PROPOSAL FOR
A
NEW CERTIFICATE PROGRAM

SUBMITTED BY

UNIVERSITY OF MARYLAND BALTIMORE COUNTY

Certificate in Science and Technology in Human Context (STHC)
CIP: 30.150 (Science,Technology, and Society)
HEGIS: 4999 (Multidisciplinary)

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Title of Program, CIP and HEGIS Code

Department of History*
Department In Which Program Will
Be Located
*(host department)

Dr. Sandra Herbert*
Name of Department Head
*(Chair of Planning Committee)

Upper-Division Undergraduate
Certificate
Award to be Offered

Fall 2001
Proposed Initiation Date

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Dr. Freeman A. Hrabowski, III
President

23 May 2000
Date

PROPOSAL FOR AN UPPER-DIVISION UNDERGRADUATE CERTIFICATE IN

"SCIENCE AND TECHNOLOGY IN HUMAN CONTEXT" (STHC)

I. Introduction

Rapid advances in science and technology have become the hallmark of the present age. The challenge for today's university is to provide its students with the latest knowledge in science and technology while integrating that knowledge into a coherent view of the world. To do this requires an understanding of human nature and achievement drawn from the humanities as well as the sciences. It is the purpose of the proposed certificate program to enhance that goal.

Taking advantage of recent scholarship on the philosophy, history, and sociology of science and technology, and a faculty already teaching courses in these subjects, the Certificate in Science and Technology in Human Context will provide undergraduates the opportunity to study systematically the interactions among the humanities, the sciences, and technology. The proposed structure of governance for this program is multidisciplinary. The members of the committee for establishing the program are: Sandra Herbert (Department of History and Chair of the Committee), Susan Blunck (Education), Thomas Field (MLL; Humanities Center), Barbara Kinach (Education), James McKusick (English), Carole McCann (American Studies), Jessica Pfeifer (Philosophy), Robert Rubenstein (Sociology/Anthropology), Philip Sokolove (Biology), Laszlo Takacs (Physics), Joseph N. Tatarewicz (History), John Titchener (Philosophy), Larry Wilt (Library). Once the proposal is approved by all authorities, the Dean will appoint the Director of the program on consultation with the committee. The Director will serve for an initial term of three years. The STHC Committee will govern the program, and the Department of History will be the first host.

II. Centrality to Mission

A program that integrates study of the humanities, the sciences, and technology addresses themes central to UMBC's mission. It underscores the university's commitment to "produce graduates in all disciplines who think critically, communicate effectively, and demonstrate technology literacy," and "[to] bridge traditional boundaries among disciplines." It also supports the university's goal that "students who major in technology-intensive programs should receive a thorough grounding in the liberal arts." For students from all majors it would establish an opportunity to pursue lines of inquiry that contribute to intellectual balance.

III. Market Demand

The potential market for this program at UMBC is large. Many undergraduates change their

majors at least once during their course of study. This program would illustrate the variety of career choices that are available to those with serious interests in both the humanities and the sciences. Sometimes the choice may be a matter of emphasis. Does a student want to be a physicist with an interest in archaeology, or an archaeologist with training in physics? Sometimes the choice is more dramatic. If a student is interested in biology, would he or she be better served by pursuing an M.D., or a degree in the new field of medical humanities? Sometimes the choice may be more market-driven. With the current high demand for teachers of mathematics and science in elementary and secondary schools, students who excel in the skills of communication so essential to the humanities might be drawn to complete more years of training in science and technology-related fields than they otherwise might have. It is also true that in the Baltimore-Washington area, with its emphasis on public affairs, students with both technical and humanistic knowledge are often preferred by employers over those students whose education is more limited.

IV. Program Description & Curriculum Design

Course of Study for a 27-credit Upper-Division Certificate Program in "Science and Technology in Human Context"

Curriculum: a three-part structure composed of a required introductory course (3 hours), electives chosen from a list of prescribed courses (15 hours), and a natural science/technology component (9 hours minimum).

(1) STHC 100 (3 hours)

In this course students explore interactions among the humanities, the sciences, and technology, including study of the sciences and technology using humanistic approaches, and study of the effects of the sciences and technology on art, philosophy, and society. Students will have the opportunity to consider the role of human values in the pursuit of the sciences and in the invention and employment of various technologies. Practical social and political issues relating to science and technology will also be addressed.

(2) Electives List   (15 hours)

A student in the STHC Certificate Program would take 5 of these courses, of which 4 would have to be at the upper level. Substitutions to this list can be approved by the Director of the Certificate Program. This course list will be subject to periodic revision.

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AMST 270   American Culture and Science
AMST 388   American Environment:  Landscape and Culture
ANTH 312   Medical Anthropology
ENGL 200   Language and Scientific Value
ENGL 317   Literature and the Sciences
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ENGL 383   Science Writing
ENGL 418   Advanced Topics in Literature and the Sciences
ENGL 419   Seminar in Literature and the Sciences
GEOG 326   Conservation Thought
GEOG 433   Sustainability, Land Use, and Natural Resources
HIST 369   Darwinism: The Evolutionary Perspective
HIST 387   Medicine and Health Care in China
HIST 404   History of Computers and Computing
HIST 492   Colloquium in the History of Science
HIST 445   History of Science to 1700
HIST 446   History of Science since 1700
MATH 432   History of Mathematics
PHIL 248   Introduction to Scientific Reasoning
PHIL 358   Ethical Issues in Health
PHIL 372   Philosophy of Science
PHIL 394   Philosophy of Biology
PHIL 472   Advanced Topics in the Philosophy of Science
PHYS 333   Applied Physics in Archaeology and Art
SOCY 361   Science and Society
SOCY 416   Cyberspace, Culture and Society
SOCY 457   Social History of American Medicine
WMST 378   Gender, Science, and Technology
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(3) Natural Science/Technology Component (9 hours minimum)

In addition to studying critical literature about science and technology, students must become acquainted in some detail with current conceptions and practice in a chosen area of science or technology as presented by that area's current practitioners. The following options are currently available:

Biology Option

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BIOL 100 100L        4+2     Concepts of Biology
BIOL 301             3       Ecology and Evolution
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Chemistry Option

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CHEM 123 124 124L    4+3+2   Introduction to General Organic and
                             Biochemistry, OR
CHEM 101 102 102L    4+3+2   Principles of Chemistry
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Computer Science Option

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CMSC 100             3       Introduction to Computers and Programming
CMSC 104             3       Problem Solving and Computer Programming
CMSC 201             4       Computer Science I for Majors
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Engineering Options

General Option for Engineering

ENES 101   3   Introductory Engineering Science

Plus at least two more 3-credit courses in an engineering field.
In exceptional cases, courses other than the ones listed below may
be accepted on the recommendation of the advisor, provided they are
at a similar or higher level.

Engineering Science

ENES 110   3   Statics
plus one of the following

ENES 220   3   Mechanics of Materials
ENES 221   3   Dynamics
ENES 230   3   Introduction to Materials and their
                                     Applications
ENES 240   3   Engineering Computation

Chemical Engineering Option

CHEM 101 102 102L   4+3+2   Principles of Chemistry
ENCH 215   3   Chemical Engineering Analysis

Electrical Engineering Option

ENEE 204   3   Basic Circuit Theory
plus one additional course at the 200 or higher level

Mechanical Engineering Option

ENME 204   3   Introduction to Engineering Design
                                     with CAD
ENES 220   3   Mechanics of Materials

Geography and Environmental Systems Option

GEOG 102   3   Human Geography
GEOG 110   3   Physical Geography
GEOG 111   3   Principles of Geology

Information Systems Option

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IFSM 125            3        Information Systems Logic and
                             Structured Design
plus two 3-credit IFSM courses at the 200  level or higher
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Physics Option

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PHYS 111 112        4+4      Basic Physics
OR
PHYS 121 122 122L   4+4+2    Introductory Physics
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Rationale:

The introductory course will establish the underlying unity of the field of the humanistic study of science and technology. This introductory course (STHC 100) will be team-taught by a scientist or engineer and a humanist who are full partners in the instruction. Students will see with their own eyes in each class the merging of the "two cultures" of the humanities and the sciences. Case studies of important discoveries and inventions will provide the core texts for the course. Site visits to local laboratories, both on-campus and off-campus, will also provide real-world examples for the instructors and students to consider. Finally, the question of the reciprocal relation between science, technology and human societies, both past and present, will be addressed. It is intended that the introductory course will have an "AH" designation within the General Foundation Requirements.

The electives were chosen from an array of courses already offered on campus. This list will change as new courses are added to the curriculum. The faculty committee that governs the program will have the authority to alter the list of electives.

The science/technology requirement was designed to provide the student a serious introduction to those fields without imposing a burdensome number of hours. As individual science and technology departments alter their introductory courses, those changes will be reflected in the list of courses offered as alternates for the science/technology requirement.

V.   Resources

The budget for the program should be on the order of $25,000 a year. While no new faculty lines are requested in this budget, it is hoped that the needs of the program will be kept in mind as full-time lines and part-time monies are assigned annually by the Dean and Provost.

Year Zero Budget (establish operating plan, create introductory course guidelines, publicize program in advance of first registration season, operate lecture series)

Salary for administrative assistant................................ 3,000
Lecture series.. 1,000
Supplies 500
TOTAL YEAR ZERO 4,500

Annual Budget

Introductory Course
Faculty (reimburse two departments for use of their
  faculty in team-taught course 7,500
Faculty training Summer stipends (2+)........................ 6,000
(Subtotal New Faculty.. 13,500)

Salary for administrative assistant................................ 8,000

Course instructional materials...................................... 1,000
Office supplies... 1,000
Field trips for students.. 500
Guest lecture series... 1,000
(Subtotal Other Operating .... 3,500)

TOTAL ANNUAL.. 25,000

Program Contact: Professor Sandra Herbert, Department of History and Chair, STHC Committee

Proposed Implementation Date: Fall 2001

Budget Analysis for New Programs/Initiatives

Table 1. Forecast of New Money Generated from the program

	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5
1. New Enrollments						
Full-time						
Part-time						
2. Tuition and fees generated						
3. Other New money generated from other sources						
Forecast of Total Money Generated						

Table 2. New funds needed to implement the program (See attached for explanation.)

	New Resources/funds needed for the program					
	2000-2001 Year 0	2001-2002 Year 1	2002-2003 Year 2	2003-2004 Year 3	2004-2005 Year 4	2005-2006 Year 5
1. Faculty						
a) Additional funds for new faculty ($)		13,500	13,500	13,500	13,500	13,500
b) Faculty funds for administration ($)						
2. Additional Staff ($)	3,000	8,000	8,000	8,000	8,000	8,000
3. New Equipment ($)						
4. Additional Library budget ($)						
5. Additional Space (rooms)						
6. Other operating ($)	1,500	3,500	3,500	3,500	3,500	3,500
Total (1a and b,2,3,4,6)	4,500	25,000	25,000	25,000	25,000	25,000

June 1, 1999