S.77-85

# SIMON FRASER UNIVERSITY

## MEMORANDUM

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| To: SENATE | From: SENATE COMMITTEE ON UNDERGRADUATE STUDIES |
| Subject: NEW COURSE MATH 304-3 (DISCONTINUANCE OF MATH 305-4) | Date: JUNE 16, 1977 |

MOTION: "That Senate approve and recommend approval to the Board of Governors, as set forth in S.77-85, the new course MATH 304-3 - Statistical Analysis of Sample Surveys, and the discontinuance of MATH 305-4."

(SCUS approved waiver of the time lag requirement to permit offering for Spring 78-1.)

SCUS 77-29

# SIMON FRASER UNIVERSITY

## MEMORANDUM

To H. Evans
Secretary to SCUS

From J.M. Webster
Dean of Science

Subject MATH 304-3, new course.
Discontinue MATH 305-4

Date May 30, 1977

Please find attached a proposal for a new course MATH 304-3, "Statistical Analysis of Sample Surveys" which was approved by the Faculty of Science at its meeting of May 19, 1977. We are requesting a waiver of the time lag requirement in order that this course may be offered in the Fall semester 77-3.

J.M. Webster

jmw/pel
Encl.



Waiver Spring 1978

# SIMON FRASER UNIVERSITY

## MEMORANDUM

To C.Y. Shen, Mathematics Dept.
Chairman, Undergraduate Studies Committee

From G. Bojadziev and D. Eaves
Mathematics Department

Subject Rationale for Proposed Course 304-3

Date April 1, 1977

1. Math 304-3 is intended to replace 305-4. Besides the reduction in credit hours, the proposal represents a reduction in prerequisites.

2. The demand for a course in sample survey theory is chiefly for training in methods and applications, by non-mathematics majors. It is therefore felt inappropriate to spend as much time on mathematical derivations and theory as has sometimes been spent in the past.

3. It is felt that, even with a slight increase in the coverage of methods (survey designs), the removal of this mathematical component justifies no more than three credit hours for the replacement course, 304-3.

4. The removal of the more mathematical material also makes it desirable to reduce the prerequisites to one course in statistics or probability, as opposed to two courses.

G. Bojadziev D.M. Eaves

Appendix $B_3$

SENATE COMMITTEE ON UNDERGRADUATE STUDIES

COURSE PROPOSAL FORM (Changes in credit hours and prerequisites, and Course Number)

1. Calendar Information

Department: Mathematics

Abbreviation Code: MATH Course Number: 304-3 Credit Hours: 3 Vector: 3-1-0

Title of Course: Statistical Analysis of Sample Surveys

Calendar Description of Course: An introduction to the major sample survey designs and their statistical analyses. Considerations of cost and the use of prior information will be included.

Nature of Course Lecture/Tutorial

Prerequisites (or special instructions):
One course in Statistics or Probability; for example Math 101-3, or Psyc 210-3.
Students who have received credit for Math 305-4 cannot subsequently receive credit for Math 304-3.

What course (courses), if any, is being dropped from the calendar if this course is approved:

Math 305-4

2. Scheduling

How frequently will the course be offered? At least once yearly.

Semester in which the course will first be offered? Spring 1978

Which of your present faculty would be available to make the proposed offering possible: Drs. Bojadziev, Stephens, Villegas, Eaves.

3. Objectives of the Course

To provide an introductory treatment of the basic methods and techniques for sample survey designs and their statistical analyses. Particular types of sampling situations and inferential problems most frequently encountered in business, the social sciences, criminology, and natural-resource management (timber, wildlife, recreation) will be studied. Consideration of designing sampling procedures that reduce cost of information will be included.

4. Budgetary and Space Requirements (for information only)

What additional resources will be required in the following areas:

Faculty
Staff
Library
Audio Visual
Space
Equipment

NONE

5. Approval

Date: April 22/77 30/6/77 14 June 77

Department Chairman — Dean — Chairman, SCUS

SCUS 73-34b:- (When completing this form, for instructions see Memorandum SCUS 73-34a. Attach course outline).

MATHEMATICS 304-3

Statistical Analysis of Sample Surveys

1. STATISTICAL CONCEPTS

Types of Variables

Review of Probability, Distributions, Parameters, Estimators, Confidence Intervals. Central Limit Theorem.

2. BASIC SAMPLING SURVEY CONCEPTS

Reasons for Sample Surveying

Sample Survey Terms (population, frame, etc.)

Types of sampling (Simple, Random, Stratified, Multi-stage etc.)

3. SIMPLE RANDOM SAMPLING

Use of Random Number Tables

Estimators, Variance of Estimators, Confidence intervals

Choice of Sample Size

4. STRATIFIED RANDOM SAMPLING

Purpose, Choice of Strata

Estimators, Variance of Estimators, Confidence intervals

Methods of Allocating samples among strata

Choice of Sample Size

Comparison with Simple Random Sampling (Accuracy, Cost, etc.)

5. CLUSTER SAMPLING

Purpose, Sample Units, Examples

Estimators, Variance of Estimators, Confidence intervals

Choice of Sample Size

Comparison with Simple Random Sampling (Cost, etc.)

6. MULTI-STAGE SAMPLING

Purpose, Choice of Sample Units, Examples

Two-stage Sampling

Estimators, etc.

Choice of Sample Size

Extension to three or more stages

Comparison with single stage methods

7. RATIO AND REGRESSION ESTIMATION

Review of Covariance, Correlation, Regression

Purpose and examples

Ratio Estimates, Variance of Estimates, etc.

Regression Estimates, Variance of Estimate

Choice of Sample Size

Comparison with other methods

8. SYSTEMATIC SAMPLING

Purpose and examples

Estimators, Accuracy of Estimators

Choice of Sample Size

Repeated Systematic Sampling

9. APPLICATIONS

Census Surveys

Market Surveys

Opinion Polls

Wildlife Surveys. Choosing Sample Sizes for Direct and Inverse Sampling.