

SIMON FRASER UNIVERSITY

S.84-41

MEMORANDUM

Members of Senate

From Office of the Dean of Graduate Studies

Graduate Curriculum Changes - New  
Subject Graduate Courses, KIN. 810, 826

Date May 10, 1984

Action undertaken by the Executive Committee, Senate Graduate Studies Committee, at its meeting on April 30, 1984, gives rise to the following motion: -

MOTION:

"That Senate approve and recommend approval to the Board of Governors, as set forth in S.84-41, the proposed new graduate courses

KIN. 810-3 Seminar in Exercise Biochemistry

KIN. 826-3 Motor Control: A Behavioural Perspective"

John M. Webster  
Dean of Graduate Studies

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# SIMON FRASER UNIVERSITY

## MEMORANDUM

To.....Marian McGinn.....	From.....Meredith Kimball.....
.....Graduate Studies.....	Associate Dean,
	.....Faculty of I.D.S.....
Subject.....PROPOSED COURSES IN.....	Date.....March 5, 1984.....
KINESIOLOGY	

Attached are course proposals for two new graduate courses in Kinesiology, KIN 810-3 and KIN 826-3. These courses have the approval of the Faculty. I have sent copies of the course proposals to Mr. Maurice Deutsch in the library for an evaluation of the library collection.

I would appreciate it if you would put these two course proposals on the agenda of the next Senate Graduate Studies Executive Committee.

MK/rj  
Encl:

*Meredith Kimball*

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: KINESIOLOGY Course Number: 810-3

Title: SEMINAR IN EXERCISE BIOCHEMISTRY

Description: A detailed study of current topics in exercise metabolism including endocrine control of exercise metabolism, protein turnover in muscle, metabolic fatigue mechanisms in muscle, and cellular adaptation to training.

Credit Hours: 3 Vector: 3-0-0 Prerequisite(s) if any: KIN 407  
KIN 410 and KIN 430 or  
equivalent

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 12 When will the course first be offered: 84-3

How often will the course be offered: Every 2 years, or yearly depending upon demand.

JUSTIFICATION: Exercise Biochemistry, over the last ten years, has evolved into a field of study of its own, along side Exercise Physiology. While a fundamental understanding of biochemistry is required, this course will focus on current research in exercise metabolism. It will thereby provide graduate students in the areas of Applied Physiology and Biochemistry with a theoretical background in Human Exercise Metabolism. This course has been offered twice in the past as a special topics (805) course and was very successful.

RESOURCES:

Which Faculty member will normally teach the course: Dr. John Wilkinson & Dr. Eric Banister

What are the budgetary implications of mounting the course: None, other than approximately \$50 per offering for materials and supplies.

Are there sufficient Library resources (append details): Yes

- Appended: a) Outline of the Course   
b) An indication of the competence of the Faculty member to give the course.  
c) Library resources

Approved: Departmental Graduate Studies Committee: Parveen Bawa Date: Feb. 8, 1984.

Faculty Graduate Studies Committee: Meredith Inbar Date: Feb 2, 1984

Faculty: Shahot Date: 13 Feb 84

Senate Graduate Studies Committee: W. B. Bower Date: 10 May 84

Senate: \_\_\_\_\_ Date: \_\_\_\_\_

## KINESIOLOGY 810

### Seminar in Exercise Biochemistry

Dr. J. Wilkinson  
K 9630 (3658)

- PURPOSE:
1. To study current topics in the areas of Cellular Exercise Physiology and Biochemistry
  2. To develop techniques for critically assessing the research literature in exercise biochemistry
  3. To develop models which describe metabolic adaptations to exercise and training.

#### COURSE FORMAT:

We will plan to meet once a week for a three hour seminar. There will be assigned reading (3-4 articles) each week which students will read critically and be prepared to discuss. This may involve substantial extra reading depending upon your knowledge of each seminar topic. There will also be one evening mini symposium for presentation of Hypothetical research papers. Several laboratory demonstrations will also be arranged.

#### COURSE REQUIREMENTS:

1. Class work - do assigned readings, draw up summary models and participate in seminar discussions. 10%
2. Present an assigned research article and lead seminar discussion. 10%
3. Present a hypothetical research paper in a mini symposium including Bibliography, abstract and model. 20%
4. Written term paper on an approved topic. 30%
5. Oral Examination. 30%

#### READING MATERIALS:

1. This course will be based upon current review articles and research papers which will be assigned each week.

#### REFERENCE BOOKS:

1. Harper's Review of Biochemistry  
Lange Med. Pub. Los Altos Cal. (1981) 18th ed.
2. Lehninger A.L. Biochemistry: The Molecular Basis of Cell Structure and Function Worth Pub., New York, 1975.

SEMINAR SCHEDULE KINESIOLOGY 810-3\*

1. Introduction, course requirements, and format:

The instructor in the course will give an introductory lecture as an overview of the course. In subsequent seminars the students will be given a background review reading which the instructor will lecture on for 30-45 minutes to provide historical perspective and scope of research papers.

2. Motor Unit Characteristics and Recruitment:

Reference: Saltin B. "Muscle Fibre Recruitment and Metabolism in Prolonged Exhaustive Dynamic Exercise." In Human Muscle Fatigue Physiological Mechanisms Pitman Medical Pub., London, p. 41-58, 1981.

3. Metabolic Specializations in Muscle:

Reference: Hultman, E., Sahlin, K. and L. Edstrom, "Glycolytic and Oxidative Energy Metabolism and Contraction Characteristics in Intact Human Muscle." In Human Muscle Fatigue: Physiological Mechanisms Pitman Medical Pub., London, p. 19-40, 1981.

4. Local Control of Substrate Metabolism:

Reference: Newsholme E.A. "Regulation of Intracellular and Extracellular Fuel Supply During Sustained Exercise." ANN. N.Y. ACAD. SCI 301: 81-97 1977.

5. Endocrine Control of Fuel Metabolism:

Reference: Terjung R. "Endocrine Response to Exercise" Exercise and Sports Science Reviews: 7: 153-171, 1979

6. Anaerobic Metabolism and Fatigue:

References: a) Edwards R.T. "Human Muscle Fatigue 1-19, 1981.  
b) Hermausen L. "Effect of Metabolic Changes on Force Generation in Muscle During Maximal Exercise." Human Muscle Fatigue: Physiological Mechanisms. Pitman Med. Pub., London, p. 75-88, 1981.

7. Mini Congress presentation of student research papers.

Bioenergetics and Cellular Adaptations to Exercise.

8. Protein Turnover in Skeletal Muscle:

Reference: Booth, F.W., Nicholson W.F., and P.A. Watson "Influence of Muscle Use on Protein Synthesis and Degradation." Exercise and Sport Science Reviews 10: 22-38, 1982.

9. Skeletal Muscle, and Connective Tissue Strength Adaptations:

Reference: J. Atha "Strengthening Muscle" Exercise and Sport Science Reviews 9: 23-36, 1981.

10. Cardiac Metabolism:

Reference: Dowell, R.T. "Cardiac Adaptations to Exercise" Exercise and Sport Science Reviews 11: 34-51, 1983.

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\* Please note: the cited references are the background readings for each seminar topic. The topics and research papers assigned for each seminar will likely change from course offering to offering.

11. Metabolic and Cardiovascular Inter-relationships:  
Reference: Blomquist, C.G., and Saltin "Cardiovascular Adaptations to Physical Training" Ann Review Physiol. 45: 169-189, 1983.
  12. Limiting Factors in Aerobic and Anaerobic Metabolism:  
Reference: Holloszy J.D., W.W. Winder, R.H. Fitts, M.J. Rennie, R.C. Hickson, R.K. Conlee "Energy Production During Exercise" Biochemistry of Exercise University Park Press Vol. 3. 61-74, 1976.
  13. Student Presentation of term papers.
  14. Oral Examinations
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#### List of Library Resources:

##### Annual Reviews:

1. Annual Review of Physiology
2. Annual Review of Biochemistry
3. Biochemistry of Exercise (Departmental Copies)
4. Exercise and Sport Science Reviews
5. Medicine and Sport
6. Physiological Reviews

##### Scientific Journals:

1. Acta Physiologica Scandanavia
2. American Journal of Physiology
3. Biochemical Medicine
4. Biochemistry and Biophysics Acta
5. Biochemistry Journal
6. Canadian Journal of Applied Sport Science
7. Canadian Journal of Physiology and Pharmacology
8. Circulation Research
9. Endocrinology
10. European Journal of Applied Physiology
11. European Journal of Biochemistry
12. Experimental Medicine and Biology
13. Hormone and Metabolism Research
14. Journal of Applied Physiology
15. Journal of Biological Chemistry
16. Journal of Molecular and Cellular Cardiology
17. Journal of Physical Fitness and Sport Medicine
18. Journal of Physiology
19. Medicine and Science in Sports and Exercise
20. Muscle and Nerve
21. Pflueger's Archieve
22. Scandanavian Journal of Clinical Laboratory Investigation
23. Sports Medicine

SIMON FRASER UNIVERSITY

New Graduate Course Proposal Form

CALENDAR INFORMATION:

Department: KINESIOLOGY Course Number: 826-3

Title: Motor Control: A Behavioural Perspective

Description: The study of selected aspects of research in motor behaviour. The focus will be on delineating the problems of a viable theory of action, and on seeking solutions to the problems.

Credit Hours: 3 Vector: 3-0-4 Prerequisite(s) if any: KIN 467 or equivalent

ENROLLMENT AND SCHEDULING:

Estimated Enrollment: 8 When will the course first be offered: 84-2

How often will the course be offered: Once every two years

JUSTIFICATION:

(see attached rationale)

RESOURCES:

Which Faculty member will normally teach the course: Dr. D. Goodman

What are the budgetary implications of mounting the course: \_\_\_\_\_

Equipment: approximately \$200 for miscellaneous equipment

Are there sufficient Library resources (append details): Materials to be placed on reserve

- Appended: a) Outline of the Course
- b) An indication of the competence of the Faculty member to give the course.
- c) Library resources

Approved: Departmental Graduate Studies Committee: Parveen Bama Date: Feb 16, 1984

Faculty Graduate Studies Committee: Meredith Kittell Date: Feb 20, 1984

Faculty: J.W. Babet Date: 22 Feb 84

Senate Graduate Studies Committee: J.M. Bawman Date: 10 May 84

Senate: \_\_\_\_\_ Date: \_\_\_\_\_

Rationale for the formal approval of a Graduate Course in Motor Control<sup>1</sup>

Dr. D. Goodman was appointed at the assistant professor level in September 1981 to teach and conduct research in the area of motor control. Since that time he has firmly established his research program and currently supervises two graduate students. It is now time to formally approve a graduate course in the area, which, besides being of interest to students in the area of motor control should be of interest to students of biomechanics as well as kinesiologists and psychologists in general.

The course as detailed was taught in 83-1. Six students were registered and all completed the course satisfactorily. Minimal overlap exists with other graduate courses in the department. Indeed, this course is unique in the B.C. universities as indicated by the intent of students studying in the area at U.B.C. to take the course at its next offering.

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<sup>1</sup> I have used the terminology motor control synonymously with motor behaviour, recognizing the fact that motor control can also be approached from a neurophysiological perspective.

### Course Rationale

The subject of motor behaviour has a fairly chequered past, both in terms of its relationship to science and with respect to its function in academic settings. Its traditional role was to familiarize future teachers, coaches, and rehabilitators with the gamut of factors that influence the acquisition of motor skills. Such factors were not always based on scientific data, but when they were they had to be gleaned from a huge and diversified data base obtained largely from applied settings. In short, not too long ago the area had a certain supermarket quality - plenty of isolated facts but little or no focus. Needless to say, without conceptual pegs to hang data on to, the student can walk away short-changed. On the other hand, examining the theoretical issues involved in motor control is a relatively new endeavour for those interested in skilled behaviour. Throughout the years, only a handful of experimental psychologists have addressed themselves to motor control. Traditionally, this topic has been the private domain of the neurophysiologist, but this is no longer so. This graduate course is based on the belief that the determinants of motor control and the conjunct problems of how movements are coordinated and controlled are fundamentally important to those concerned with understanding human behaviour. With the foregoing in mind, the specific course objectives may be stated as follows:

### Course Objectives

1. To become familiar with both the classical papers and current theoretical positions with respect to motor control.
2. To develop a critical attitude with respect to reports of experimental work in motor control.
3. To consider, in depth, an appropriate issue in the area of motor control and conduct a preliminary investigation and report on the results.
4. To be able to formulate a position, and support such a position, with respect to a viable theory of action.

### Course Requirements

Students registered in Kin 826 Motor Control: A Behavioural perspective are expected to:

	Proportion of total mark
1. Read all assigned materials and partake in discussions of them.	20%
2. Conduct a preliminary investigation on a substantive problem in motor control, and report on the results	40%
3. Critically review an assigned research report	20%
4. Lead a seminar on an assigned topic	20%

## KIN 826: Laboratory Schedule

The laboratory section of this course is seen as an important and integral part of the course. Through both demonstrations and conducting mini-experiments students will gain an appreciation of experimental methodology and techniques used in motor behaviour research.

### Week

- 1 Introduction
- 2 Using the lab computer and interfacing to the computer
- 3 Demonstration and discussion of 2-hand studies
- 4 Presentation of proposals
- 5 Pilot testing
- 6-9 Conduct experiments
- 10 Analysis of experiments
- 11 First draft
- 12 Presentations
- 13 Final Draft due

All labs will be conducted in the motor behaviour laboratory. This lab has four self contained experimental chambers, two of which will be made available for the students in the course. A micro-computer is available for use in each chamber as is interfacing hardware enabling students to set up a wide variety of experimental conditions. Students will be expected to program their own controlling software, using routines already developed and documented. Assistance will be provided by the lab director. Limited funds (approximately \$200) will be required for miscellaneous equipment.