

The University Senate of Michigan Technological University

PROPOSAL 17-06

(Voting Units: Academic Departments)

EXERCISE SCIENCE, B.S.

1. Program Description

The proposed Exercise Science B.S. will be offered by the Department of Exercise Science, Health and Physical Education (a request to change the name of the *Department of Physical Education* to *Department of Exercise Science, Health, and Physical Education* is submitted to the Board of Control concurrently). The program provides a strong scientific basis for students seeking advanced degrees in the health and allied health professions as well as those seeking practical skills for employment in the health fitness industry. The program consists of a core in biological sciences, chemistry, physics, and mathematics as well as core courses in exercise science. All students are required to register for an internship in Exercise Science. Internships are anticipated in community health and fitness centers, as well as cardiac and exercise rehabilitation programs. The program is consistent with the American College of Sports Medicine (ACSM) standards. Students upon completion of the degree and appropriate internship will be qualified to take the ACSM Health Fitness Instructor certification examination. Depending upon student career interest, a sufficient number of course credits (28 credits) are available to pursue certificates, minors and required courses for entrance to professional and medical schools. Throughout their education students will be advised in both academic and career choices.

2. Rationale

This new degree program is consistent with the university's vision of expanded degree program offerings to attract new students. The degree builds on Michigan Tech's traditional strengths in the sciences, specifically on existing course offerings in Biological Sciences and on research interests in Biological Sciences and Biomedical Engineering. The vision for the department is to go beyond the current offering of a comprehensive package of wellness, fitness, and intramural activities and to offer academic programs that provide a strong scientific basis for students seeking advanced degrees in the health and allied health professions as well as for those seeking practical skills for employment in the health and fitness industry, a rapidly growing employment sector.

This degree provides students an entrance into a field that has a broad choice of career options. These range from the health fitness industry (e.g. personal and corporate center trainers, respiratory and cardiopulmonary therapists) to professional degrees (e.g. physical therapy, chiropractic, and medical degrees). Since many students upon admission to the University are uncertain of their long-range interests, this degree provides the skills necessary for either direct employment or continued education and allows students to pursue careers in additional health application fields. The required internship will, in addition to helping students focus on career goals, provide opportunities for additional skills development. Several institutions (Portage Health Rehabilitation Center, Keweenaw Memorial Rehabilitation Center) have already expressed their willingness to provide these internship experiences. With the changing health demographics and the aging population, the Bureau of Labor Statistics projects substantial job growth in the health and wellness arena (150,000 job increase in next 10 years). This program will be an attractive choice for students and will provide employees and professionals for this growing employment sector.

3. Related Programs

The B.S. in Exercise Science will draw upon courses currently taught as part of the existing B.S. in Biological Sciences. It is also complemented by the recently approved Minor in Coaching.

Related Bachelor of Science and Bachelor of Arts Degrees at other State of Michigan Universities

Central Michigan Univ.

B.S. in Health Fitness In Preventive and Rehabilitative Programs	School of Health Sciences
B.S. in Sports Studies	Department of Physical Education and Sport
Minor in Sport Studies	School of Health Sciences
B.A. in Health Fitness In Preventative and Rehabilitative Programs	School of Health Sciences

Eastern Michigan University

B.S. in Sports Medicine, Exercise Science (intent to propose)	School of Health Promotion and Human Performance
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Grand Valley State University

B.S. in Exercise Science (proposed Fall 2006)	Department of Movement Science
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Lake Superior State University

B.S. in Exercise Science	Department of Recreation Studies and Exercise Science
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Michigan State University

B.S. in Kinesiology Exercise Science Option	Department of Kinesiology
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Northern Michigan University

B.S. in Sports Science	Department of Health, Physical Education and Recreation
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Oakland University

B.S. in Health Science Focus in Exercise Science	School of Health Sciences
B.S. in Wellness, Health Promotion and Injury Prevention Minor (focus) in exercise science	School of Health Sciences
B.S. in General Studies Exercise Science Minor	University Wide

Saginaw Valley State University

B.S. in Exercise Science	Department of Kinesiology
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University of Michigan, Ann Arbor

B.S. in Movement Science	Division of Kinesiology
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Wayne State University

B.S. in Kinesiology, Exercise and Sports Science Track	Division of Kinesiology, Health and Sports Studies
B.A. in Kinesiology	Division of Kinesiology, Health and Sports Studies

Western Michigan University

B.S. in Exercise Science	Department of Health, Physical Education, and Recreation
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4. Projected Enrollment

The goal in the first year is to attract 20 students, with the expectation of 60-80 students enrolled in the major by the fourth year (steady state). Some students might be internal transfer students, especially from Biological Sciences. The program is expected to yield a net increase through the recruiting of additional students and by improving the retention rate.

5. Scheduling Plans

This Exercise Science B.S. will be a regular on-campus program offering. The anticipated start date is Fall Semester 2006.

6. Curriculum Design

Students will take a common core of courses in the field of Exercise Science and supporting disciplines. These will include courses in Exercise Science, Biological Sciences, Chemistry, Mathematics and Physics. This core includes a required Internship in Exercise Science that students must complete to obtain a degree. In addition, students will meet the General Education and Co-Curricular requirements of the University. The total number of credits to earn the degree will be 128 credits earned as: Core courses, 72 credits; General Education, 28 credits; free Electives, 28 credits which can be used, depending on the student's career interest, to pursue certificates, minors, and required courses for entrance to professional and medical schools.

The department GPA will be calculated using grades in Exercise Science and Biological Sciences (EH and BL designations) core course, and any cognate courses taken as electives with these designations.

<u>Core Courses</u>	Exercise Science, B.S.		
Course #	Course Title	Credits	
Biological Sciences			
BL 1040	Principles of Biology	4	
BL 1710	Medical Terminology	1	
BL 2010	Anatomy and Physiology I	3	
BL 2011	Anatomy and Physiology I Lab	1	
BL 2020	Anatomy and Physiology II	3	
BL 2021	Anatomy and Physiology II Lab	1	
BL 2100	Principles of Biochemistry	3	
BL 2200	Genetics	3	
BL 2940	Human Nutrition	3	
BL 3970	Current Health Issues	3	
BL 4210	Exercise Physiology	3	
BL 4470	Analysis of Biological Data	4	
			32
Chemistry			
CH 1110	Chemistry I	4	
CH 1111	Chemistry I Lab	1	
CH 1120	Chemistry II	4	
			9
Exercise Science			
EH 1000	Exercise Science Orientation	1	
EH 3100	Exercise Assessment and Prescription	3	
EH 3200	Foundations of Kinesiology	3	
EH 4010	Psychology of Coaching	3	
EH 4050	Intro to Athletic Training	3	
EH 4200	Sports Nutrition Seminar	2	
EH 4211	Exercise Physiology Lab	1	
EH 4900	Internship in Exercise Science	3	
			19
Mathematics			
MA 1135	Calc for Life Sciences	4	
			4
Physics			
PH 1100	Physics Lab I	1	
PH 1111	Physics I	3	
PH 1200	Physics Lab II	1	
PH 1210	Physics II	3	
			8
General Education & Distribution			
UN 1001	Perspectives	3	

UN 1002	World Cultures	4	
UN 2001	Revisions	3	
UN 2002	Institutions	3	
General Education and Distribution courses		15	
			28
<u>Electives</u>			28
TOTAL credits required 128		(Core, General Education, Electives)	128

7. New Course Descriptions

Six new courses were submitted through the course change process and approved, EH 1000, EH 3100, EH 3200, EH 4200, EH 4211 and EH 4900. Two others courses (EH4010 and EH4050) already exist as academic PE (2005/06) courses and a request to have them re-designated as EH courses has been submitted through the course change process and approved.

8. Library and Other Learning Resources

There are 58 journals to which the library subscribes (see appendix) that will support the exercise science degree program. \$1,000 (recurring need) is set aside for additional library resources in support of this degree.

9. Computing Access Fee

Until Exercise Science has established its own lab, students will have computer access through the Biological Sciences, Psychology, and Social Sciences computing facilities (students expected to be concentrated in Biological Sciences). The computational fee will be \$215 per semester. This arrangement is temporary as the department moves toward establishing its own laboratory and office spaces in the Student Development Center (SDC) in physical proximity to the Portage Health Clinic.

10. Faculty Curriculum Vitae

Current Exercise Science faculty:

Vitae can be found at: <http://www.csa.mtu.edu/eh/>

Jason Carter, PhD, Chair,
Exercise Physiology

Brian Brewster, M.A.T., ATC,
Clinical athletic training, physical therapy, rehabilitation

Judy Fynewever
Sports Psychology, Aquatics, Ballroom dancing, Study Skills, Individual Sports

Joseph Haggemiller, J.D.,
Endurance training

Christopher Ipson, ATC,
Certified Athletic Trainer

Nathan Larson, ATC,
Certified Athletic Trainer

Adjunct exercise faculty:

Christopher Hurley, Ph.P.T., ATC,
Physiology, Bilateral force deficit, rate of fatigue, balance and falls

Mark Randell, Ph.P.T.,

Biological Sciences Faculty (teaching core courses)

Vitae can be found at: <http://www.bio.mtu.edu/faculty/index.htm>

John Adler, Ph.D., Chair,
Biochemistry of sterols and steroids

Karyn Fay, M.S., MT (ASCP) SH,
Clinical Chemistry/ Clinical Lab Science

Ronald Gratz, Ph.D.,
Pulmonary and Cardiovascular physiology

Martha Janners, Ph.D.,
Health and developmental biology

Robert Keen, Ph.D.,
Biostatistics

Thomas Snyder, Ph.D.
Genetics and paleobiology

Alice Soldan, M.S., MT(ASCP), CLS(NCA),
Human nutrition/ Clinical Lab Science

11. Available/Needed Equipment

Equipment will be necessary for a research lab and a teaching lab. In support of the proposed degree program, the Department of Biomedical Engineering has agreed to make equipment available which is currently not used extensively. This includes a metabolic cart, nerve traffic analysis system, ECG leads & amplifiers, 2 tilt tables, a Grass S48 stimulator, and an O2 analyzer. Some of it will be used for both laboratories. In addition, some basic equipment [consumables (ECG patches, electrodes etc), treadmill, exercise bike, measuring devices] for the teaching lab and some miscellaneous equipment for the research lab (finometer) will be necessary. Total equipment start-up costs are estimated to be \$60,000 which will be covered by the university Provost and Dean of the College of Sciences and Arts.

12. Program Costs

As specified in the appendix, additional recurring costs are associated with the start of this program. One GTA will be assigned to Exercise Science in support of the new teaching and course lab (Exercise Physiology EH4211, Exercise Assessment and Prescription EH3100), an additional GTA will be allocated to the department of Biological Sciences in support of additional necessary lab sections in Principles in Biology and in Anatomy and Physiology. In the beginning of the program some courses will be taught by adjunct faculty.

13. Space

A teaching laboratory and a research laboratory for the chair will be assigned for the program. Space in the SDC which has the potential to house a growing program, additional office and laboratory spaces for future faculty, and a computing laboratory for the exercise majors is currently negotiated. Temporarily the Anatomy and Physiology lab in Biological Sciences can be used until the separate Exercise Physiology lab in the SDC is established.

14. Policies, Regulations and Rules

15. Accreditation Requirements

The program itself does not need to be certified. It is consistent with the American College of Sports Medicine (ACSM) standards. Students upon completion of the degree program and appropriate internship will be qualified to take the ACSM Health Fitness Instructor certification examination.

16. Internal Status of Proposal

Department of Physical Education,	, Date Approved
Dean of Sciences and Arts,	, Date Approved
Provost,	, Date Approved
University Support Units,	, Date Approved
University Senate,	, Date Approved
Academic Affairs Officers,	, Date Approved
Board of Control,	, Date Approved

17. Planned Implementation Date

Fall Semester, 2006

Appendices:

Resource Analysis for Proposed B.S. Program in Exercise Science

		2006- 07 Year 1	2007- 08 Year 2	2008- 09 Year 3	2009- 10 Year 4	2010-11 Year 5 steady state
EXERCISE SCIENCE MAJOR	Assumptions (can be changed)					
retention rate	0.875					
tuition (\$250*30)	7,500					
tuition discount	30%					
discounted tuition	5,250					
enrollment:						
year 1		20	18	15	13	graduated
year 2			20	18	15	13
year 3				20	18	15
year 4					20	18
year 5 (steady state)						20
total enrollment (rounded to nearest integer)		20	38	53	66	66
discounted tuition revenue		\$105,000	\$196,875	\$277,266	\$347,607	\$347,607
<i>specific expenses related to major:</i>						
teaching lab (1-time start-up)	\$20,000					
research lab (1-time start-up)	\$40,000					
1 GTA exercise sci lab support	\$18,000	18,000	18,000	18,000	18,000	18,000
1 GTA biology lab support	\$18,000	18,000	18,000	18,000	18,000	18,000

adjunct faculty teaching tenure-track faculty	\$4,500/course	9,000	18,000	9,000	9,000	9,000
	\$55,000			55,000	55,000	55,000
dept. SS&E increase	\$5,000	5,000	5,000	5,000	5,000	5,000
library	\$1,000	1,000	1,000	1,000	1,000	1,000
<i>additional gen ed expenses (UN, math, phys, chem, SS, HU, CS)</i>						
\$30,000 per 20 freshmen		30,000	30,000	30,000	30,000	30,000
\$30,000 per 20 sophomore			30,000	30,000	30,000	30,000
total start-up (1-time)		60,000				
total expenses		\$141,000	\$120,000	\$166,000	\$166,000	\$166,000
net profit/loss		-\$36,000	\$76,875	\$111,266	\$181,607	\$181,607

Journals related to Exercise Science at the JRVP Library

Acta physiologica Scandinavica
American journal of physiology
American journal of sports medicine, the
Annual Review of Medicine
Annual Review of Nutrition
Annual Review of Physiology
Athletic journal
Athletic training
Biogerontology
British abstracts
British chemical and physiological abstracts
Canadian journal of biochemistry and physiology
Canadian journal of medical sciences
Canadian journal of research
Cancergram
Clinical laboratory science: journal of the American Society for Medical Technology
Clinical physiology
European journal of applied physiology
Experimental physiology
Experiments in physiology and biochemistry
IEEE engineering in medicine and biology magazine: the quarterly magazine of the Engineering in
Medicine & Biology Society
IEEE transactions on biomedical engineering / Bio-medical Engineering Group
IEEE transactions on information technology in biomedicine: a publication of the IEEE Engineering in
Medicine and Biology Society
IEEE transactions on medical imaging
Issues in science and technology
JAMA: the journal of the American Medical Association
Journal of applied physiology: Respiratory, environmental and exercise physiology (Continuation of:
Journal of applied physiology)
Journal of athletic training
Journal of Cellular Physiology
Journal of general physiology, the
Journal of Health, Physical Education, Recreation, and Dance
Journal of occupational and environmental hygiene
Journal of physiology, the
Journal of public health
Journal of sports medicine and physical fitness

Laboratory medicine
Medical engineering & physics
Medicine and science in sports and exercise
National Academies in focus / National Academy of Sciences ... [et al.], the
New England journal of medicine, the
Nutrition bulletin
Nutrition & dietetics
Obesity reviews
Pain practice
Perspectives in Biology and Medicine
Perspectives on sexual and reproductive health
Physical fitness research digest
Physics in medicine & biology
Physiological Reviews
Physiology and Behavior
Report of the ... Summer Session of the International Olympic Academy
Research quarterly for exercise and sport
Respiratory physiology & neurobiology (Continuation of: Respiration physiology)
Respirology
Reviews of physiology, biochemistry and pharmacology
Sports sciences for health
Studies in history and philosophy of biological and biomedical sciences
Systems biology

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Introduced in the University Senate: 1 February 2006

Adopted by the Senate: 15 February 2006

Approved by Administration: 21 March 2006

Approved by BOC: 28 April 2006