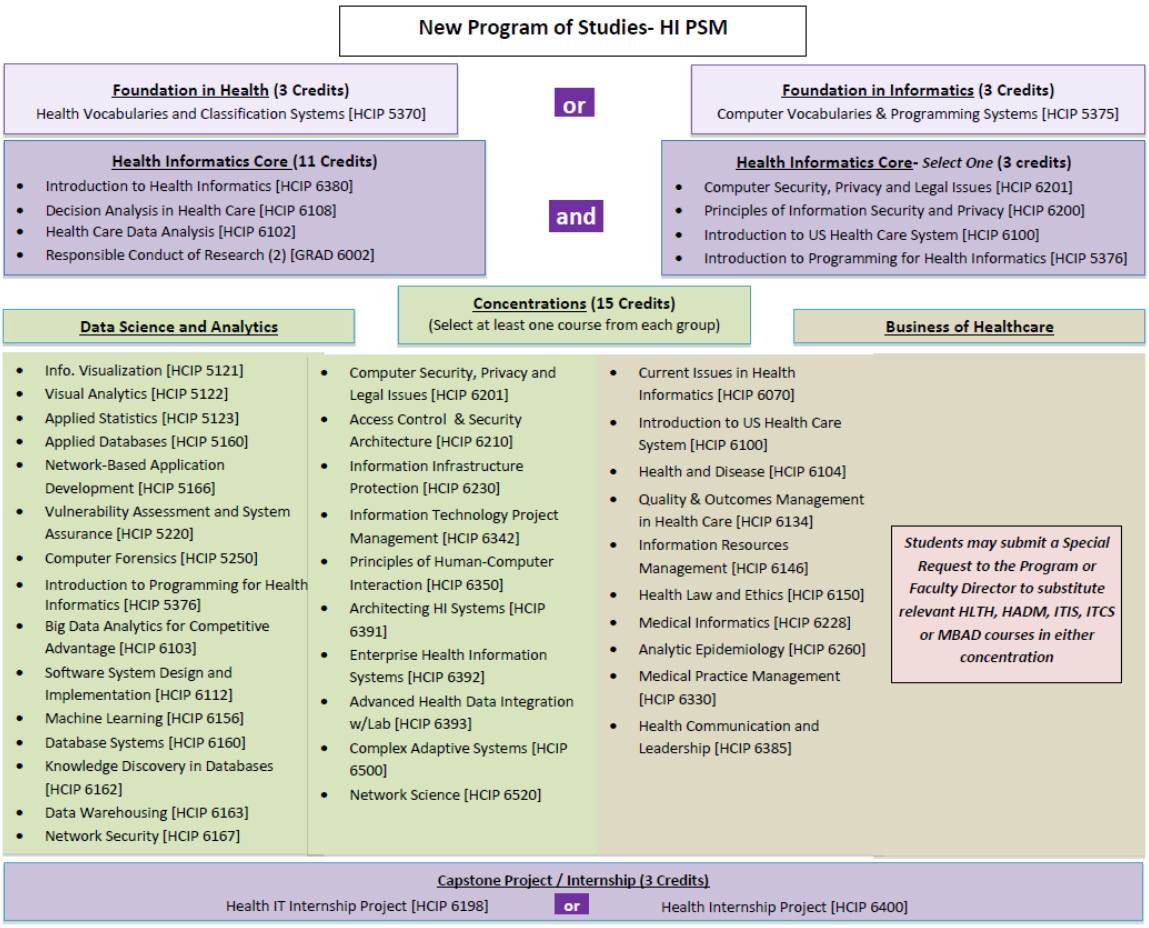
Admission Requirements

Applicants must meet the general Graduate School requirements for admission to Master's Degree programs. Applications must include all of the materials listed by the Graduate School as typical for Master's Degree application submissions. In addition to the general requirements for admission to the Graduate School, the following are required for study toward the M.S. in Heath Informatics.

- An earned baccalaureate degree from an accredited college or university in computer sciences, health sciences, information systems, or life sciences or in an informatics discipline or a closely related field

Degree Requirements

The PSM in Health Informatics program requires 35-38 graduate credit hours, including 3-6 hours of Foundation courses, 11 credit hours of Core courses, 3 credit hours of Core elective courses, 15 credit hours of concentration-focus courses, and 3 credit hours of Internship/Practicum. The following table depicts the new program requirements.



A minimum of 24 credit hours contributing to the M.S. in Health Informatics must be from courses numbered 6000 or higher. A maximum of 6 credit hours of graduate credit may be transferred. Students may apply all of the credits earned in the Graduate Certificate in Healthcare Informatics towards the M.S. in Health Informatics.

Foundation Courses

Students lacking an adequate healthcare background will take the "Foundation in Health" course sequence. Similarly, students lacking an adequate informatics background will take the "Foundation in Informatics" course sequence. In all cases a minimum of 3 credit hours of Foundation courses are required.

Foundation in Health

HCIP 5370 Health Vocabularies and Classification Systems (3)

Foundation in Informatics

HCIP 5375 Computer Vocabularies and Programming Systems (3)

The adequacy of a student's background is determined by the Graduate Program Director. Students who are determined by the Graduate Program Director to lack an

adequate background in informatics as well as health will be required to take courses from both Foundation sequences (Foundation General) for a maximum of up to 6 hours.

Core Courses
All students complete four required Core courses (11 hours) that provide a strong general background in health informatics.

HCIP 6380 Introduction to Health Informatics (3)
HCIP 6108 Decision Analysis in Healthcare (3)
HCIP 6102 Health Care Data Analysis (3)
GRAD 6002 Responsible Conduct of Research (2)

Core Elective
Students must take 3 credit hours of Core elective coursework from the following set, complementary to the student's base Foundation coursework.

HCIP 5376 Introduction to Programming for Health Informatics (3)
HCIP 6100 Introduction to the US Healthcare System (3)
One of these two equivalent courses:

- HCIP 6201 Computer Security, Privacy, and Legal Issues (3)
- HCIP 6200 Principles of Information Security and Privacy (3)

Concentration Requirements
Each student must also complete an approved concentration focus consisting of fifteen (15) credit hours. Concentration coursework balances depth and breadth across the following concentration coursework categories with a breadth requirement. Students must take at least 3 of the 15 hours in a separate concentration category from the majority of the Concentration coursework. Concentration category areas and applicable courses include:

Data Science & Analytics – Students with a focus in this concentration category create and manipulate data as part of advanced health information systems in order to meet the unique needs and exacting standards of the healthcare industry.

HCIP 5121 Information Visualization (3)
HCIP 5122 Visual Analytics (3)
HCIP 5123 Applied Statistics (3)
HCIP 5160 Database Systems (3)
HCIP 5166 Network-Based Application Development (3)
HCIP 5220 Vulnerability Assessment and System Assurance (3)
HCIP 5250 Computer Forensics (3)
HCIP 6103 Big Data Analytics for Competitive Advantage (3)
HCIP 6112 Software System Design and Implementation (3)
HCIP 6156 Machine Learning (3)
HCIP 6162 Knowledge Discovery in Databases (3)
HCIP 6163 Data Warehousing (3)

HCIP 6167 Network Security (3)
HCIP 6201 Computer Security, Privacy, and Legal Issues (3)
HCIP 6200 Principles of Information Security and Privacy (3)
HCIP 6210 Access Control & Security Architecture (3)
HCIP 6230 Information Infrastructure Protection (3)
HCIP 6342 Information Technology Project Management (3)
HCIP 6350 Principles of Human-Computer Interaction (3)
HCIP 6391 Architecting Health Information Systems (3)
HCIP 6392 Enterprise Health Information Systems (3)
HCIP 6393 Advanced Health Data Integration w/Lab (3)
HCIP 6500 Complex Adaptive Systems (3)
HCIP 6520 Network Science (3)

Business of Healthcare – Students with a focus in this concentration category develop skills in analyzing health data to identify risk and to adopt best practices in the healthcare industry.

HCIP 6070 Current Issues in Health Informatics (3)
HCIP 6100 Introduction to US Health Care System (3)
HCIP 6104 Health and Disease (3)
HCIP 6134 Quality & Outcomes Management in Health Care (3)
HCIP 6146 Information Resources Management (3)
HCIP 6150 Health Law and Ethics (3)
HCIP 6260 Analytic Epidemiology (3)
HCIP 6330 Medical Practice Management (3)
HCIP 6385 Health Communication and Leadership (3)

A course cannot be used to satisfy any two requirements toward the degree.

Other focus areas may be possible with the approval of the Graduate Program Director. In addition, the Graduate Program Director may approve substitution of courses within approved concentration areas. Students may submit a Special Request to the Program or Faculty Director to substitute relevant HLTH, HADM, ITIS, ITCS or DSBA courses in a given concentration.

Capstone Project/Internship
In line with the practice-based nature of the program, all students must complete an approved Capstone Project/Internship experience from one of the following:

HCIP 6198 Health IT Internship Project (3)
HCIP 6400 Health Internship Project (3)

GRADUATE CERTIFICATE IN HEALTH INFORMATICS

The Graduate Certificate in Health Informatics (HI) is designed to introduce individuals to the core concepts of data management and analysis in healthcare. The certificate requires fifteen (15) credit hours of coursework. The certificate may be pursued concurrently with a related graduate degree program at UNC Charlotte. Students may apply all of the credits earned in the HI Certificate towards the Health Informatics PSM.

Admission Requirements

Applicants must meet the general Graduate School requirements for admission to Graduate Certificate programs. Applications must include all of the materials listed by the Graduate School as typical for Graduate Certificate application submissions. In addition to the general requirements for admission to the Graduate School, the following are required for study toward the Graduate Certificate in Health Informatics.

1) A bachelor's degree in a related field, including, but not limited to, a life science, health science, health administration, business administration, or computing discipline.
2) Knowledge of applications of information technology, including an understanding of computers, database management, and basic programming skills. The adequacy of a student's background is determined by the Graduate Program Director.

Program Requirements

Foundation Courses

Students lacking an adequate healthcare background will take the "Foundation in Health" course sequence. Similarly, students lacking an adequate informatics background will take the "Foundation in Informatics" course sequence. In all cases a minimum of 3 credit hours of Foundation courses are required.

Foundation in Health
HCIP 5370 Health Vocabularies and Classification Systems (3)

Foundation in Informatics
HCIP 5375 Computer Vocabularies and Programming Systems (3)

The adequacy of a student's background is determined by the Graduate Program Director. Students who are determined by the Graduate Program Director to lack an adequate background in informatics as well as health will be required to take courses from both Foundation sequences (Foundation General) for a maximum of up to 6 hours.

Core Courses

All students complete four required Core courses (9 hours) that provide a strong general background in health informatics.

HCIP 6380 Introduction to Health Informatics (3)
HCIP 6108 Decision Analysis in Healthcare (3)
HCIP 6102 Health Care Data Analysis (3)

Core Elective
Students must take 3 credit hours of Core elective coursework from the following set, complementary to the student's base Foundation coursework.

HCIP 5376 Introduction to Programming for Health Informatics (3)
HCIP 6100 Introduction to the US Healthcare System (3)
One of these two equivalent courses:

- HCIP 6201 Computer Security, Privacy, and Legal Issues (3)
- HCIP 6200 Principles of Information Security and Privacy (3)

This Graduate Certificate represents the first part of the HI PSM program, thus allowing students who want to continue their studies a smooth transition into HI PSM.

Transfer credits cannot be applied to this certificate program.

COURSES IN HEALTH INFORMATICS (HCIP)

HCIP 5121. Information Visualization. (3) Cross-listed as ITCS 5121. Prerequisite: Full graduate standing and enrollment in Health Informatics Masters or Graduate Certificate program. Information visualization concepts, theories, design principles, popular techniques, evaluation methods, and information visualization applications. (Spring) (Evenings)

HCIP 5122. Visual Analytics. (3) Cross-listed as ITCS 5122. Prerequisite: STAT 1220, STAT 1221, STAT 1222, STAT 2122, STAT 2223, or approval of the instructor, full graduate standing and enrollment in Health Informatics Masters or Graduate Certificate program. Introduces the new field of visual analytics, which integrates interactive analytical methods and visualization. Topics include: critical thinking, visual reasoning, perception/cognition, statistical and other analysis techniques, principles of interaction, and applications. (Fall) (Evenings)

HCIP 5123. Applied Statistics I. (3) Cross-listed as STAT 5123. Prerequisites: MATH 2164 with a grade of C or above and junior standing, or permission of department, and enrollment in Health Informatics Masters or Graduate Certificate program. Review of stochastic variables and probability distributions, methods of estimating a parameter, hypothesis testing, confidence intervals, and contingency tables. Linear and multiple regression, time series analysis. (Fall)

HCIP 5160. Applied Databases. (3) Cross-listed as ITIS 5160. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI and full graduate standing required. Identification of business database needs; requirements specification; relational database model; SQL; E-R modeling; database design,

implementation, and verification; distributed databases; databases replication; object-oriented databases; data warehouses; OLAP; data mining; security of databases; vendor selection; DBMS product comparison; database project management; tools for database development, integration, and transaction control. *(Fall) (Evenings)*

HCIP 5166. Network-Based Application Development. (3) Cross-listed as ITIS 5166. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI and full graduate standing. Examines the issues related to network based application development. Topics include: introduction to computer networks, web technologies and standards, network based programming methodologies; languages, tools, and standards *(Spring) (Evenings)*

HCIP 5220. Vulnerability Assessment and System Assurance. (3) Cross-listed as ITIS 5220. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Discusses methodologies, tools, and technologies that are important for vulnerability assessment and systems assurance. Topics include: ethical hacking techniques, vulnerability assessment, risk assessment/management, finding new exploits, discovering vulnerabilities, penetrating network perimeters, bypassing auditing systems, and assured administration of systems, as well as evaluating systems assurance levels. Focus will be placed on: 1) understanding current penetration techniques for networks, operating systems, services and applications; 2) investigating mitigation and defense strategies; and 3) studying legal and ethical considerations. Based on case studies with a strong lab component. *(On demand)*

HCIP 5250. Computer Forensics. (3) Cross-listed as ITIS 5250. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. The identification, extraction, documentation, interpretation, and preservation of computer media for evidentiary purposes and/or root cause analysis. Topics include: techniques for discovering digital evidence; responding to electronic incidents; tracking communications through networks; understanding electronic media, crypto-literacy, data hiding, hostile code, and Windows™ and UNIX™ system forensics; and the role of forensics in the digital environment. *(On demand)*

HCIP 5370. Health Vocabularies and Classification Systems. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Development of fundamental medical terminology, consisting of basic word structure (including word analysis, combining forms, suffixes, prefixes, and pronunciation) of descriptive medical terms pertaining to the body as a whole and to each body system. Clinical vocabularies, terminologies and coding systems, along with definitions are described in the context of caring and treating patients. Terms covered include: diseases, diagnoses, findings, operations, treatments, drugs, and administrative items as utilized to support recording and reporting a patient's care at varying levels of detail via an electronic medical record. Identifying appropriate representation elements, uses, and sources in order to apply them in the context of health information systems and communication. *(Fall or Summer)*

HCIP 5375. Computer Vocabularies and Programming Systems. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Study of the terminology and concepts used in Information Technology, Computer Science, and Information Systems. Topics include: computers and their components, system and application software, programming paradigms, databases and data warehouses, networks, Internet, Web, security, personal digital assistants, communications, data formats and media, data representations, computer games, and technology. Explores technological constraints introduced by the intricacies of varying application domains. *(Fall or Summer)*

HCIP 5376. Introduction to Programming for Health Informatics. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Foundational use of object-oriented programming and scripting techniques to solve common problems in health informatics. Topics include: data structures for electronic health records; developing basic electronic health record applications; relational database connectivity; and interfacing with industry standard health information systems. *(Spring) (Evenings)*

HCIP 6070. Current Issues in Health Informatics. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Current topics and issues related to Health Informatics, including health policy analysis and development, ethical issues, structure of health administrative and delivery systems, assessment of population health, models of healthcare delivery, access and quality of care issues. (*On demand*)

HCIP 6100. Introduction to the U.S. Healthcare System. (3) Cross-listed as HADM 6100. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Overview of healthcare delivery in the United States, including organizational structures, financing mechanisms and delivery systems, with particular attention to program formation. *(Fall or Summer) (Evenings)*

HCIP 6102. Health Care Data Analysis (3) Prerequisites: enrollment in the Professional Science Masters in Health Informatics or the Graduate Certificate in HI. This course develops skills in the management, analysis, and reporting of health data using SAS, including introductory applied statistical analysis. Students use SAS in exercises to control costs, improve quality, adjust for risk, quantify access, target marketing, measure population health, and evaluate policies and programs. The course focuses on using base SAS and SAS STAT, and introduces SAS Maps, Enterprise Miner, and Visual Analytics to generate reports, develop clinical, financial, and operational recommendations for managerial action, and communicate with stakeholders. It also introduces SPSS, Stata, SQL, IML/R, qualitative methods, and managerial, legal, and ethical concepts in health care data analysis. *(Fall or Spring) (Evenings)*

HCIP 6103. Big Data Analytics for Competitive Advantage (3) Cross-listed as DSBA 6100. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate

in HI. This course provides an introduction to the use of big data as a strategic resource. A focus is placed on integrating the knowledge of analytics tools with an understanding of how companies leverage data analytics to gain strategic advantage. A case approach will be used to emphasize hands-on learning and real-world view of big data analytics. (Fall)

HCIP 6104. Health and Disease. (3) Cross-listed as HADM 6104. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Principles and methods of epidemiology, including definitions and models of health, illness, and disease; modes of transmission of clinically important infectious agents; risk factors and chronic diseases; and insights into existing studies and paradigms of health promotion and disease prevention. *(Fall or Spring) (Evenings)*

HCIP 6108. Decision Analysis in Healthcare. (3) Cross-listed as HADM 6108. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Study of selected quantitative management tools useful in the analysis of managerial decisions, a review of basic descriptive and inferential statistics, applied probability distributions, forecasting methods, statistical process control, queuing, transportation and assignment modeling, and linear programming. Emphasis on applying quantitative decision making methods to the operational problems facing healthcare organizations. Familiarity with computers and computer software will be important for success in this course. *(Fall or Spring) (Evenings)*

HCIP 6112. Software System Design and Implementation. (3) Cross-listed as ITCS 6112 and ITIS 6112. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Introduction to the techniques involved in the planning and implementation of large software systems. Emphasis on applying quantitative decision making methods to the operational problems facing healthcare organizations. Familiarity with computers and computer software will be important for success in this course. *(Fall or Spring) (Evenings)*

HCIP 6134. Quality and Outcomes Management in Healthcare. (3) Cross-listed as HADM 6134. Prerequisite: HCIP 5370, HCIP 6100, and enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Examination of the concepts and practices of quality management, performance improvement, and assessment of outcomes in healthcare delivery settings. Designed to provide an in-depth understanding of basic concepts and frameworks and of their applicability and relevance in specific situations. Topics include: process reengineering, service improvement, continuous quality improvement, accreditation standards, patient satisfaction, outcome measurement, teamwork, and case management. *(Fall or Spring) (Evenings)*

HCIP 6146. Information Resources Management. (3) Cross-listed as HADM 6146. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. A study of the use of information management to improve the delivery of healthcare. Information resource management includes methods and practices to acquire,

disseminate, store, interpret and use information to provide healthcare in a more efficient, effective and economical manner. Emphasis is placed upon information as central to the ongoing operations and strategic decisions of healthcare organizations. *(Fall or Spring) (Evenings)*

HCIP 6150. Health Law and Ethics. (3) Cross-listed as HADM 6150. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Analysis of ethical and bioethical problems confronting healthcare delivery systems. Selected legal principles and their application to the healthcare field, including corporate liability, malpractice, informed consent and governmental regulation of health personnel and health facilities. *(Fall or Spring) (Evenings or Weekends)*

HCIP 6156. Machine Learning. (3) Cross-listed as ITCS 6156. Prerequisite: ITCS 6150 or permission of department, and enrollment in Health Informatics Masters or Graduate Certificate program. Machine learning methods and techniques including: acquisition of declarative knowledge; organization of knowledge into new, more effective representations; development of new skills through instruction and practice; and discovery of new facts and theories through observation and experimentation. (*Fall, Odd years*)

HCIP 6162. Knowledge Discovery in Databases. (3) Cross-listed as ITCS 6162 and ITIS 6162. Prerequisite: ITCS 6160 and enrollment in the PSM in Health Informatics or Graduate Certificate in HI. The entire knowledge discovery process is covered in this course. Topics include: setting up a problem, data preprocessing and warehousing, data mining in search for knowledge, knowledge evaluation, visualization and application in decision making. A broad range of systems, such as OLAP, LERS, DatalogicR+, C4.5, AQ15, Forty-Niner, CN2, QRAS, and discretization algorithms are covered. *(Fall) (Evenings)*

HCIP 6163. Data Warehousing. (3) Cross-listed as ITCS 6163 and ITIS 6163. Prerequisite: ITCS 6160 or equivalent and enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Topics include: use of data in discovery of knowledge and decision making; the limitations of relational databases and SQL queries; the warehouse data models: multidimensional, star, snowflake; architecture of a data warehouse and the process of warehouse construction; data consolidation from various sources; optimization; techniques for data transformation and knowledge extraction; relations with enterprise modeling. *(Spring) (Evenings)*

HCIP 6167. Network Security. (3) Cross-listed as ITIS 6167. Prerequisite: ITIS 6200 or equivalent and enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Examines the issues related to network security. Topics include: network security background and motivation, network centric threats, network authentication and identification, network security protocols, firewall, IDS, security in wireless environments, email security, instant message security, network application security, and network based storage security. There are heavy lab based components in this course. *(Fall) (Evenings)*

HCIP 6198. Health IT Internship Project. (3) Cross-listed as ITIS 6198. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Complete a team-based project that is originated from an IT organization and approved by the department. *(Fall, Spring or Summer)*

HCIP 6199. Principles of Computer Networks and Databases. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Computer concepts (hardware components, systems architectures, operating systems and languages, and software packages and tools); Communications technologies (networks—LANS, WANS, VPNs; data interchange standards— NIST, HL-7); Internet technologies (Intranet, web-based systems, standards – SGML, XML); Data, information and file structures (data administration, data definitions, data dictionary, data modeling, data structures, data warehousing, database management systems); Data storage and retrieval (storage media, query tools/applications, data mining, report design, search engines); Data security (protection methods—physical, technical, managerial, risk assessment, audit and control program, contingency planning, data recovery, Internet, web-based, and eHealth security). (*On demand*)

HCIP 6200. Principles of Information Security and Privacy. (3) Cross-listed as ITIS 6200. Prerequisite: Permission of department. Topics include: security concepts and mechanisms; security technologies; authentication mechanisms; mandatory and discretionary controls; basic cryptography and its applications; database security, intrusion detection and prevention; assurance requirement, assurance class, evaluation methods and assurance maintenance; anonymity and privacy issues for information systems. *(Fall, Spring) (Evening)*

HCIP 6201. Computer Security, Privacy, and Legal Issues. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Topics include: security concepts and mechanisms; security technologies; authentication mechanisms; mandatory and discretionary controls; basic cryptography and its applications; database security, intrusion detection and prevention; assurance requirement, assurance class, evaluation methods and assurance maintenance; anonymity and privacy issues for information systems. Students gain hands-on experience through lab exercises and case studies. *(Summer Fall) (Evening)*

HCIP 6210. Access Control and Security Architecture. (3) Cross-listed as ITIS 6210. Prerequisite: ITIS 6200 or equivalent and enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Discusses objectives, formal models, and mechanisms for access control; and access control on commercial off-the-shelf (COTS) systems. Examines the issues related to security architectures and technologies for authorization. Topics include: cryptographic infrastructure, distributed systems security architectures, database systems security architectures, Internet security architectures, network security architectures, and e-commerce security architectures. *(Spring) (Evenings)*

HCIP 6228. Medical Informatics. (3) Cross-listed as ITCS 6228. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI and graduate standing. Focuses on methods and techniques used in storage, communication, processing, analysis, integration, management, and distribution of medical information. Emphasizes the applications of telemedicine and intelligent computer-aided decision making systems in different medical and surgical systems. Discusses the computational methods to accept or reject a new drug or a new treatment for a given disease. (*On demand)*

HCIP 6230. Information Infrastructure Protection. (3) Cross-listed as ITIS 6230. Prerequisite: ITIS 6200 and enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Discusses methodologies, tools, and technologies that are important for protecting information systems and information infrastructures. Topics include: techniques, processes and methodologies for information security risk assessment and management, tools and technologies for critical infrastructure protection, methodologies for continuous operation, and recovery from disasters. *(On demand)*

HCIP 6240. Applied Cryptography. (3) Cross-listed as ITIS 6240. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI and full graduate standing. Provides students with an understanding of modern cryptographic techniques, algorithms and protocols that are of fundamental importance to the design and implementation of security critical applications. Covers not only standard cryptographic techniques, but also exposes students to the latest advances in applied cryptography. Topics include: secret and public key ciphers, stream ciphers, one-way hashing algorithms, authentication and identification, digital signatures, key establishment and management, secret sharing and data recovery, public key infrastructures, and efficient implementation. *(On demand)*

HCIP 6260. Analytic Epidemiology. (3) Cross-listed as HLTH 6260, HSRD 8003, and PPOL 8665. Prerequisites: HLTH 6202 with a grade of B or above, and enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Principles and methods of studying advanced epidemiology, with emphasis on the analytic approach. Advanced techniques in the establishment of disease causation in groups and communities. Topics include: risk assessment, environmental exposures, stratification and adjustment, and multivariate analysis in epidemiology. Emphasis also placed on quality assurance and control and communicating results of epidemiological studies in professional publications and settings. *(Spring)*

HCIP 6330. Medical Practice Management. (3) Cross-listed as HADM 6210. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. A comprehensive study of medical practice management and the issues, tools, and techniques to resolve those issues. Provides the student with an understanding of the financial and regulatory issues that influence today's medical practice with an insight into the cultural, human resource, and governance issues that make physician practices unique among healthcare organizations. (*On demand*)

HCIP 6342. Information Technology Project Management. (3) Cross-listed as ITIS 6342. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Introduces students to problems associated with managing information technology projects involving, particularly, integration of systems, development of client-specific solutions, and project justification. Moves beyond the classic techniques of project management and integrate communication software/systems, multi-site, multi-client facilities projects, cultural issues involved with managing interdisciplinary teams, and the effect of rapid technological obsolescence on project justification, funding and continuance. *(Spring, Summer) (Evenings or Weekends)*

HCIP 6350. Principles of Human-Computer Interaction. (3) Cross-listed as ITIS 6400. Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI and full graduate standing. Introduction to Human-Computer Interaction practice and research. Topics include: the perceptual, cognitive, and social characteristics of people, as well as methods for learning more about people and their use of computing systems. The process of interface design, methods of design, and ways to evaluate and improve a design. Also highlights a number of current and cutting-edge research topics in Human-Computer Interaction with a balance of design, sociological/psychological, and information systems elements. *(Spring)*

HCIP 6380. Introduction to Health Informatics. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Introduces the fundamental concepts and techniques in application data management for Health Informatics and in understanding reference terminologies, data mapping and conversion, and supporting data storage and formats. Topics include: internal and external policy issues governing data collection, storage, exchange, and compliance. Includes a detailed look at the Electronic Health Record and digitized Personal Health Record as used in current healthcare environments. Primarily covers AHIMA HIM competency I.A. *(Fall, Spring) (Evenings or Weekends)*

HCIP 6385. Healthcare Communication and Leadership. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Principles and useful techniques for effective oral presentations, poster presentations, scientific writing. Students critique and help revise each other's presentations and learn how to enhance communications. Students learn how to properly organize and run a meeting. Also covers negotiation, conflict management, and influence. Students use several approaches evaluate their individual leadership style. Completes a management style assessment, and analyze leadership styles of prominent leaders in the eHealth environment, using contemporary leadership theory and principles. Primarily covers AHIMA HIM competency III.A. (*Fall*) (*Evenings*)

HCIP 6390. Advanced Programming for Health Informatics. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Examines advanced use of object-oriented programming and scripting techniques applied to case studies in health informatics development. Emphasizes programming techniques

beyond the fundamentals, with emphasis on efficiency in speed, data structures and file size. Students learn how to optimize code and databases so that the demands of large-scale health information systems can be performed in acceptable amounts of time while minimizing hardware requirements. Topics include: algorithm optimization, optimization of database queries and development for software as a service. (*On demand*)

HCIP 6391. Architecting Health Information Systems. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Introduces planning, implementation, and maintenance of Health Information Systems for organizations. Students learn about the development of hardware and software requirements for system deployment, including: cost/benefit analysis, assessment of work-flow, interface, human resource factors, as well as capability assessment of regulatory requirements. Topics include: policy and procedure development for capability evaluation, regulatory compliance, system use, and data exchange. (*On demand*)

HCIP 6392. Enterprise Health Information Systems. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Practical case studies in the use of large scale Health Information Systems. Survey of industry standard software tools and best practices. Laboratory experience in management and analytics for Electronic Health Records and enterprise data. Evaluation and selection of clinical, administrative, and specialty information technology applications for health organization. (*Spring*) (*Evenings*)

HCIP 6393. Advanced Health Data Integration. (3) Prerequisite: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI. Secondary data sources (registries and indexes; databases – such as MEDPAR, NPDB, HCUP); Healthcare data sets (such as OASIS, HEDIS, DEEDS, UHDDS, UACDS, NEDSS, NMMFS); National Healthcare Information Infrastructure (NHII); Standards and regulations for documentation (such as JCAHO, CARF, COP, AAAHC, AOA); Health information standards (such as HIPAA, ANSI, ASTM, LOINC, UMLS, MESH, Arden Syntax, HL-7); Healthcare taxonomies, clinical vocabularies, terminologies/nomenclatures (such as ICD-9-CM, ICD-10, CPT, SNOMED-CT, DSM-IV); Severity of illness systems ; Vital statistics ; Epidemiology ; Reimbursement Methodologies; Clinical data and reimbursement management; Compliance strategies and reporting (e.g. National Correct Coding Initiative); Charge-master management; Casemix management; Audit process such as compliance and reimbursement; Payment systems (such as PPS, DRGs, APCs, RBRVS, RUGs); Commercial, managed care, and federal insurance plans. (*On demand*)

HCIP 6400. Health Internship Project. (3) Cross-listed as HADM 6400. Prerequisites: HADM 6100; enrollment limited to students already holding or concurrently pursuing a MHA degree; instructor permission required. Offers administrative experience in a healthcare setting for students. The initial assumption is made that students participating in the internship experience have had limited hands-on exposure to healthcare administration. *Graded on a Pass/Unsatisfactory basis. (Fall, Spring or Summer)*

HCIP 6410. Personalization and Recommender Systems. (3) Cross-listed as ITIS 6410 and ITIS 8410. Prerequisites: Enrollment in the PSM in Health Informatics or Graduate Certificate in HI and full graduate standing. An introduction to the application of personalization and recommender systems techniques in information systems. Topics include: historical, individual and commercial perspectives; underlying approaches to content-based and collaborative recommendation techniques for building user models; acceptance issues; and case-studies drawn from research prototypes and commercially deployed systems. *(On demand)*

HCIP 6490. Industrial Internship. (0-6) Cross-listed as ITCS 6490. Prerequisites: Completion of six hours of graduate coursework and enrollment in the PSM in Health Informatics or Graduate Certificate in HI; full or part-time academic year internship in computer science areas complementary to the concentration area of studies and designed to allow theoretical and course-based practical learning to be applied in a supervised industrial experience. The supervising faculty, the academic advisor, and the graduate program director must approve each student's internship program. A mid-term report and a final report to be evaluated by the supervising faculty are required. *Graded on a Pass/Unsatisfactory basis* by the supervising faculty in consultation with off-campus supervisor at the internship organization. The credit hours may not be part of the minimum 30 credit hours for graduation. May be repeated for credit hours, but no more than six hours may be applied toward PSM degree requirements. *(On demand)*

HCIP 6500. Complex Adaptive Systems. (3) Cross-listed as ITIS 8500 and ITCS 6500/8500. Prerequisite: Permission of instructor, and enrollment in Health Informatics Masters or Graduate Certificate program. Complex adaptive systems (CAS) are networked (agents/part interact with their neighbors and, occasionally, distant agents), nonlinear (the whole is greater than the sum of its parts), adaptive (the system learns to change with its environment), open (new resources are being introduced into the environment), dynamic (the change is a norm), emergent (new, unplanned features of the system get introduced through the interaction of its parts/agents), and self-organizing (the parts organize themselves into a hierarchy of subsystems of various complexity). Ant colonies, networks of neurons, the immune system, the Internet, social institutions, organization of cities, and the global economy are a few examples where the behavior of the whole is much more complex than the behavior of the parts. This course will cover those and similar topics in an interactive manner. Examples of our current research effort will be provided. Topics include: Self-organization; emergent properties; learning; agents; localization affect; adaptive systems; nonlinear behavior; chaos; complexity. (On demand)

HCIP 6520 Network Science. (3) Cross-listed as ITIS 6520. Prerequisite: Full graduate standing or permission of department. Network Science helps students design faster, more resilient communication networks; revise infrastructure systems such as electrical power grids, telecommunications networks, and airline routes; model market dynamics; understand synchronization in biological systems; and analyze social interactions among people. It examines the various kinds of networks (regular, random,

small-world, influence, scale-free, and social) and applies network processes and behaviors to emergence, epidemics, synchrony, and risk. This course integrates concepts across computer science, biology, physics, social network analysis, economics, and marketing. *(On demand)*

Other Computer Science Courses (ITCS)
See descriptions of ITCS courses under "Computer Science" in the College of Computing and Informatics section of this *Catalog*.

Other Health Administration Courses (HADM)
See descriptions of HADM courses under "Health Administration" in the College of Health and Human Services section of this *Catalog*.

Other Information Technology Courses (ITIS)
See descriptions of ITIS courses under "Information Technology" in the College of Computing and Informatics section of this *Catalog*.

APPENDIX 4

Academic Plan of Study (Undergraduate Only) – N/A

APPENDIX 5

2013-14 Student Learning Outcomes Assessment Plan and Report

HI PSM

Student Learning Outcomes – Graduates of the PSM in Health Informatics will earn an M.S. in Health Informatics and be prepared to meet the urgent need for professionals capable of creating, implementing, evaluating, and modifying the next generation of medical information systems. Evaluation of graduates' characteristics (ability to create, implement, evaluate, and modify medical information systems) will be conducted in the *Introduction to Health Informatics (HCIP 6380)* course and two Internship courses (*HCIP 6198 Health IT Internship Project* and *HCIP 6400 Health Internship Project*). This is a modification from the previous curriculum. Under the original curriculum students were initially assessed in one the foundation sequence courses: HCIP 6100 Introduction to US Healthcare Systems or HCIP 6201 Computer Security, Privacy and Legal Issues. For purposes of streamlining the assessment and reporting requirements the committee decided to shift the foundation assessments into HCIP 6380 Introduction to Health Informatics. This is a core requirement for all students regardless of what Foundation (Health or Informatics) track students start and for both Certificate and HI PSM students. The following section includes the SLOs for the above-mentioned courses.

College: Inter-College Program – Computing and Informatics (CCI), Health and Human Services (CHHS), The Graduate School

Department: Inter-College Program – Graduate School, Computing and Informatics, Health and Human Services

Name of Degree or Certificate Program/Stand Alone Minor/Online Distance Education Program: Professional Science Masters in Health Informatics (HI PSM)

Course: HCIP 6380- Introduction to Health Informatics

Reflection on the Continuous Improvement of Student Learning **1. List the changes and improvements your program planned to implement as a result of last year's student learning outcomes assessment data.** **2. Were all of the changes implemented? If not, please explain.** **3. What impact did the changes have on student learning?**
As a result of input from students, faculty, and our advisory board the HI program has restructured the curriculum for the Professional Science Master's degree. Starting in the 2013 the SLO's were eliminated from HCIP 6201 and HCIP 6100. As part of the new curriculum and core requirements students will be assessed first in HCIP 6380- Introduction to Health Informatics. The existing Student Learning Outcomes for HCIP 6198 or HCIP 6400 will remain. The new assessment model will allow the program early in the program in a common core requirement and provide continuity between the HI Certificate and HI PSM.

Student Learning Outcome 1 **(knowledge, skill or ability to be assessed)**
Read, interpret, and extract information from medical documents, applying knowledge of medical terminology, billing, and diagnostic codes. Collect and interpret health information data for a variety of purposes (e.g., determining community health information needs). Apply professional healthcare standards. Use presentation software to prepare communications. Apply leadership and work effectively in a team environment to improve the quality of work and the work environment.

Changes to the Student Learning Outcomes Assessment Plan: If any changes were made to the assessment plan (which includes the Student Learning Outcome, Effectiveness Measure, Methodology and Performance Outcome) for this student learning outcome since your last report was submitted, briefly summarize the changes made and the rationale for the changes.
NA

Effectiveness Measure: Identify the data collection instrument, e.g., exam, project, paper, etc. that will be used to gauge acquisition of this student learning outcome and explain how it assesses the desired knowledge, skill or ability. A copy of the data collection instrument and any scoring rubrics associated with this student learning outcome are to be submitted electronically to the designated folder on the designated shared drive.
Students are required to apply healthcare knowledge of medical terminology, billing, and diagnostic codes to develop an electronic health record example. This is done as a team project. Application of healthcare and medical data knowledge to solve a problem will be judged in the areas of data source identification, data analysis / synthesis, background research, and EHR development outcomes. Project guidelines are given to the students, and then student project proposals are reviewed and approved by the instructor before the students begin work.

Methodology: Describe when, where and how the assessment of this student learning outcome will be administered and evaluated. Describe the process the department will use to collect, analyze and disseminate the assessment data to program faculty and to decide the changes/improvements to make on the basis of the assessment data.
Student's healthcare knowledge to solve a problem will be evaluated by the course instructor. The project will be scoped to address the skill areas described above in the Effectiveness Measure. The instructor will evaluate project conduct and outcomes according to a rubric that scores student performance on a scale of 1 to 5 across the multiple skill areas described above in the Effectiveness Measure.

Performance Outcome: Identify the percentage of students assessed that should be able to demonstrate proficiency in this student learning outcome <u>and</u> the level of proficiency expected. *Example: 80% of the students assessed will achieve a score of "acceptable" or higher on the Oral Presentation Scoring Rubric. (*Note: a copy of the scoring rubric, complete with cell descriptors for each level of performance, is to be submitted electronically to the designated folder on the designated shared drive.)
At least 80% of students will score 3 or better (on a 5 point scale) on performance in applying healthcare knowledge and techniques to solve an EHR development problem in the health domain.

Fall 2011-Spring 2012 Assessment Data	**Fall 2012 Assessment Data**
NA	**NA**

Plans for 2013-14: Based upon the 2012 assessment data included in this annual report, what changes/improvements will the program implement during the next academic year to improve performance on this student learning outcome?

Assessment Lead's Comments on Student Learning Outcome 1:

Student Learning Outcome 2 **(knowledge, skill or ability to be assessed)**
Identify and interpret medical/ healthcare terminology. Apply appropriate laws, regulations, and industry standards to health care situations. Interpret and use tables, charts, and figures to support written communication

Changes to the Student Learning Outcomes Assessment Plan: If any changes were made to the assessment plan (which includes the Student Learning Outcome, Effectiveness Measure, Methodology and Performance Outcome) for this student learning outcome since your last report was submitted, briefly summarize the changes made and the rationale for the changes.
NA

Effectiveness Measure: Identify the data collection instrument, e.g., exam, project, paper, etc. that will be used to gauge acquisition of this student learning outcome and explain how it assesses the desired knowledge, skill or ability. A copy of the data collection instrument and any scoring rubrics associated with this student learning outcome are to be submitted electronically to the designated folder on the designated shared drive.
The students skills on their ability to Identify and interpret medical/ healthcare terminology, appropriate laws, regulations, and industry standards, Interpret and use tables, charts, and figures to support written communication will be evaluated using multiple choice questions in the final exam.

Methodology: Describe when, where and how the assessment of this student learning outcome will be administered and evaluated. Describe the process the department will use to collect, analyze and disseminate the assessment data to program faculty and to decide the changes/improvements to make on the basis of the assessment data.
In the final exam there will be 5 multiple choice questions (each weighing 10 points) to evaluate the students learning on their ability to Identify and interpret medical/ healthcare terminology. Apply appropriate laws, regulations, and industry standards to health care situations. Interpret and use tables, charts, and figures to support written communication

Performance Outcome: Identify the percentage of students assessed that should be able to demonstrate proficiency in this student learning outcome and the level of proficiency expected. *Example: 80% of the students assessed will achieve a score of "acceptable" or higher on the Oral Presentation Scoring Rubric. (*Note: a copy of the scoring rubric, complete with cell descriptors for each level of performance, is to be submitted electronically to the designated folder on the designated shared drive.)
80 percent of the students will score 7 or higher (out of 10) on these questions

Fall 2011-Spring 2012 Assessment Data	**Fall 2012 Assessment Data**
NA	**NA**

Plans for 2013-14: Based upon the 2012 assessment data included in this annual report, what changes/improvements will the program implement during the next academic year to improve performance on this student learning outcome?

Assessment Lead's Comments on Student Learning Outcome 2:

Description of Introduction to Health Informatics
Assessment Instrument for HCIP 6380

This course has been designed to explore the use and management of health care analytics in healthcare organizations. Informatics provides a framework to understand the use of information in healthcare organizations, impact internal and external decisions, evaluate specific strategies, understand industry changes, and understand the ramifications of health data standards and privacy concerns. In this course, students will learn how the core competencies of healthcare informatics can be developed and applied using real-world case studies. Students will be exposed to specific concepts related to electronic medical records (EMR), Electronic Health Records (EHR), health data and standards, sourcing, and analytics investments in healthcare.

Student Learning Objectives/Outcomes:

- Read, interpret, and extract information from medical documents, applying knowledge of medical terminology, billing, and diagnostic codes
- Establish and maintain record storage systems within legal guidelines and protocols
- Collect and interpret health information data for a variety of purposes (e.g., determining community health information needs)
- Identify and interpret medical/ healthcare terminology
- Describe the relationship, roles, and responsibilities among health care professionals
- Analyze the impact on health care systems based on changes in technology, epidemiology, managed care, etc.
- Apply appropriate laws, regulations, and industry standards to health care situations
- Identify ethical issues and demonstrate ethical behavior in health care situations
- Interpret and use tables, charts, and figures to support written and oral communication
- Work effectively in a team environment to improve the quality of work and the work environment

HADM 6100 Exam Example Questions

1. Which one of the following is NOT a driving force for the adoption of health informatics?
    a. Natural diffusion of technology into the medical field
    b. Lower healthcare costs
    c. Improved medical quality
    d. Improved Joint Commission scores

2. Which one of the following is NOT a barrier to the adoption of health information technology?
    a. Governmental support
    b. Cost of technology
    c. Interoperability
    d. Physician resistance

3. Medical studies suggest that paper charts, on average, are missing what percent of the time?
    a. 5%
    b. 20%
    c. 50%
    d. 75%

4. Medical studies suggest that laboratory results are missing in paper charts approximately what percent of the time?
    a. 5%
    b. 20%
    c. 50%
    d. 70%

5. Which one of the following is NOT part of EHR "Meaningful Use", stage 1?
    a. Computerized physician order entry
    b. Quality reports
    c. Secure messaging

d. Interoperability

6. EHRs have the potential to save money through which of the following mechanisms? (select all that apply)
    a. Improved patient satisfaction
    b. Decreased cost related to record storage
    c. Improved coding
    d. Reduced transcription costs
7. Select known EHR obstacles
    a. Little governmental interest
    b. Slow computer speed
    c. Cost
    d. Altered workflow
8. Which of the following represents a datum?
    a. ICD-9
    b. 14
    c. HL7
    d. Chest x-ray
9. Which of the following represents healthcare information?
    a. Elevated fasting blood sugar and HbA1c proving diabetes
    b. 26
    c. Jpg
    d. MP3
10. Which of the following represents healthcare knowledge?
    a. 14
    b. ICD-9 code of 250.0
    c. HIV infection leads to opportunistic infections
11. Which of the following statements is true?

a. Computer science tends to deal with data
b. Informaticians deal primarily with data
c. Information technology professionals deal mainly with information
d. Computer science tends to deal with knowledge

12. Which of the following statements is true?
    a. Information is derived from knowledge
    b. Vocabularies help convert data to information
    c. Computers convert data to information
    d. Computers convert information to data
13. Which of the following can help convert information into knowledge?
    a. Unstructured data
    b. Voice recognition
    c. Electronic health records
    d. Central data warehouses
14. Select one the main reasons health informatics is difficult
    a. Data are scarce
    b. Data are structured
    c. Data are vague, imprecise and inconsistent
    d. Lack of adequate data warehouses
15. Select one of the main reasons health informatics fails
    a. Inadequate marketing by vendors
    b. We are data rich but information poor
    c. HIT is too new
    d. The US is the only county to use HIT
16. Not all medical errors result in an adverse event.
    a. True

b. False

17. An *adverse event* means that a patient injury occurred.
    a. True
    b. False
18. Ordering a CAT scan for routine acute sinusitis is an example of which of the following? (select all that apply)
    a. Misuse
    b. Overuse
    c. Underuse
    d. Nonuse
19. What is the most common category of patient safety studied?
    a. Diagnosis
    b. Preventative care
    c. Medication use
    d. Disease management
20. Which <u>one</u> of the following government agencies has a patient safety network?
    a. CDC
    b. CMS
    c. AHRQ
    d. FDA

HCIP 6380 Introduction to Health Informatics Rubric

	Poor	Needs Improvement	Acceptable	Good	Excellent
	1	2	3	4	5
Understanding of Electronic Medical Records (EMR)	Does not understand EMR	Shows limited understanding of EMR	Demonstrates understanding of most aspects of EMR	Exhibits thorough understanding of EMR with only limited gaps	Presents exemplary and complete understanding of EMR
Understanding of Medical Claims Trend	Does not understand Medical Claims Trend	Shows limited understanding of Medical Claims Trend	Demonstrates understanding of most aspects of Medical Claims Trend	Exhibits thorough understanding of Medical Claims Trend with only limited gaps	Presents exemplary and complete understanding of Medical Claims Trend
Understanding of Healthcare Terminology	Does not understand Medical Claims Trend	Shows limited understanding of Medical Claims Trend	Demonstrates understanding of most aspects of Medical Claims Trend	Exhibits thorough understanding of Medical Claims Trend with only limited gaps	Presents exemplary and complete understanding of Medical Claims Trend
Understanding of Healthcare Regulations	Does not understand Healthcare Regulations	Shows limited understanding of Healthcare Regulations	Demonstrates understanding of most aspects of Healthcare Regulations	Exhibits thorough understanding of Healthcare Regulations with only limited gaps	Presents exemplary and complete understanding of Healthcare Regulations
Understanding Use of Healthcare Data	Does not understand Use of Healthcare Data	Shows limited understanding of Use of Healthcare Data	Demonstrates understanding of most aspects of Use of Healthcare Data	Exhibits thorough understanding of Use of Healthcare Data with only limited gaps	Presents exemplary and complete understanding of Use of Healthcare Data

Revised 12/18/12
OAA/mjw

College: Inter-College Program – Computing and Informatics (CCI), Health and Human Services (CHHS), The Graduate School

Department: Inter-College Program – The Graduate School, Computing and Informatics, Health and Human Services

Name of Degree or Certificate Program/Stand Alone Minor/Online Distance Education Program: Professional Science Masters in Health Informatics (HI PSM)

Course: HCIP/ITIS 6198 Health Information Technology Internship Project - or HCIP 6400 Health Internship Project

Reflection on the Continuous Improvement of Student Learning **1. List the changes and improvements your program planned to implement as a result of last year's student learning outcomes assessment data.** **2. Were all of the changes implemented? If not, please explain.** **3. What impact did the changes have on student learning?**
No changes or improvements were planned based on the 2012-2013 SLO outcome assessment data, as all measured learning goals were met.

Student Learning Outcome 1 **(knowledge, skill or ability to be assessed)**
HI PSM students will demonstrate the ability to apply Health Informatics knowledge and techniques, including creation, implementation, evaluation, and modification of health information systems.

Changes to the Student Learning Outcomes Assessment Plan: If any changes were made to the assessment plan (which includes the Student Learning Outcome, Effectiveness Measure, Methodology and Performance Outcome) for this student learning outcome since your last report was submitted, briefly summarize the changes made and the rationale for the changes.
None.

Effectiveness Measure: Identify the data collection instrument, e.g., exam, project, paper, etc. that will be used to gauge acquisition of this student learning outcome and explain how it assesses the desired knowledge, skill or ability. A copy of the data collection instrument and any scoring rubrics associated with this student learning outcome are to be submitted electronically to the designated folder on the designated shared drive.
In HCIP/ITIS 6198 Health Information Technology Internship Project –or– HCIP/HADM 6400 Health Internship (required program course) students are required to apply Health Informatics (HIT) knowledge and techniques to solve an information technology development problem in the health domain. This is done in the context of a capstone

project, typically an internship project. Application of HI knowledge to solve a problem will be judged in the areas of data source identification, data analysis / synthesis, background research, development procedures, code design and implementation, system evaluation, and system modification. Project guidelines are given to the students, and then student project proposals are reviewed and approved by the instructor before the students begin work. Students will (a) submit weekly reports to the instructor, (b) submit a final report at the end of the class, and (c) make an oral presentation to the instructor and, if appropriate, the business representative at the end of the class.

Methodology: Describe when, where and how the assessment of this student learning outcome will be administered and evaluated. Describe the process the department will use to collect, analyze and disseminate the assessment data to program faculty and to decide the changes/improvements to make on the basis of the assessment data.

Application of HI knowledge to solve a problem and design a computer-based system will be evaluated by the course instructor and internship supervisor (as appropriate) each semester that a program-related HCIP/ITIS 6198 or HCIP/HADM 6400 is taught. Sections of these courses are individually set up for program students, when internships are arranged. The project will be scoped to address the skill areas described above in the Effectiveness Measure. The instructor and internship supervisor (as appropriate) will evaluate project conduct and outcomes according to a rubric that scores student performance on a scale of 1 to 3 across the multiple skill areas described above in the Effectiveness Measure. The 1-3 scale here differs from the more common 1-5 scale for compatibility with existing assessment instruments in HCIP/HADM 6400. After collecting data, the instructors will report results, comments and suggestions for improvements to the Program Director. The Program Director will provide additional analysis and comments as needed and will forward all results and suggestions to the Departmental Graduate Committee for discussion and analysis. The Committee will evaluate results, identify areas for improvement, and suggest changes to achieve minimum performance targets by submitting a report to the Department Chair, the Program Director, and the College's Associate Dean for Administration, copying each affected instructor. The Program Director will coordinate with instructors to ensure that deficient areas are corrected and suggested changes are implemented. The Program Director will be responsible for generating the Final Assessment Report and gaining approval for the Report from the Department Chair and the College's Associate Dean for Administration.

Performance Outcome: Identify the percentage of students assessed that should be able to demonstrate proficiency in this student learning outcome <u>and</u> the level of proficiency expected. *Example: 80% of the students assessed will achieve a score of "acceptable" or higher on the Oral Presentation Scoring Rubric. (*Note: a copy of the scoring rubric, complete with cell descriptors for each level of performance, is to be submitted electronically to the designated folder on the designated shared drive.
At least 80% of students will score 2 or better (on a 3 point scale) on performance in applying health informatics knowledge and techniques to solve an information technology development problem and system design in the health domain.

2009-10 Assessment Data (Results can be shown by year or by semester)	**2010-11 Assessment Data (Results can be shown by year or by semester)**	**2011-12 Assessment Data (Results can be shown by year or by semester)**	**2012-13 Assessment Data (Results can be shown by year or by semester)**
Because of the complete redesign of the assessment protocol, assessment data collected prior to 2010-2011 is not accurately comparable for the updated learning goals.	2010-11: 100% of students received a score of 2 or better.	2011-12: 100% of students received a score of 2 or better.	2012-13: N/A – Data not collected for HI PSM students. The course was not offered in Fall or Spring term.

Plans for 2012-13: Based upon the assessment data included in this annual report, what changes/improvements will the program implement during the next academic year to improve performance on this student learning outcome?
None.

HCIP 6198 & HCIP 6400 Capstone/Internship Rubric

	Did Not Meet Expected Performance Level	Met Expected Performance Level	Exceeded Expected Performance Level
	1	2	3
Identify sources of data / information	Little to no progress in identifying sources.	Acceptable progress in identifying sources.	Good progress in identifying sources.
Analysis / Synthesis of data / information to make useful recommendations	Little to no analysis.	Acceptable analysis.	Good analysis.
Obtain and complete background research	Little to no background research.	Acceptable background research.	Good background research.
Use (design, implement, apply) information to meet project goals	Little to no progress in technology development.	Acceptable progress in technology development.	Good progress in technology development.

2013-14 Student Learning Outcomes Assessment Plan and Report
HI Graduate Certificate

Student Learning Outcomes – Graduates of the Graduate Certificate in Health Informatics (HI Cert.) will be prepared to meet the urgent need for professionals capable of creating, implementing, evaluating, and modifying the next generation of medical information systems. Evaluation of graduates' characteristics (ability to create, implement, evaluate, and modify medical information systems) will be conducted in the Introduction to Health Informatics (HCIP 6380) course The following section includes the SLOs for the above-mentioned course.

College: Inter-College Program – Computing and Informatics (CCI), Health and Human Services (CHHS), The Graduate School

Department: Inter-College Program – The Graduate School, Computing and Informatics, Health and Human Services

Name of Degree or Certificate Program/Stand Alone Minor/Online Distance Education Program: Graduate Certificate in Health Informatics (HI Cert.)

Course: HCIP 6380 Introduction to Health Informatics

Reflection on the Continuous Improvement of Student Learning **1. List the changes and improvements your program planned to implement as a result of last year's student learning outcomes assessment data.** **2. Were all of the changes implemented? If not, please explain.** **3. What impact did the changes have on student learning?**
As a result of input from students, faculty, and our advisory board the HI program has restructured the curriculum for the Professional Science Master's degree. Starting in the 2013 the SLO's were eliminated from HCIP 6201 and HCIP 6100. As part of the new curriculum and core requirements students will be assessed first in HCIP 6380-Introduction to Health Informatics. The existing Student Learning Outcomes for HCIP 6198 or HCIP 6400 will remain. The new assessment model will allow the program early in the program in a common core requirement and provide continuity between the HI Certificate and HI PSM.

Student Learning Outcome 1 **(knowledge, skill or ability to be assessed)**
Read, interpret, and extract information from medical documents, applying knowledge of medical terminology, billing, and diagnostic codes. Collect and interpret health information data for a variety of purposes (e.g., determining community health information needs). Apply professional healthcare standards. Use presentation software to prepare communications. Apply leadership and work effectively in a team environment to improve the quality of work and the work environment.

Changes to the Student Learning Outcomes Assessment Plan: If any changes were made to the assessment plan (which includes the Student Learning Outcome, Effectiveness Measure, Methodology and Performance Outcome) for this student learning outcome since your last report was submitted, briefly summarize the changes made and the rationale for the changes.
NA

Effectiveness Measure: Identify the data collection instrument, e.g., exam, project, paper, etc. that will be used to gauge acquisition of this student learning outcome and explain how it assesses the desired knowledge, skill or ability. A copy of the data collection instrument and any scoring rubrics associated with this student learning outcome are to be submitted electronically to the designated folder on the designated shared drive.
Students are required to apply healthcare knowledge of medical terminology, billing, and diagnostic codes to develop an electronic health record example. This is done as a team project. Application of healthcare and medical data knowledge to solve a problem will be judged in the areas of data source identification, data analysis / synthesis, background research, and EHR development outcomes. Project guidelines are given to the students, and then student project proposals are reviewed and approved by the instructor before the students begin work.

Methodology: Describe when, where and how the assessment of this student learning outcome will be administered and evaluated. Describe the process the department will use to collect, analyze and disseminate the assessment data to program faculty and to decide the changes/improvements to make on the basis of the assessment data.
Student's healthcare knowledge to solve a problem will be evaluated by the course instructor. The project will be scoped to address the skill areas described above in the Effectiveness Measure. The instructor will evaluate project conduct and outcomes according to a rubric that scores student performance on a scale of 1 to 5 across the multiple skill areas described above in the Effectiveness Measure.

Performance Outcome: Identify the percentage of students assessed that should be able to demonstrate proficiency in this student learning outcome and the level of proficiency expected. *Example: 80% of the students assessed will achieve a score of "acceptable" or higher on the Oral Presentation Scoring Rubric. (*Note: a copy of the scoring rubric, complete with cell descriptors for each level of performance, is to be submitted electronically to the designated folder on the designated shared drive.)
At least 80% of students will score 3 or better (on a 5 point scale) on performance in applying healthcare knowledge and techniques to solve an EHR development problem in the health domain.

Fall 2011-Spring 2012 Assessment Data	Fall 2012 Assessment Data
NA	**NA**

Plans for 2013-14: Based upon the 2012 assessment data included in this annual report, what changes/improvements will the program implement during the next academic year to improve performance on this student learning outcome?

Assessment Lead's Comments on Student Learning Outcome 1:

Student Learning Outcome 2 **(knowledge, skill or ability to be assessed)**
Identify and interpret medical/ healthcare terminology. Apply appropriate laws, regulations, and industry standards to health care situations. Interpret and use tables, charts, and figures to support written communication

Changes to the Student Learning Outcomes Assessment Plan: If any changes were made to the assessment plan (which includes the Student Learning Outcome, Effectiveness Measure, Methodology and Performance Outcome) for this student learning outcome since your last report was submitted, briefly summarize the changes made and the rationale for the changes.
NA

Effectiveness Measure: Identify the data collection instrument, e.g., exam, project, paper, etc. that will be used to gauge acquisition of this student learning outcome <u>and</u> explain how it assesses the desired knowledge, skill or ability. <u>A copy of the data collection instrument and any scoring rubrics associated with this student learning outcome are to be submitted electronically to the designated folder on the designated shared drive.</u>
The students skills on their ability to Identify and interpret medical/ healthcare terminology, appropriate laws, regulations, and industry standards, Interpret and use tables, charts, and figures to support written communication will be evaluated using multiple choice questions in the final exam.

Methodology: Describe when, where and how the assessment of this student learning outcome will be administered and evaluated. Describe the process the department will use to collect, analyze and disseminate the assessment data to program faculty and to decide the changes/improvements to make on the basis of the assessment data.
In the final exam there will be 5 multiple choice questions (each weighing 10 points) to evaluate the students learning on their ability to Identify and interpret medical/ healthcare terminology. Apply appropriate laws, regulations, and industry standards to health care situations. Interpret and use tables, charts, and figures to support written communication

Performance Outcome: Identify the percentage of students assessed that should be able to demonstrate proficiency in this student learning outcome <u>and</u> the level of proficiency expected. *Example: 80% of the students assessed will achieve a score of "acceptable" or higher on the Oral Presentation Scoring Rubric. (*Note: a copy of the scoring rubric, complete with cell descriptors for each level of performance, is to be submitted electronically to the designated folder on the designated shared drive.)
80 percent of the students will score 7 or higher (out of 10) on these questions

Fall 2011-Spring 2012 Assessment Data	**Fall 2012 Assessment Data**
NA	**NA**

Plans for 2013-14: Based upon the 2012 assessment data included in this annual report, what changes/improvements will the program implement during the next academic year to improve performance on this student learning outcome?

Assessment Lead's Comments on Student Learning Outcome 2:

Description of Introduction to Health Informatics
Assessment Instrument for HCIP 6380

This course has been designed to explore the use and management of health care analytics in healthcare organizations. Informatics provides a framework to understand the use of information in healthcare organizations, impact internal and external decisions, evaluate specific strategies, understand industry changes, and understand the ramifications of health data standards and privacy concerns. In this course, students will learn how the core competencies of healthcare informatics can be developed and applied using real-world case studies. Students will be exposed to specific concepts related to electronic medical records (EMR), Electronic Health Records (EHR), health data and standards, sourcing, and analytics investments in healthcare.

Student Learning Objectives/Outcomes:

- Read, interpret, and extract information from medical documents, applying knowledge of medical terminology, billing, and diagnostic codes
- Establish and maintain record storage systems within legal guidelines and protocols
- Collect and interpret health information data for a variety of purposes (e.g., determining community health information needs)
- Identify and interpret medical/ healthcare terminology
- Describe the relationship, roles, and responsibilities among health care professionals
- Analyze the impact on health care systems based on changes in technology, epidemiology, managed care, etc.
- Apply appropriate laws, regulations, and industry standards to health care situations
- Identify ethical issues and demonstrate ethical behavior in health care situations
- Interpret and use tables, charts, and figures to support written and oral communication
- Work effectively in a team environment to improve the quality of work and the work environment

HADM 6100 Exam Example Questions

21. Which one of the following is NOT a driving force for the adoption of health informatics?
    e. Natural diffusion of technology into the medical field
    f. Lower healthcare costs
    g. Improved medical quality
    h. Improved Joint Commission scores

22. Which one of the following is NOT a barrier to the adoption of health information technology?
    e. Governmental support
    f. Cost of technology
    g. Interoperability
    h. Physician resistance

23. Medical studies suggest that paper charts, on average, are missing what percent of the time?
    e. 5%
    f. 20%
    g. 50%
    h. 75%

24. Medical studies suggest that laboratory results are missing in paper charts approximately what percent of the time?
    e. 5%
    f. 20%
    g. 50%
    h. 70%

25. Which one of the following is NOT part of EHR "Meaningful Use", stage 1?
    e. Computerized physician order entry
    f. Quality reports
    g. Secure messaging

h. Interoperability

26. EHRs have the potential to save money through which of the following mechanisms? (select all that apply)

e. Improved patient satisfaction

f. Decreased cost related to record storage

g. Improved coding

h. Reduced transcription costs

27. Select known EHR obstacles

e. Little governmental interest

f. Slow computer speed

g. Cost

h. Altered workflow

28. Which of the following represents a datum?

e. ICD-9

f. 14

g. HL7

h. Chest x-ray

29. Which of the following represents healthcare information?

e. Elevated fasting blood sugar and HbA1c proving diabetes

f. 26

g. Jpg

h. MP3

30. Which of the following represents healthcare knowledge?

d. 14

e. ICD-9 code of 250.0

f. HIV infection leads to opportunistic infections

31. Which of the following statements is true?

e. Computer science tends to deal with data

f. Informaticians deal primarily with data

g. Information technology professionals deal mainly with information

h. Computer science tends to deal with knowledge

32. Which of the following statements is true?

e. Information is derived from knowledge

f. Vocabularies help convert data to information

g. Computers convert data to information

h. Computers convert information to data

33. Which of the following can help convert information into knowledge?

e. Unstructured data

f. Voice recognition

g. Electronic health records

h. Central data warehouses

34. Select one the main reasons health informatics is difficult

e. Data are scarce

f. Data are structured

g. Data are vague, imprecise and inconsistent

h. Lack of adequate data warehouses

35. Select one of the main reasons health informatics fails

e. Inadequate marketing by vendors

f. We are data rich but information poor

g. HIT is too new

h. The US is the only county to use HIT

36. Not all medical errors result in an adverse event.

c. True

d. False

37. An *adverse event* means that a patient injury occurred.
    c. True
    d. False

38. Ordering a CAT scan for routine acute sinusitis is an example of which of the following? (select all that apply)
    e. Misuse
    f. Overuse
    g. Underuse
    h. Nonuse

39. What is the most common category of patient safety studied?
    e. Diagnosis
    f. Preventative care
    g. Medication use
    h. Disease management

40. Which <u>one</u> of the following government agencies has a patient safety network?
    e. CDC
    f. CMS
    g. AHRQ
    h. FDA

HCIP 6380 Introduction to Health Informatics Rubric

	Poor	Needs Improvement	Acceptable	Good	Excellent
	1	2	3	4	5
Understanding of Electronic Medical Records (EMR)	Does not understand EMR	Shows limited understanding of EMR	Demonstrates understanding of most aspects of EMR	Exhibits thorough understanding of EMR with only limited gaps	Presents exemplary and complete understanding of EMR
Understanding of Medical Claims Trend	Does not understand Medical Claims Trend	Shows limited understanding of Medical Claims Trend	Demonstrates understanding of most aspects of Medical Claims Trend	Exhibits thorough understanding of Medical Claims Trend with only limited gaps	Presents exemplary and complete understanding of Medical Claims Trend
Understanding of Healthcare Terminology	Does not understand Medical Claims Trend	Shows limited understanding of Medical Claims Trend	Demonstrates understanding of most aspects of Medical Claims Trend	Exhibits thorough understanding of Medical Claims Trend with only limited gaps	Presents exemplary and complete understanding of Medical Claims Trend
Understanding of Healthcare Regulations	Does not understand Healthcare Regulations	Shows limited understanding of Healthcare Regulations	Demonstrates understanding of most aspects of Healthcare Regulations	Exhibits thorough understanding of Healthcare Regulations with only limited gaps	Presents exemplary and complete understanding of Healthcare Regulations
Understanding Use of Healthcare Data	Does not understand Use of Healthcare Data	Shows limited understanding of Use of Healthcare Data	Demonstrates understanding of most aspects of Use of Healthcare Data	Exhibits thorough understanding of Use of Healthcare Data with only limited gaps	Presents exemplary and complete understanding of Use of Healthcare Data

Revised 12/18/12
OAA/mjw

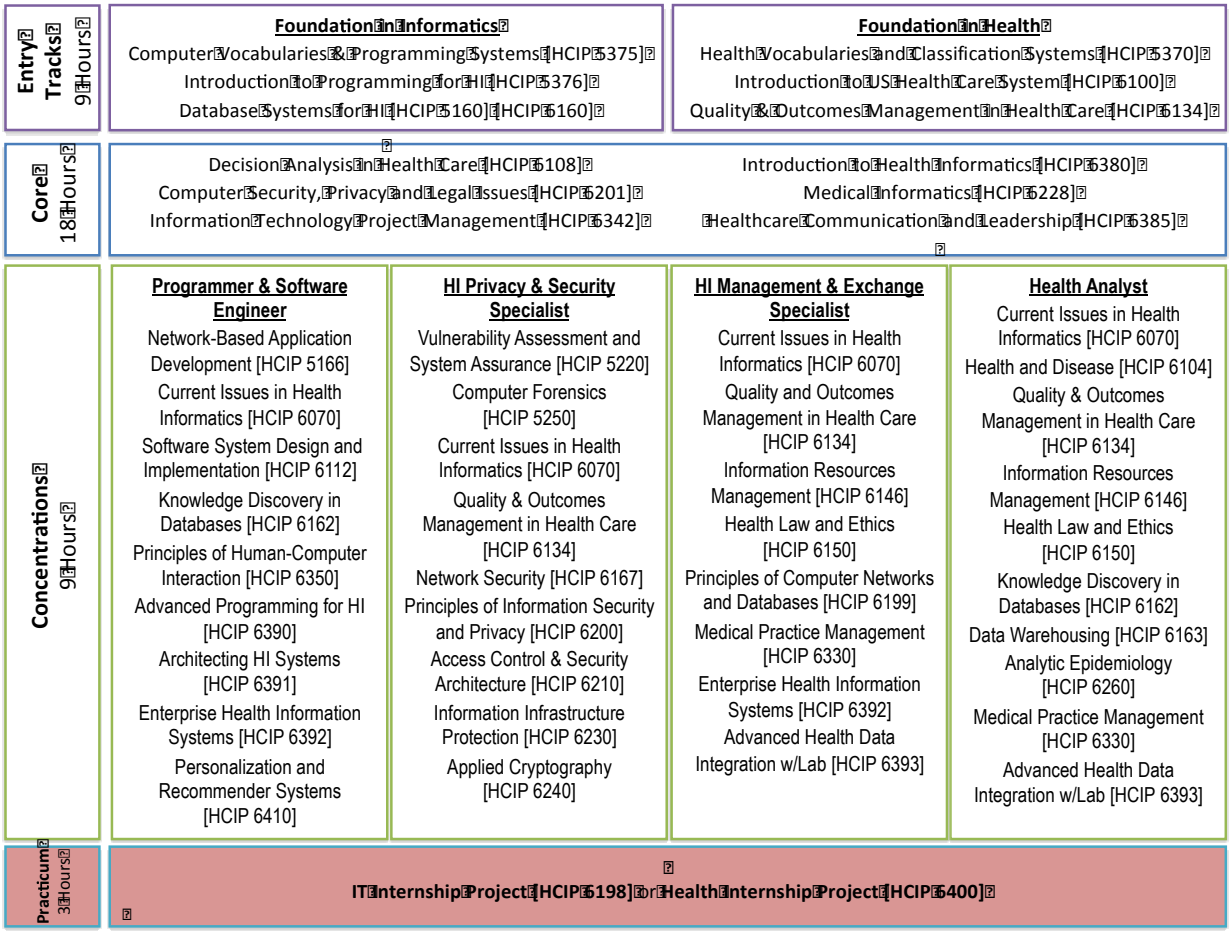
APPENDIX 6

Textbook Costs – Electronic textbooks, textbook rentals, and the buyback program have been considered and recommended as part of the program, but remain the purview of the faculty member offering the course.

APPENDIX 7

Overview of program requirement changes

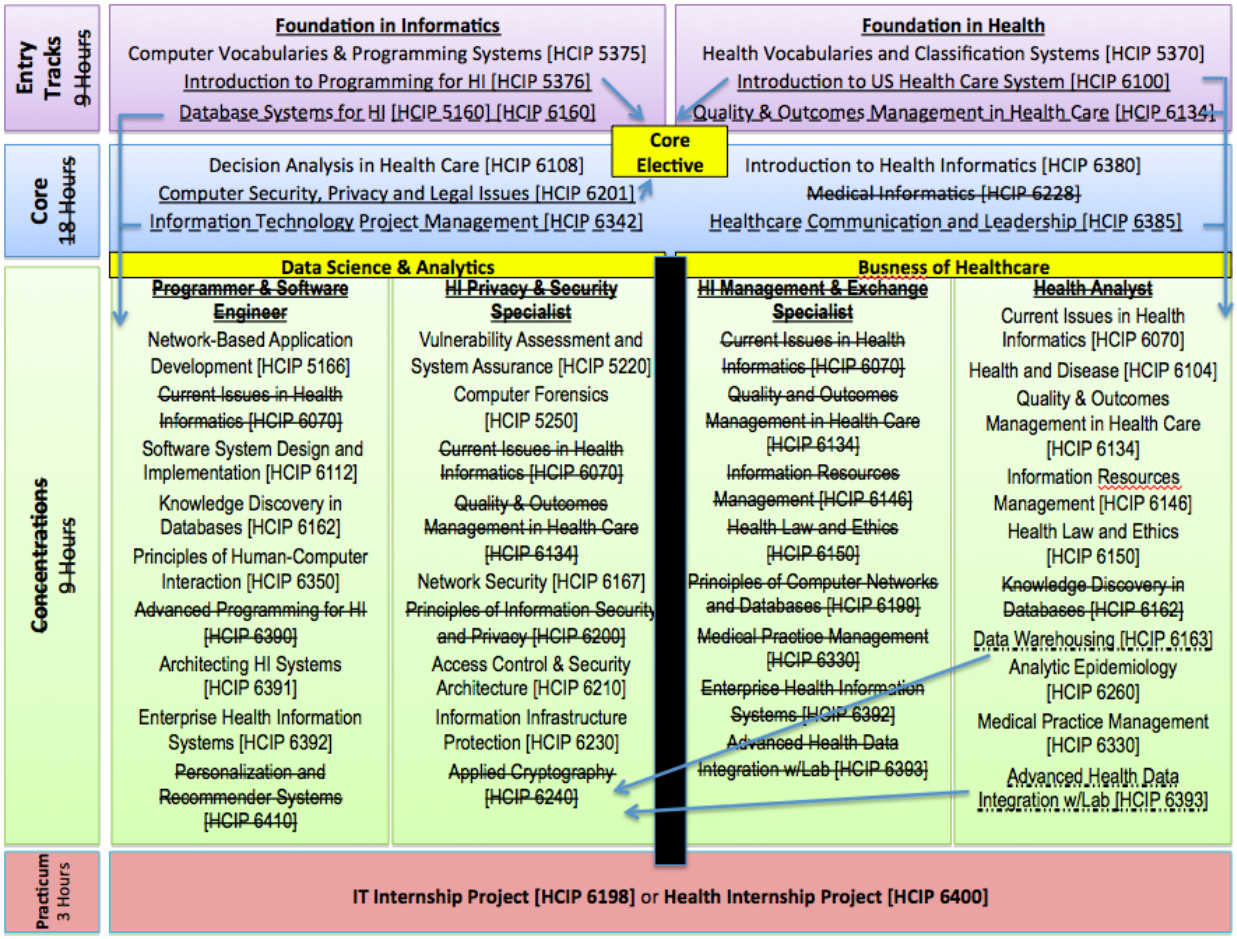
Existing Program Overview



Program Changes

Changes to streamline the program essentially (1) reduce the overall number of credit hours; (2) while preserving competency pathways through the program with additional foundation and concentration elective flexibility; and (3) creating a better fit of concentration identity to health informatics needs in practice. Practically, these changes include:

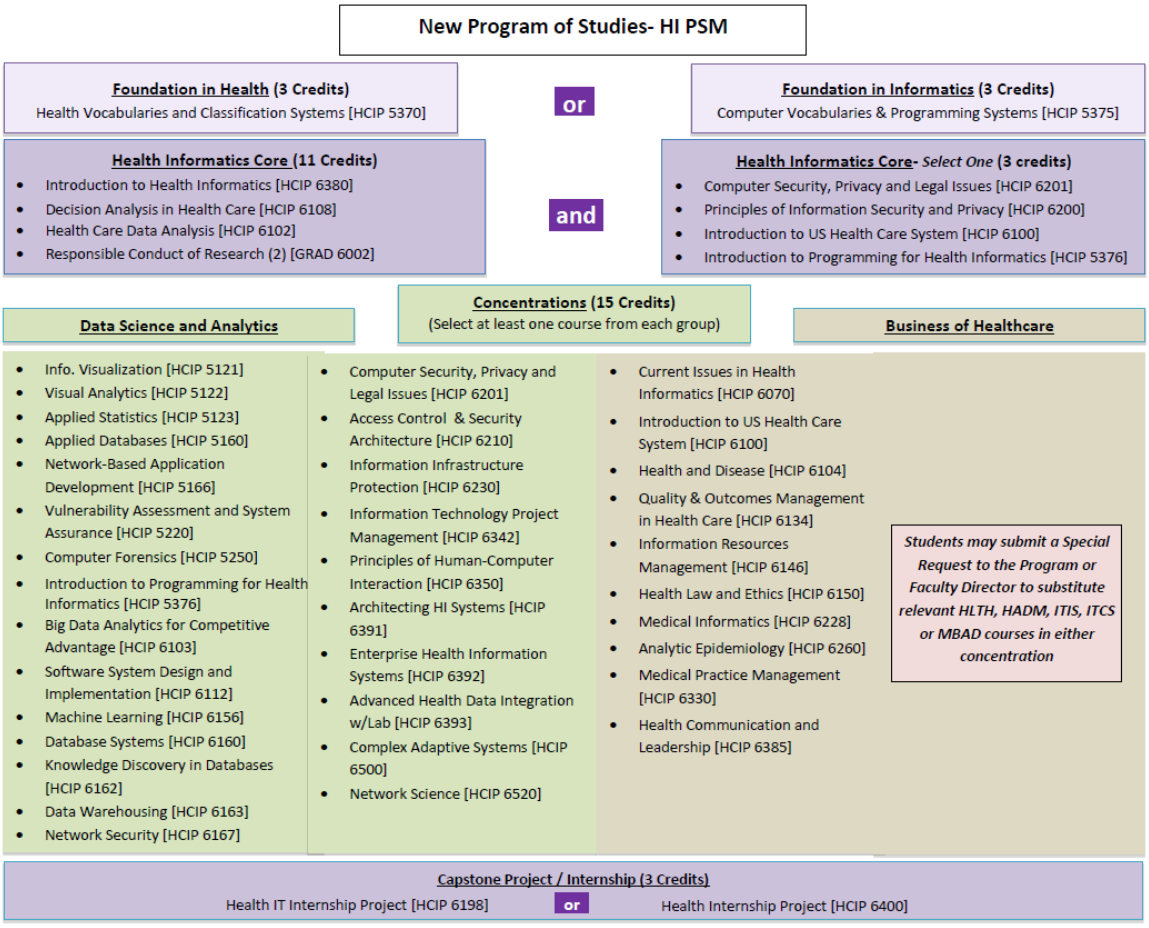
- Consolidating four former concentrations into two concentration areas: Data Science & Analytics and the Business of Healthcare
- Moving some Foundation/Entry and Core courses to an Entry Elective and/or concentration areas (solid underline)
- Moving some Foundation/Entry and Core courses to the concentration areas (dashed underline)
- Removing elective duplicates in consolidating concentrations into two concentrations, and removing some course electives (strikethrough)



Revised 12/18/12
OAA/mjw

New Program Requirements Overview- HI PSM

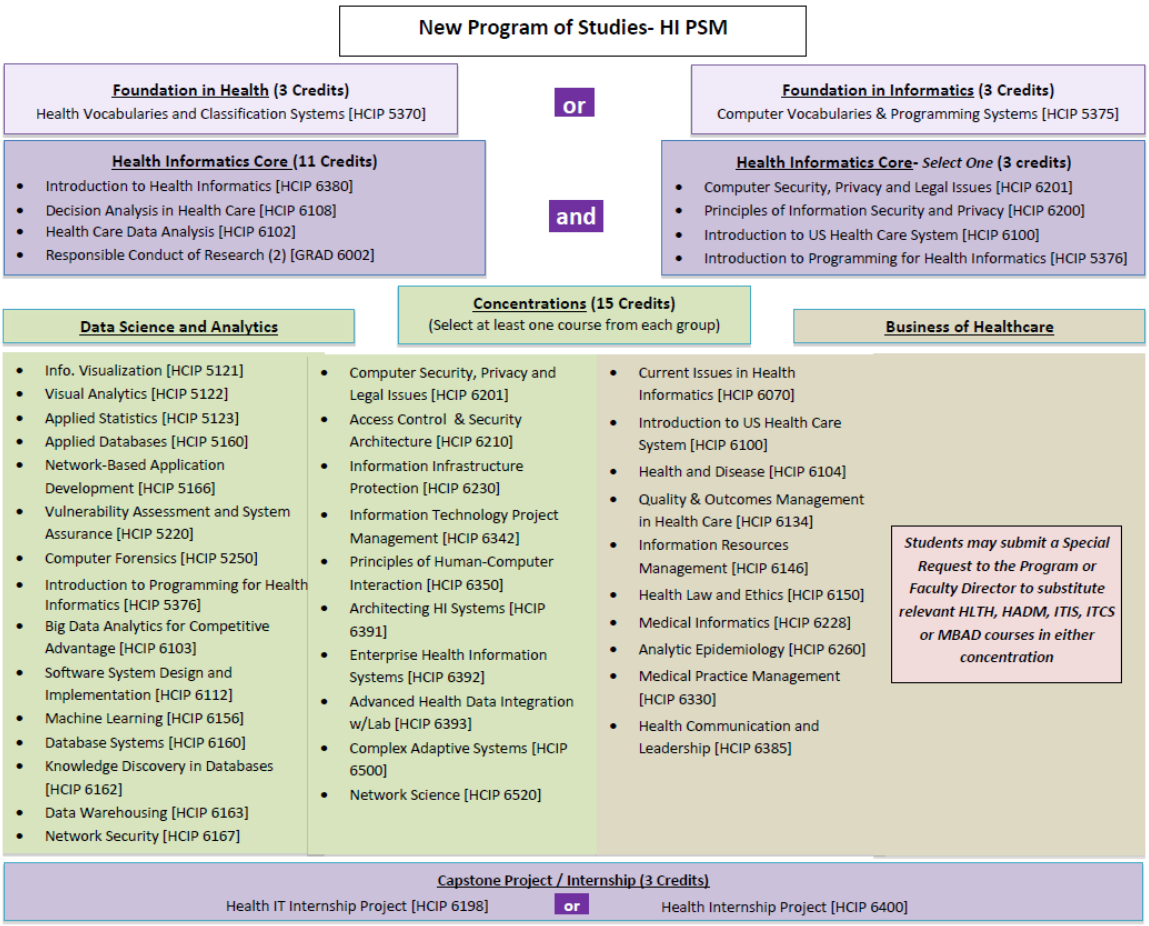
In the final new program requirements, a limited number of courses have been added: one core course, and several appropriate concentration elective options (underlined). Red font indicates courses being newly developed.



Revised 12/18/12
OAA/mjw

New Program Requirements Overview- HI PSM

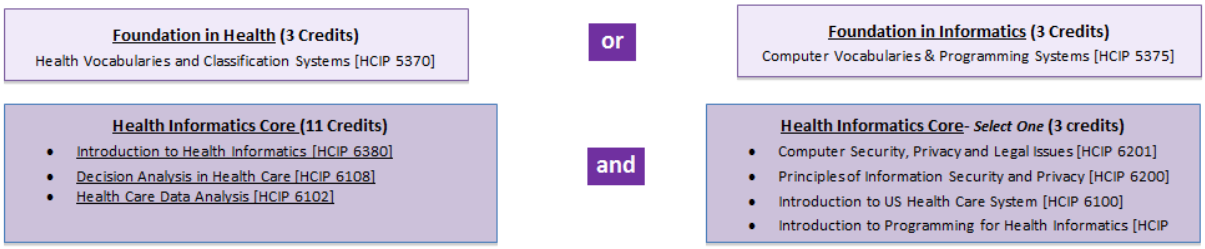
Final new program requirements, with courses ordered by course number.



Revised 12/18/12
OAA/mjw

New Program Requirements Overview- Graduate Certificate in HI

Final new program requirements, with courses ordered by course number.



Revised 12/18/12
OAA/mjw

APPENDIX 8

Students in the dual MHA/Health Informatics (HI) PSM programs develop a program of study, working with the MHA program coordinator and the HI PSM program director. The minimum number of credit hours for the dual MHA/HI PSM is 65. The required program of study appears below.

MHA- HI PSM Degree Program

HADM 6100	Intro to U.S. Healthcare System	3 hours
HADM 6104	Health and Disease	3 hours
HADM 6116	Accounting for Healthcare Management	3 hours
HADM 6120	Health Economics	3 hours
HADM 6124	Marketing in Healthcare	3 hours
HADM 6128	Human Resource Management	3 hours
HADM 6138	Health Care Finance	3 hours
HADM 6142	Health Policy Development	3 hours
HADM 6145	Organizational Behavior in Health Care	3 hours
HADM 6146	Information Resources	3 hours
HADM 6150	Health Law and Ethics	3 hours
HADM 6154	Strategic Management of Health Services	3 hours
HCIP 5375	Computer Vocabularies & Classification Sys	3 hours
HCIP 6108	Decision Analysis in HealthCare	3 hours
HCIP 6134	Quality and Outcomes in Healthcare	3 hours
HCIP 6201	Computer Security, Privacy and Legal Issues	3 hours
or HCIP 6200	Principles of Information Security and Privacy	3 hours
GRAD 6240*	Responsible Conduct of Research	2 hours
HCIP 6102	Healthcare Data Analysis	3 hours
HCIP 6380	Introduction to Health Informatics	3 hours
HCIP 3 hours	Restricted Elective- Data Science Concentration	
HCIP 3 hours	Restricted Elective- Data Science Concentration	
HCIP 6400	Health Internship Project	3 hours

MHA-HI PSM Dual Degree program Total **65 hours**

* *Required course for all students enrolled in a PSM per the Graduate School.*

Note: *Under the MHA/HI PSM dual degree option, students must take a minimum of 10 HCIP courses (29 hours) and 12 HADM courses (36 hours). Additionally, the Graduate School considers any deviation from the approved plan of study as requiring a Special Request approval*.

Students in the dual MSPH/Health Informatics (HI) PSM programs develop a program of study, working with the MSPH program coordinator and the HI PSM program director. The minimum number of credit hours for the dual MSPH/HI PSM is **60.** The required program of study appears below.

MSPH-HI PSM Degree Program

HLTH 6201	Social and Behavioral Foundations of PH	3 hours
HLTH 6202	Community Epidemiology	3 hours
HLTH 6203	Public Health Data Analysis	3 hours
HLTH 6204	Public Health Research Methods	3 hours
HLTH 6205	Environmental Health	3 hours
HLTH 6207	Program Planning and Evaluation	3 hours
HLTH 6220	Health Behavior Change	3 hours
HLTH 6221	Community Health	3 hours
HLTH 6222	Methods in Community Health	3 hours
HCIP 5375	Computer Vocabularies & Classification Systems	3 hours
HCIP 6102	Healthcare Data Analysis	3 hours
HCIP 6380	Introduction to Health Informatics	3 hours
HCIP 6385	Health Services Administration	3 hours
HCIP 6400	Health Internship Project	3 hours

One of the following:

HCIP 5376	Introduction to Programming -Health Informatics	3 hours
HCIP 6201	Computer Security, Privacy and Legal Issues	3 hours
or HCIP 6200	Principles of Information Security and Privacy	3 hours

Thesis Option

HLTH 6900(2)	Research and thesis in Public Health	6 hours
HCIP	Restricted Elective- Data Science Concentration	
3 hours		
HCIP	Restricted Elective- Data Science Concentration	
3 hours		
HCIP	Restricted Elective- Data Science Concentration	
3 hours		

Project Option

HLTH 6901	Public Health Capstone Project	3 hours
HLTH	Elective	3 hours
HCIP	Restricted Elective- Data Science Concentration	
3 hours		
HCIP	Restricted Elective- Data Science Concentration	
3 hours		
HCIP	Restricted Elective- Data Science Concentration	
3 hours		

MSPH-HI PSM Dual Degree Program Total **60 hours**

Note: *Under the MSPH/HI PSM dual degree option, students must take a minimum of 9 HCIP courses (27 hours) and 11 HLTH courses (33 hours). Additionally, the Graduate School considers any deviation from the approved plan of study as requiring a Special Request approval.*

College of Health and Human Services
Department of Public Health Sciences

9201 University City Boulevard, Charlotte, NC 28223-0001
t/704.687.8742 f/704.687.1644 http://publichealth.uncc.edu/

To: Graduate Council Chair

Fm: Gary Silverman, Chair, Department of Public Health Sciences

Re: Revision of the Professional Science Master's in Health Informatics

Dt: October 14, 2013

This memo documents our support of the proposed changes to the Professional Science Master's in Health Informatics. The Department of Public Health Sciences is one of the two major academic areas (the other being from the College of Computing and Informatics) providing support for this professional science masters. We offer complementary degree programs at the master's level in Health Administration and in Public Health, and a variety of our courses are used to meet requirements in the Health Informatics program.

In conversation with Josh Hertel, we have agreed on two very minor editorial corrections to the existing long form. One is simply to include this letter of support – such inclusion is currently indicated in the proposal to be appendix 8. The other change is in the existing appendix 8, which does not make clear that the course sequences shown provide a listing of the requirements needing to be met for degree completion, rather than simply one way of meeting those requirements. After our discussion, I now understand that these sequences outline total requirements, and are not simply one example among others. The language needs to be changed just a bit to provide more clarity.

The proposed changes were developed in consultation with our department faculty, and represent our best judgment in creating curricula and requirements that support all three of these master's programs to best serve a variety of student needs.

Catalog Copy: Dual MHA and HI PSM; Dual MSPH and HI PSM

Text Positioning
In MHA catalog text section: To be positioned immediately after the other dual MHA degrees (after the dual MBA, JD)

DUAL MHA AND HEALTH INFORMATICS

The Dual MHA and HI PSM Degree Program allows students to earn a Professional Science Masters' in Health Informatics (HI PSM) and a Master of Health Administration (MHA) degree. The dual MHA and HI PSM program (outlined below) consists of 65 credit hours of course work, as opposed to the 86 required if pursuing these degrees separately.

Both programs' admissions committees will review applicants to the dual program. Applicants might be offered admission into only the MHA or HI PSM instead of the dual program. Similarly, students admitted into the dual program may opt to matriculate into only the MHA or HI PSM program. Students having matriculated into either the MHA or HI PSM program desiring to add the dual degree must apply and gain admission to the dual degree no later than the end of their first semester of matriculation into either program.

MHA and HI PSM Dual Degree Program

HADM 6100	Intro to U.S. Healthcare System	3 hours
HADM 6104	Health and Disease	3 hours
HADM 6116	Accounting for Healthcare Management	3 hours
HADM 6120	Health Economics	3 hours
HADM 6124	Marketing in Healthcare	3 hours
HADM 6128	Human Resource Management	3 hours
HADM 6138	Health Care Finance	3 hours
HADM 6142	Health Policy Development	3 hours
HADM 6145	Organizational Behavior in Health Care	3 hours
HADM 6146	Information Resources	3 hours
HADM 6150	Health Law and Ethics	3 hours
HADM 6154	Strategic Management of Health Services	3 hours
HCIP 5375	Computer Vocabularies & Classification Sys	3 hours
HCIP 6108	Decision Analysis in HealthCare	3 hours
HCIP 6134	Quality and Outcomes in Healthcare	3 hours
GRAD 6240	Responsible Conduct of Research	2 hours
HCIP 6102	Healthcare Data Analysis	3 hours
HCIP 6380	Introduction to Health Informatics	3 hours
HCIP	Restricted Elective- Data Science Concentration	3 hours

HCIP 3 hours	Restricted Elective- Data Science Concentration	
HCIP 6400	Health Internship Project	3 hours

One of the following two courses:

HCIP 6201	Computer Security, Privacy and Legal Issues	3 hours
HCIP 6200	Principles of Information Security and Privacy	3 hours

MHA-HI PSM Dual Degree program Total **65 hours**

Note: *Under the MHA and HI PSM dual degree option, students must take a minimum of 10 HCIP courses (29 hours) and 12 HADM courses (36 hours). Additionally, the Graduate School considers any deviation from the approved plan of study as requiring a Special Request approval*.

Text Positioning
In MSPH catalog text section: To be positioned immediately after the dual MSPH JD degree

DUAL MSPH AND HEALTH INFORMATICS

The Dual MSPH and HI PSM Degree Program allows students to earn a Professional Science Masters' in Health Informatics (HI PSM) and a Master of Science in Public Health (MSPH) degree. The dual MSPH and HI PSM program (outlined below) consists of 60 credit hours of course work, as opposed to the 80 required if pursuing these degrees separately.

Both programs' admissions committees will review applicants to the dual program. Applicants might be offered admission into only the MSPH or HI PSM instead of the dual program. Similarly, students admitted into the dual program may opt to matriculate into only the MSPH or HI PSM program. Students having matriculated into either the MSPH or HI PSM program desiring to add the dual degree must apply and gain admission to the dual degree no later than the end of their first semester of matriculation into either program.

MSPH and HI PSM Dual Degree Program

HLTH 6201	Social and Behavioral Foundations of PH	3 hours
HLTH 6202	Community Epidemiology	3 hours
HLTH 6203	Public Health Data Analysis	3 hours
HLTH 6204	Public Health Research Methods	3 hours
HLTH 6205	Environmental Health	3 hours
HLTH 6207	Program Planning and Evaluation	3 hours
HLTH 6220	Health Behavior Change	3 hours
HLTH 6221	Community Health	3 hours
HLTH 6222	Methods in Community Health	3 hours

HCIP 5375	Computer Vocabularies & Classification Systems	3 hours
HCIP 6102	Healthcare Data Analysis	3 hours
HCIP 6380	Introduction to Health Informatics	3 hours
HCIP 6385	Health Services Administration	3 hours
HCIP 6400	Health Internship Project	3 hours

One of the following three courses:

HCIP 5376	Introduction to Programming -Health Informatics	3 hours
HCIP 6201	Computer Security, Privacy and Legal Issues	3 hours
HCIP 6200	Principles of Information Security and Privacy	3 hours

And complete either the thesis or project option

Thesis Option

HLTH 6900	Research and Thesis in Public Health	6 hours
HCIP 3 hours	Restricted Elective- Data Science Concentration	
HCIP 3 hours	Restricted Elective- Data Science Concentration	
HCIP 3 hours	Restricted Elective- Data Science Concentration	

Project Option

HLTH 6901	Public Health Capstone Project	3 hours
HLTH	Elective	3 hours
HCIP 3 hours	Restricted Elective- Data Science Concentration	
HCIP 3 hours	Restricted Elective- Data Science Concentration	
HCIP 3 hours	Restricted Elective- Data Science Concentration	

MSPH-HI PSM Dual Degree Program Total **60 hours**

Note: *Under the MSPH and HI PSM dual degree option, students must take a minimum of 9 HCIP courses (27 hours) and 11 HLTH courses (33 hours). Additionally, the Graduate School considers any deviation from the approved plan of study as requiring a Special Request approval.*