GRADUATE SCHOOL PROPOSAL COVER SHEET

All curriculum proposals should be sent to the Graduate School office for review. Minor changes will be handled administratively. Substantive changes and new proposals require the action of both Graduate Council and Faculty Senate. When all signatures have been obtained, the Graduate School will notify the originator of the proposal to send an electronic version of the proposal to the Graduate School dean for placement on the Graduate Council agenda.

Note: All changes that affect course numbers or titles do not require action by the Graduate Council but must be submitted to the Dean of Graduate School for transmission. All other curricular proposals require the action of both Graduate Council and Faculty Senate. After the required signatures have been obtained, return the proposal to the Dean of Graduate School, who will notify the proposal originator to send an electronic version of the proposal to the Graduate School office.

From: Computer Science, Andy Novobilski Date: 12/4/2006

Title of Proposal: Graduate Certificate in Biomedical Informatics

Proposed Starting Date: ~~Spring~~ Fall 2007

REVIEWED BY:

	Date			
Department Head	12/4/06	✓ approve	neutral	disapprove*
Dean	12/14/06	✓ approve	neutral	disapprove*
Director, The Graduate School	12/15/06	✓ approve	neutral	disapprove*
Dean, The Graduate School	12.12.06	✓ approve	neutral	disapprove*
Registrar	1.31.07	approve	neutral	disapprove*
Dean of Lupton Library	12/19/06	✓ approve	neutral	disapprove*
Provost	2/7/07	✓ approve	neutral	disapprove*

yes

REVIEWED BY OTHER UNITS IMPACTED:

	Date			
Reviewer	12/11/06	✓ approve	neutral	disapprove*
Reviewer	12/12/06 (AN - per attached email)	✓ approve	neutral	disapprove*
Reviewer	Date	approve	neutral	disapprove*

* Those who disapprove must attach an explanation.

SUMMARY OF ACTION BY GRADUATE COUNCIL

_____ Approved as submitted

_____ Approved with amendments (amendments indicated and transmitted to originator to revise and submit electronical for Faculty Senate)

_____ Forwarded to Faculty Senate

Graduate Council Chair Date

SUMMARY OF ACTION BY FACULTY SENATE

_____ Approved as submitted and sent to originator and Registrar

_____ Approved with amendments (amendments indicated) and sent to originator and Registrar

President, Faculty Senate Date

revised

Graduate Certificate in Biomedical Informatics

Program Description

The rapid expansion of available data in the field of healthcare in both medical research and treatment has presented opportunities and challenges for a new group of information architects. This is certainly true in the Chattanooga metropolitan area, with its strong leadership in the areas of advanced medical care (UT College of Medicine, Erlanger Unit), industry focus in the area of shared health and health insurance (Blue Cross and Blue Shield of Tennessee) and community interest in improving the health of its citizens (The Chattanooga Healthcare Initiative).

In consideration of its stated mission:

> The University of Tennessee at Chattanooga will serve as a national model of an engaged metropolitan university whose faculty, staff, and students, in collaboration with external partners, employ the intellectual resources of the liberal arts and professional programs to enrich the lives of those we serve. (UTC Mission Statement, 2006)

UTC is in a unique position to serve as a coordinating partner within its community to build a cohort of trained information architects skilled in the area of Biomedical Informatics.

Stepping up to its role as a community leader, UTC is proposing a new graduate certificate program in Biomedical Informatics, to be created in active partnership with Blue Cross, Blue Shield of Tennessee, that will develop the skills necessary for nurses, computer scientists and healthcare policy advocates to turn data into information useful for members of the healthcare community.

Program Goals

The Graduate Certificate in Biomedical Informatics seeks to accomplish the following goals:

1. To develop a shared understanding of necessary terms and procedures from different areas involved with informatics to allow stakeholders in the healthcare community (medical, information manipulation, and policy advocates) to actively listen and communicate concepts from a shared descriptive model.
2. To provide knowledge of the tools and techniques involved in the actual conversion of data to information.
3. To understand the impact that informatics has on policy and procedures within the healthcare community.
4. To gain practical experience in a cross disciplinary team, using the shared knowledge to solve a practical informatics-based problem.

Program Objectives

In order to meet the stated goals, the graduate certificate program will be organized to support a student cohort that will gain knowledge, as a group, in the areas of:

- Medical Terminology
- Issues in Healthcare Policy
- Statistical Analysis Techniques for use with Medical Data
- Datamining Techniques for Model Building
- Programming Techniques For Use in Analyzing Data and Building Models
- Multi-disciplinary Approaches to Problem Solving using Informatics Techniques

Integration of this knowledge will be demonstrated by completion of a required design/implementation project.

Catalogue Description

The Department of Computer Science, in conjunction with the School of Nursing and the Department of Mathematics, offers a Certificate in Biomedical Informatics. The program is intended to provide skilled individuals with the technical, policy and vocabulary knowledge necessary to successfully convert medical-based data into information useful for members of healthcare community. Requirements for the certificate are 18 hours of graduate credit earned in the following six UTC courses:

NURS 512 – Health Policy, Economics and Finance (3)
CPSC 575 –Programming With SAS (3)
Approved 3 Hour Graduate Statistics Course (3)
CPSC 580 – Introduction to Machine Learning (3)
NURS 551 – Health Promotion and Illness Prevention in Primary Care(3)
CPSC 595r – Design Project (1-4) 3 hours required

Admission Requirements

Students admitted to the certificate program will be required to meet admissions standards for the UTC Graduate School. In addition, they must be able or willing to acquire basic skills in statistics and programming skills consistent with an introductory computer programming course. Since students working towards the certificate will do so in a prescribed order, they will have the time to acquire the necessary skills through various methods. For example, they can enroll in UTC statistics and basic programming courses for credit or could attend an on-line course. Also, it would be possible to offer one or more seminars through the Continuing Education department if demand warranted it.

Initial Cohort

The initial cohort of this certificate will be drawn primarily from the Blue Cross Blue Shield team and will consist of graduate level students with strong backgrounds in one of three areas - nursing, computer science, and/or healthcare policy. Although this mixture will mean a somewhat mismatched set of skills, the use of a cohort model will allow members to "tutor" each other. This will have the intended effect of building a shared vocabulary across all three fields that will benefit members of each discipline by increasing their understanding of the broader opportunity.

The planned schedule for the first offering of the certificate is as follows:

- Spring '07 NURS 512 - Health Policy, Economics and Finance (3)
- Fall '07 CPSC 575 - Programming With SAS (3)
- Spring '08 Graduate Level Statistics Course (See Appendix B) (3)
- Summer '08 CPSC 580 - Introduction to Machine Learning (3)
  CPSC 595r - 1 hour of project
- Fall '08 NURS 551 - Health Promotion and Illness Prevention in Primary Care (3)
  CPSC 595r - 2 hours of project

Retention

Students must meet the continuation standards specified for graduate study in the Graduate Catalog.

Graduate Certificate Requirements

The courses, NURS 512, CPSC 575, Approved 3 Hour Graduate Statistics Course, CPSC 580, NURS 551, and CPSC 595r must be completed within six calendar years at UTC with a B cumulative average in the courses applied to the certificate program and grades of C or better in each course.

Application of Credit towards MS Programs

Courses completed as part of the certificate will count towards a Master's of Science in Computer Science provided that the student qualifies for admission to the Computer Science Masters program. Note, CPSC 595r will count as a computer science elective, and not as the final project/thesis for the MS degree.

Description of New Courses Required by the Program

It is anticipated that additional work will be supported to develop online versions of the certificate courses to be used in future offerings:

Delineation of Evaluation Procedures

The computer Science Department has the responsibility for conducting systematic assessments of its programs by gathering data and evaluating the goals of students, faculty and external partners. The program outcome measures for the proposed certificate program will be assessed using student, faculty, and external partner surveys, student portfolios and exit interviews of those earning certificates.

Estimated Size of Program

The cohort size requires a minimum of 10 students and will have a maximum of 15.

Faculty

Computer Science, Mathematics, and Nursing will provide appropriate faculty to teach courses within their major area.

Administrative Resources

The program will be housed in the Department of Computer Science, within the College of Engineering and Computer Science. The Department of Computer Science will provide administrative resources related to the coordination of the program. In addition, the Continuing Education office will provide resources to coordinate the offering of the certificate via a partnership arrangement with Blue Cross Blue Shield of Tennessee.

Library Resources

No additional library resources are required.

Instructional Facilities

It is anticipated that the initial offering of the certificate program will be done on site at Blue Cross Blue Shield of Tennessee at their Chattanooga facility. Additional instructional facilities, including computer laboratories and classroom space will be provided on an as-needed basis by the Department of Computer Science.

Funding Considerations

There are two funding considerations related to the development and delivery of the certificate program in Biomedical Informatics. The first consideration involves the continuation of a minimum-sized cohort. In order for the initial offering of this program to go forward, Blue Cross Blue Shield will need to commit to a minimum of 10 participants in the program. Additionally, if the cohort size falls to below 8 for any given course, UTC might not be able to continue offering the course work leading to the certificate.

The second funding consideration involves the development of course versions suitable for future on-line delivery. It is expected that additional funding in the form of extra service pay or additional release time will be provided to faculty members in exchange for development of the new course versions. These course versions will then become the property of UTC so they can be offered to future cohorts.

Appendix A – Catalogue Descriptions of Certificate Courses

NURS 512 Health Policy, Economics & Finance (3)
This course examines health care policy, economics, and finance in health care systems including a focus on the advanced practice nursing role. Prerequisite: NURS 513

NURS 551 Health Promotion and Illness Prevention in Primary Care (3)
Theoretical foundations in health promotion, illness prevention and maintenance of function across the health-illness continuum with clients: the individual, family and community. Prerequisite: Admission to Family Nurse Practitioner concentration or permission of Director.

CPSC 575 Programming with SAS (3)
Report generation, data management and data analysis using SAS and other data management utilities. Prerequisite: CPSC 501 or equivalent.

CPSC 580 Introduction to Machine Learning (3)
Artificial Intelligence based algorithms and applications related to both supervised and unsupervised learning as implemented in software systems. Algorithms include neural networks, Bayesian networks, decision trees, and Genetic Algorithms. Applications include forecasting, planning, classification and other current topics. Prerequisites: CPSC 502 and 503 or equivalents.

CPSC 595r Design Project (1-4)
A detailed study, design, implementation and report of a real world scenario that will integrate material from the courses required in the certificate programs. May be repeated for credit with approval of the Computer Science Graduate Coordinator. Prerequisite: approval of Computer Science Graduate Coordinator.

Appendix B – Sample Description of an Approved Graduate Statistics Course

An intermediate 3 hour graduate statistics course suitable for students in a variety of health and science disciplines. The course will cover descriptive and inferential statistics, including parametric and non-parametric hypothesis testing methods, sample size, statistical significance and power, survival curve analysis, relative risk, and odds ratios. Data will be analyzed using SAS statistical software. Prerequisites: Math 136 or Math 151/152; Math 210 or equivalent; CPSC 575.