

Academic Senate – August 31, 2009
Executive Committee – June 1, 2009



30 April 2009

A. Lorris Betz
Senior Vice President for Health Sciences
Bldg 550, 5th Floor
Campus

Dear Vice President Betz,

Enclosed is the proposal for the Informatics Graduate Certificate which was approved by the Graduate Council on April 27, 2009. Included in this packet are the proposal and signature page.

Please forward this packet to the President's Office for his signature before being forwarded to the Academic Senate to be placed on the information calendar for the next meeting of the Senate.

Sincerely,

A handwritten signature in black ink that reads "David S. Chapman".

David S. Chapman
Associate Vice President for Graduate Studies
Dean, The Graduate School

The Graduate School
302 Park Building
201 South Presidents Circle Room 302
Salt Lake City, Utah 84112-9016
(801) 581-7642 • FAX (801) 585-6749
www.gradschool.utah.edu

I. Proposal To Expand the Current Biomedical Informatics Graduate Certificate and Rename It as “Informatics Graduate Certificate”

1. Introduction

This is a proposal to: a) expand the existing Biomedical Informatics Graduate Certificate to include Nursing Informatics students, faculty and courses, and b) change the name of the certificate to “Informatics Graduate Certificate” to allow interdisciplinary growth into the future. We propose not limiting this new name to the health sciences because informatics can include a broad range of disciplines beyond health sciences. We chose a broad name to be more inclusive.

2. Need for an Informatics Certificate

Biomedical Informatics (BMI) has an approved BMI certificate listed with the Graduate School. Nursing Informatics (NI) has a “post-master’s” certificate program internal to the College of Nursing. The NI program would like to have a certificate program through the Graduate School and have the certificate available to any post-baccalaureate student. Moreover, the current BMI certificate is listed as interdisciplinary; however, the program description explicitly states that BMI courses must make up 12 of the 15 required hours, which would exclude students from taking NI courses, and that students must be admitted to the BMI program in the School of Medicine rather than coming through other departments or colleges. Other programs such as the College of Nursing would possibly lose tuition reimbursement revenues and student credits if nursing students enrolled in the BMI Certificate Program versus an NI program. Rather than create a separate certificate for NI, we propose expanding the existing BMI certificate from Biomedical to an interdisciplinary Informatics certificate to incorporate nursing and other informatics students. We propose renaming the program as “Informatics Graduate Certificate.”

Having an interdisciplinary informatics certificate is both efficient and effective. The Biomedical Informatics (BMI) Department in the School of Medicine and the Nursing Informatics (NI) program in the College of Nursing collaborate in several areas now. Currently, four Nursing and Biomedical Informatics courses are co-taught by instructors in the two programs and cross-listed in the separate schools. The BMI and NI faculty share geographical space and participate on joint research grants. The core competencies of informatics are essentially the same between the specialties, who have more in common than they do differences. Having separate certificate programs, as is now the case, makes little sense organizationally. Last, an interdisciplinary certificate would allow students to have interdisciplinary experiences during classes and it would be consistent with the way informatics is practiced in health settings.

The following justification was originally written for the BMI certificate. The rationale is appropriate for interdisciplinary Informatics. Thus, the original text remains with few edits. The content edits are annotated in yellow, except for the word change to interdisciplinary.

National initiatives such as the National Health Information Infrastructure and President Bush's 2004 mandate for every American to have an electronic medical record within the next 10 years have dramatically increased awareness of the need for informatics practitioners. There is an urgent need for professionals trained in informatics. The American Medical Informatics Association (AMIA) launched a "10 x 10 program" that is intended to train 10,000 new professionals by the year 2010. The increasing demand for informatics practitioners on the national level is echoed by local employers including Intermountain Health Care (IHC), the University of Utah Health Sciences Center, the Veterans Administration, and vendors such as TheraDoc, 3M Health Information Systems, Associated Regional and University Pathologists (ARUP), General Electric Medical, and Myriad Genetics. These companies have expressed support of a graduate certificate in addition to the academic degrees currently offered. The new certificate program will be a key part of our plans toward implementing national initiatives for increasing the number of trained informatics professionals.

The need for a certificate program is also apparent from interactions with potential and existing students in both NI and BMI. The BMI department typically receives 3 to 4 times as many highly qualified applications for the masters and doctoral degree programs than can be accommodated in those programs. Many of the requests are from students who are looking for a career in applied informatics rather than a research career. These students already have a degree in a related field such as computer science, business, public health, or a clinical area (e.g., medicine, nursing, pharmacy) and desire formal training as a supplement to their primary degree to enhance their capabilities and productivity. Nursing Informatics has similar needs. A market exists for BS-prepared workers who would like formal preparation in the field but they typically work full-time and do not wish to complete a complete graduate degree.

The Graduate Certificate in Informatics is designed to provide students with a set of competencies in the aspects of informatics that will enable them to be successful in their careers. The program is flexible so that students can participate in the courses that would be most valuable for their career paths. The design enables students to take advantage of their existing academic background and to fill gaps in areas where they have less experience. The certificate program would allow the two programs to increase the number of students who are trained generally in Informatics.

The need for a certificate program is also illustrated by the number of previous students who have completed their course work and then received job offers before finishing their research dissertation or thesis. Many of these individuals are now employed and productive in the field, indicating that a graduate certificate could lead to a cadre of skilled and productive professionals who have the necessary competencies for meeting the interdisciplinary challenges of Biomedical Informatics.

Multiple requests are received each week for distance education in informatics. The Graduate Certificate in Informatics plans to offer coursework in a distance learning format, supplemented

with in-person sessions. This will open access to informatics coursework to people in rural areas and areas outside of Salt Lake City.

Similar programs at the University of Utah in disciplines such as Business and Public Administration have demonstrated that a graduate certificate in these high-demand areas is desired by working professionals. Similar programs in informatics at other universities include programs at Oregon Health and Science University, Ohio State University, Stanford, and Pittsburgh. The success of these programs indicates that a graduate certificate in Informatics at the University of Utah would be in demand.

Educational objectives

The graduate certificate program in Informatics is an opportunity for students (most of whom bring expertise from related disciplines) to develop a basic understanding of how health information systems are developed, implemented, studied and modified. The certificate program allows students to gain a broad background in the core issues, as well as more specialized knowledge in the sub-domains, such as bioinformatics, public Informatics, clinical information systems and medical imaging. Individual programs of study allow for further specialization and development of knowledge in related fields. The table below illustrates some possible courses of study for a range of students:

Informatics emphasis area	Major areas of concern	Student background	Additional areas of study for individual
Clinical information systems	Standards and terminologies; evidence-based medicine; patient data representation, storage and retrieval, decision support technologies; order entry systems; implementation, integration, testing and training.	Health care professional (MD, RN, PharmD, etc.)	Application design; databases; research methods
		Hospital administration	Research methods; operations and quality management
		Computer science	Human factors engineering; principles of health care including terminology and delivery; statistics
Public Informatics	Standards and terminologies; syndromic surveillance; patient registries; immunization records	Public health (MPH, etc.)	Computer science, database technology and data mining
		Computer science	Epidemiology
Bioinformatics	Analysis of genetic and protein sequences, genetic epidemiology,	Molecular biology	Statistics; computer science and database technology
		Clinical genetics	
		Computer science or mathematics	Fundamental genetics and molecular biology; computational biology; statistics; database technology;
Medical imaging	Image interpretation;	Radiology	
		Computer science	Human anatomy

Impact on Existing Programs

The Certificate Program will become an integral part of the BMI and College of Nursing's teaching and research programs. Our goal is to have the certificate program students attend the

existing courses whenever possible. We may need to add additional courses over time based on assessments of the unique needs of the certificate students. The Health Sciences Education Building on the health sciences campus of the University provides ample classrooms with size and facilities to teach larger classes and to use new teaching technologies to help in distance learning and interactive remote teaching. Graduate Teaching Assistants can assist with the major courses taught by the faculty. As a result, the faculty load of grading additional papers and exams resulting from the new Certificate Students will be reduced.

A major faculty and student activity for achieving a Master of Science (MS) or a Doctor of Philosophy degree (PhD) is carrying out an innovative research project. These original research projects are intensive and complex. Execution of such research projects is not part of the Certificate need. As a consequence, we should be able to accommodate these new Certificate students rapidly and easily.

B. Certificate Program Admissions and Acceptance Criteria

Applicants must satisfy University of Utah requirements for admission to graduate school. Those requirements include a Bachelor's Degree and 3.0 grade point average or better in their undergraduate work. They must also have completed a programming class or have equivalent experience.

For the informatics certificate, we plan to use existing admission processes within the respective programs; however, applications will be reviewed by a joint admissions committee across the programs. Using existing admissions processes would avoid the cost of creating an entirely new process just for certificate students. If NI and BMI ever combine their programs into an interdisciplinary program, new admission processes would need to be developed for all degrees.

II. Courses

Fifteen hours of course credits is the minimum needed for a certificate. The curriculum for the Graduate Certificate in Informatics consists of a required introductory course to Informatics (3 credits) such as BMI 6010, 6030, 6700 or NURS 6810, required seminar (Spring and Fall semesters of "Graduate Seminar") (total of 2 Credits), and the remainder as electives. Students may select courses to meet their learning objectives. Depending on the student's prior background (e.g. clinical vs. computer science), the elective courses can be chosen from any of the standard courses offered by Nursing or Biomedical Informatics, or other appropriate departments such as Psychology, Computer Science or the Eccles School of Business. A faculty advisor will be assigned to each student to guide them in selecting courses that best meet their needs. Courses outside BMI and NI must be approved by the advisor to be counted toward the certificate award.

Although all of the existing courses offered in the two programs will be available to certificate students, the research courses are likely to be less appropriate. Standard course prerequisite requirements will be followed as with degree-seeking students. We have adapted many of the BMI and NI courses to accommodate distance learning opportunities, and we expect to adapt

more of our courses over the next few years to accommodate this teaching mode and further improve access to our classes.

Sample Course Offerings:

BMI 5750 Medicine for Engineers and Scientists (3 Credits, Spring Semester)

Introductory survey of clinical medicine, intended for students without prior clinical training or experience. The course introduces basic vocabulary, anatomy, physiology and pathology for selected organ systems. Use of medical records methods of clinical data collection and decision making, and medical education are covered. Students are also exposed to the medical environment through tours of clinical settings.

BMI 6010/NURS 6810 Foundations of Clinical Informatics (3 Credits)

Provides an overview of the basic concepts of Informatics. The course includes an introduction to health information systems, systems development, databases, data representation, data acquisition and presentation, human-computer interaction, communication and networking, quality improvement, physiologic models, and medical imaging. The emphasis in this course is on concepts and theoretical underpinnings for specialty practice in clinical informatics. Infrastructures for healthcare information systems are analyzed. Informatics issues impacting healthcare decisions are explored. This course will be a combined, co-taught and cross-listed course beginning in Fall 2009.

BMI 6030 Foundations of Bioinformatics (1.5 Credits, Fall Semester)

This course includes an introduction to fundamental concepts in bioinformatics and will introduce students to the data that is being managed, databases where this data resides, knowledge bases which are used to associate concepts with each other, and tools of analysis of this data. The course will have a short introduction to terminology and concepts, although it is strongly recommended that students will have had an introduction to molecular biology and genetics concepts in their undergraduate coursework. This course serves as the first course for students who wish to take more advanced courses in these topics. (Required for all biomedical informatics graduate students).

BMI 6105 Statistics for Biomedical Informatics (3 Credits)

This course covers a range of statistical methods from classical hypothesis testing to more modern computational methods. The emphasis is on application and practice rather than extensive theoretical derivations. Simulation is used to illustrate properties of distributions, tests and methods. Students are expected to have access to a personal computer and the "R" environment for statistics and computation.

BMI 6220 MI Vocabulary & Standards (3 Credits)

Principles of database management systems as applied to medical care. Tools for representation of information in the electronic medical record. Standards applicable to medical information systems for communication, development, and validation of systems.

6240 Imaging Informatics (1 Credit, Prerequisite: BMI 6010)

A course focusing on imaging systems, in reference to the fields of imaging informatics. The

course will explore radiology modalities, image processing techniques, Picture Archiving and Communication Systems (PACS), Radiology Information Systems (RIS), Speech Recognition (SR) use in radiology, and imaging system integration issues.

BMI 6300 Medical Decision-Making or NURS 6802 Decision Support Systems

(3 credits, Prerequisite: 6010 or Nurs6810). Co-taught, Cross-listed course.

Quantitative and symbolic approaches to medical decision-making. Statistical methods (discriminate functions, Bayes theorem), decision analysis, utility theory, artificial intelligence and expert systems. Survey of operational decision-making systems; strengths and weaknesses of a group of approaches. Expert system techniques used in medical decision-making. Conceptual framework for computer-based medical decision-making. Student works with an expert in a medical discipline to conceive and develop an operational expert system.

BMI 6420 Advanced Biomedical Computing (2 Credits)

This course presents a survey of advanced techniques for computational science and their application to biomedical problems. The computational techniques presented will include: parallel, distributed and Grid computing. New emerging techniques will be incorporated to the course as appropriate. The course will review all the aspects of these techniques efficiency, portability, scalability, extensibility, security, etc. and provide both hands-on experience and conceptual frameworks to apply advanced computing techniques to problems of interest to the students enrolled in the class.

NURS/BMI/IS 6666 Project Management in Health Informatics

Project management (PM) methods and skills are critical for the success of projects in complex organizations such as healthcare. This interdisciplinary course will prepare students to use formal, state-of-the-art project management techniques in health informatics projects. Course content includes: Project initiation, planning, implementation and project termination. Issues related to project leadership, human resources, budgeting, and scheduling are discussed while risk identification and risk mitigation tactics are stressed. Case discussions highlight the state-of-the-art for project management practices as applied to health informatics in contemporary environments. Project management software is used throughout the course to hone students' skills. This course satisfies the educational requirement for students to be eligible to take the Project Management Institute (PMI) certification examinations.

BMI 6700 Public Health Informatics (2 Credits)

Public Informatics is an emerging interdisciplinary field focusing on the use of information technology in public health practice, research, and education. This course provides an introduction to the field through exposure to core concepts of public health and epidemiology and examination of national and local public Informatics initiatives. Students will become familiar with informatics problems in the public health domain by evaluating existing surveillance systems and examining the breadth of existing information management systems.

BMI/NURS 6804 Successful Implementation of Systems in Healthcare Settings (3 Credits)

This course addresses the planning, implementation and outcomes of information systems in health care settings. Concepts related to the whole systems life cycle are applied. National and international informatics trends are analyzed. Project management techniques including risk

mitigation are woven throughout the course. Electronic Health Record architecture, Information Technology processes, and major implementation issues are defined, evaluated and applied. Approaches for maintaining health information systems and evaluating the outcomes of such systems are analyzed.

BMI/NURS 6820 Human-Systems Interactions in Healthcare Informatics (3 credits)

Prerequisite: Instructor's consent.

Students will be exposed to a range of topics about humans, systems of varying kinds and levels and their interactions within healthcare contexts. Models, theories and methods pertinent to human-systems interactions frame the course. Quasi-experimental research designs and human-systems system research methods are woven throughout the course. Cognitive psychology aspects of individuals are learned, including cognition, errors in decision-making and perception. Human-computer interaction principles are outlined, concentrating on user-centered design, interface design principles and usability testing. Ergonomics and device engineering concepts are reviewed. Sociological aspects of organizations are applied to healthcare informatics to include sociotechnical systems, motivations and team interactions for optimal decision-making and work design.

NURS 6803 Clinical Database Design (3) Prerequisite: Programming course, NURS 6800 and consent of instructor.

Development and maintenance of clinical databases or application in solving clinical problems. Design methods, database structures, indexing, data dictionaries, retrieval languages, and data security are presented.

BMI 6950 Special Topics (1-4 Credits, by arrangement)

Special projects and clinical internships announced or arranged by the Department.

NURS 6075 Independent Study, (1-3 credits, by arrangement)

In depth study of a topic or project with an individual faculty member.

BMI 7000 Graduate Seminar (1 Credit, Fall and Spring Semesters)

Weekly research presentations by University faculty, visiting faculty, and graduate students.

Assessment

The value of the certificate program will be assessed by:

- Student course evaluations
- Exit interviews
- Contact/survey of alumni one or more years following graduation
- Survey of employers of former students to assess whether the educational program is meeting the needs of the employer

A committee will be formed that will be responsible for assessing the program. The committee will consist of five members: the faculty coordinator, two other faculty members appointed by NI and BMI, and two current students. Course evaluations will be performed for each course, and at least half of the students will be interviewed as they exit the program. Surveys of

employers and former students will be conducted every two years after the program start date. The assessment committee has the responsibility for conducting the assessments, receiving evaluations from the advisory committee (described below), and recommending improvements to the department's curriculum committee. The curriculum committees from each school will consider the recommendations of the assessment committee and advise the department chair on needed changes in faculty assignments, course content, course timing, and in any other areas as appropriate.

1. Faculty

Current and future faculty members in the Departments of Biomedical Informatics and Nursing Informatics will teach the certificate program courses. The faculty members most likely to be involved are: Denise Beaudoin, Bruce E. Bray, Scott Evans, Julio Facelli, Joseph W. Hales, Peter J. Haug, John F. Hurdle, Stanley M. Huff, Joyce A. Mitchell, Scott Narus, Mollie Poynton, Kathy Sward, Dean K. Sorenson, Catherine Staes, Nancy Staggers, and Charlene R. Weir.

2. Coordinators

Co-coordinators of the Informatics Certificate Program will be Scott Narus for BMI and Nancy Staggers for NI. The coordinator responsibility will be rotated among interested faculty as appropriate in BMI, and the NI program director will serve as the coordinator from the College of Nursing.

3. Advisory Committee

We will form an advisory committee with two representatives from each of four areas: industry, government, informatics faculty, and external faculty. The advisory committee will be convened by the chair and will meet at least annually to assess the needs and value of the program. The advisory committee provides its input to the assessment committee described above.

4. Budget

The College of Nursing and Department of Biomedical Informatics are primed to expand the program to Informatics. A contributing strength is that both Informatics Programs are housed in the new Health Sciences Education Building, which is equipped with distance learning technology and adequate space to accommodate larger classes. It will not be difficult to absorb the initial students into the existing classes. Faculty can be assigned TAs to help handle the additional work of larger classes. The cost of providing TAs to our instructors will be kept at a minimum by using degree-seeking students supported on BMI's National Library of Medicine (NLM) training grant and existing TA funding mechanisms in the College of Nursing. The programs plan to accept up to 8 certificate-seeking students in Fall 2009, 10 in Fall 2010 and 15 in Fall 2011. As the program expands to a national draw, we will adjust course delivery to be a blend of asynchronous and distance education.

10.4.1. Signature Page to Accompany Proposals Providing Board Notification. This signature page, with all appropriate signatures included, must be attached to proposals submitted for Board notification.

Institution Submitting Proposal:

College, School of Division affected: College of Nursing, School of Medicine

Department(s) or Areas(s) affected: Nursing Informatics Program (CoN), Department of Biomedical Informatics (SoM)

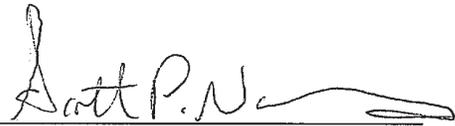
Change Description: Expand the existing Biomedical Informatics Certificate Program to an interdisciplinary informatics certificate program and change the name to "Informatics Graduate Certificate"

Proposed Beginning Date: Fall Semester, 2009

Institutional Signatures (as appropriate):



Program Director (NI, CoN)



Program Director (BMI Certificate Program)



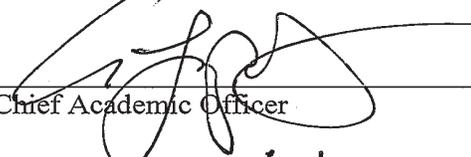
Dean or Division Chair (CoN)



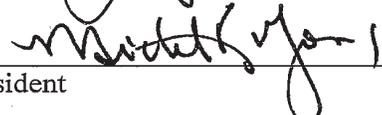
Dean of Division Chair (BMI/SoM)



Dean of the Graduate School



Chief Academic Officer



President

Date

Academic Senate – August 31, 2009
Executive Committee – August 24, 2009



*Please forward.
David Pershing
04/24/09*

Office of Undergraduate Studies

195 S. Central Campus Drive Salt Lake City, UT 84112-0511 (801) 581-3811 FAX (801) 585-3581

April 22, 2009

TO: David Pershing
Senior Vice President for Academic Affairs

FR: Chuck Wight *CW*
Chair, Undergraduate Council

RE: Minor in Health

*Approved
Please forward
Michael K. Jones
4/27/09*

At its meeting of Tuesday, April, 21, 2009, the Undergraduate Council voted unanimously to approve a proposal from the Department of Health Promotion and Education for a new Minor in Health. A copy of the proposal, with supporting letters, is attached.

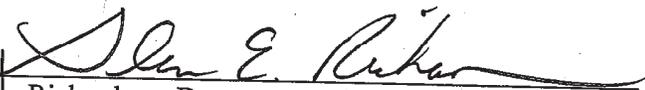
We are asking you, if you also approve of the proposal, to forward it on to the Executive Committee of the Academic Senate for their consideration.

Cc: Patricia Eisenman, College of Health
Glenn Richardson, Department of Health Promotion and Education

Signature Page

Institution Submitting Proposal: University of Utah
College, School or Division affected: College of Health
Department(s) or Area(s) affected: Department of Health Promotion and Education
Change Description: Creation of an Undergraduate Minor in Health
Proposed Beginning Date: Fall 2009

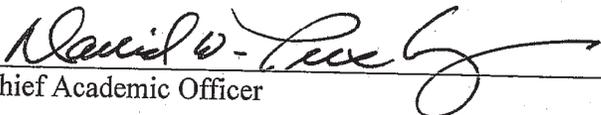
Institutional Signatures (as appropriate):



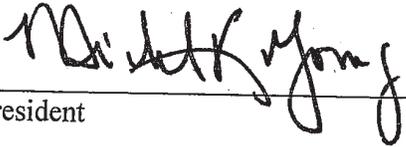
Glenn Richardson, Department Chair – Health Promotion and Education



James E. Graves, Dean College of Health



Chief Academic Officer



President

April 28, 2009

Date