

**FN 9222A – RESEARCH METHODS AND STATISTICS**

**Course Directors:**

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**COURSE DESCRIPTION:** This course will focus on the study of research methods and statistics used in nutrition research. Nutrition research plays a vital role in setting professional practice standards and health policy and in determining the role of nutrition in health and disease prevention.

**BEHAVIOURAL OBJECTIVES:** By the end of the course, students will be able to:

- 1) Discuss methods to appropriately collect, analyze and interpret research data in a variety of nutrition-related areas
- 2) Understand the importance of applying scientific principles and statistical methods to nutrition research
- 3) Develop leadership skills in the area of research proposal writing by adhering to funding agency guidelines and grant writing principles
- 4) Apply statistical methods to a series of data sets and be able to interpret their statistical significance

**OUTCOME:**

- 1) A research proposal that is based on a research topic familiar to both the student and thesis or internship project advisor.
- 2) A series of data sets that are analyzed using recommended statistical software. These exercises are presented and discussed for class learning.

**APPROACHES:**

- 1) A series of lectures, discussions of relevant literature, student presentations, and workshop periods on the research methods and appropriate / selected statistics. Classes will require active participation and contribution by students.

- 2) Periods of self-directed learning and independent study that allow students to write a research proposal and complete their statistical computer assignments.
- 3) Periods of individual consultation with the Professors and/or Thesis Advisers, if appropriate, to provide feedback on the components of the research proposal and/or statistical assignments, as necessary.

**CLASS SCHEDULE:** Wednesdays, 9:30 – 12:30 PM

- TEXTBOOKS:**
- 1) Monsen, E.R. (ed). 2008. Research: Successful Approaches, 3<sup>rd</sup> ed. Academy of Nutrition and Dietetics, Chicago, IL.
  - 2) Pripp AH. 2013. Statistics in Food Science and Nutrition. Springer Briefs in Food, Health, and Nutrition. Springer Science + Business Media, New York.

- REFERENCES:**
- 1) Simon SD. 2006. Statistical Evidence in Medical Trials: What do the Data Really Tell Us? Oxford University Press.
  - 2) Leedy PD, Ormrod JE. 2012. Practical Research: Planning and Design, 10<sup>th</sup> ed. Pearson Merrill Prentice Hall, Upper Saddle River NJ.
  - 3) Rosner BA. 2010. Fundamentals of Biostatistics, 7<sup>th</sup> ed. Brooks/Cole Publishing, Belmont, CA.
  - 4) Hulley SB, Cummings SR, Browner WS, Grady DG, Newman, TB. 2013. Designing Clinical Research, 4<sup>th</sup> ed. Lippincott Williams & Wilkins, Philadelphia, PA.
  - 5) Bryman A, Bell EA, Teevan JJ. 2012. Social Research Methods: Third Canadian Edition. Oxford University Press Canada, Don Mills, Ontario.
  - 6) Bell J. 2010. Doing your Research Project, 5<sup>th</sup> ed. Open University Press, McGraw-Hill Education, Berkshire, England.

- EVALUATION:**
- 1) The research proposal will be evaluated based on the following components (**50%**):
 

a) Critical review of literature and uniqueness of the proposal	20
b) Appropriateness of methodology and evaluation	15
c) Statement of significance of proposed research	5
c) Presentation of research proposal (10 min)	10

2) The statistical assignments will be evaluated based on the following components (**50%**):

a) Statistical computer lab assignments	P/F
b) Class presentation	20
c) Group projects and exercises	10
d) Final exam	20
	100%
Total	

**LECTURE TOPICS:**

**RESEARCH METHODS:**

Week 1	Sept 16	Course requirements / assignments Overview of research design – descriptive, analytic Ideas for individual research topics Review of research proposal writing and funding agencies
2	Sept 23	Descriptive research – surveys, epidemiologic and qualitative research methods Review of published research articles and their methodologies
3	Sept 30	Seminar discussions – qualitative research studies Analytic research – clinical nutrition research, diet and human genetics, complementary and alternative medicine Review of published research articles and their methodologies
4	Oct 7	Seminar discussions – quantitative research studies Research in foodservice management and marketing Sample Size Review of published research articles and their methodologies
5	Oct 14	Ethics in human and animal research Discussions on research misconduct The role of research in dietetic practice
6	Oct 21	Descriptive statistics, Basic statistical terminology, Quantitative and qualitative measurements for Food and Nutrition research, Techniques and approaches for presenting research data, Class exercises
7	Oct 28	Statistical concepts, Frequency distribution, Central tendency, Measure variability, Class exercises

8	Nov 4	Research methods for food science, Statistical applications for sensory analysis of food, Z-scores, Probability, $X^2$ test, Class exercises
9	Nov 11	Introduction to t-test, Paired and un-paired t-test, Application of t-test in Food and Nutrition research, Class exercises, <b>Computer lab</b>
10	Nov 18	Introduction to analysis of variance, Application of ANOVA in Food and Nutrition research, Class exercises, <b>Computer lab</b> <b>Research Proposal Due</b>
11	Nov 25	Independent project, Data analysis, <b>Computer lab</b>
12	Dec 2	Presentation of research proposal
13	Dec 9	Presentation of research proposal

## **LECTURE RESOURCES / READINGS:**

### **A. Research Proposal guidelines – see Sakai/Owl posting**

### **B. Additional Reference Materials**

1. Agnew NM, Pyke SW. 2007. The Science Game. An Introduction to Research in the Behavioral and Social Sciences, 7<sup>th</sup> ed. Oxford University Press, Don Mills, Ontario.
2. Babbie, E. and Benaquisto, L. 2010. Fundamentals of Social Research: Second Canadian Edition. Nelson Education, Scarborough, ON.
3. Creswell J. 2013. Research design: qualitative, quantitative and mixed method Approaches, 4<sup>th</sup> ed. Sage Publications Inc., Thousand Oaks, CA.
4. Plichta SB, Kelvin E. 2012. Munro's statistical methods for health care research. Lippincott-Raven Publishers, Philadelphia, PA.
5. Canadian Public Health Association. 2012. Guide to questionnaire construction and question writing. CPHA.
6. World Health Organization. 2001. Health research methodology: A guide for training in research methods. WHO Regional Office for the Western Pacific, Manila, Philippines.

7. Kane RL. Understanding health care outcomes research, 2<sup>nd</sup> ed. 2006. Jones and Bartlett Publishers, Inc.

### **C. Other Articles**

1. Procter M. The abstract. <http://www.witing.utoronto.ca>. Accessed Aug. 8, 2013
2. Ten steps to writing an effective abstract. <http://www.sfeddit.net>. Accessed Aug. 8, 2013.
3. Manore MM. Getting your abstract accepted: the key to success. *J Am Diet Assoc.* 2001; 101:1410-1411.
4. Schiller MR, Moore C. Practical approaches to outcomes evaluation. *Topics Clin Nutr*, 1999; 14:1-12.
5. Seabrook JA, Avison WR. Genotype-environment interaction and sociology: Contributions and complexities. *Soc Sci Med* 2010; 70:1277-1284.
6. Vaughan L. Research and the dietetics profession: Initiating undergraduate students into the culture of research. *J Am Diet Assoc.* 2003; 103:815-816.
7. Walters SJ. Consultants' forum. Should post hoc sample size calculations be done? *Pharm Stat* 2009; 8:163-169.

### **D. Abstract Compilations**

1. Journal of the American Dietetic Association. Supplement 3 - Abstracts, August 2007, Vol. 107 No. 8.
2. Canadian Journal of Dietetic Practice and Research. Dietetic Research Event: A supplement to Vol. 64 No. 2, Summer 2003.

### **E. Ethics Guidelines**

1. Brescia University College. Research Ethics Board Guidelines for Research. 2005.
2. Canadian Council on Animal Care. Guide to the Care and Use of Experimental Animals, vol. 1, 2<sup>nd</sup> ed. 1993.
3. Tri-Council Policy Statement. Ethical conduct for research involving humans, 2<sup>nd</sup> ed. Medical Research Council of Canada, Natural Science and Engineering Research Council of Canada, Social Sciences and Humanities Research Council of Canada. 2011.

4. University of Western Ontario. Non-Medical Research Ethics Board (NMREB) Research Ethics Guidelines, ROMEO 2013.
7. University of Western Ontario. Health Sciences Research Ethics Board for the (HSREB) Research Ethics Guidelines, ROMEO 2013.
6. World Medical Association Declaration of Helsinki. Ethical principles for medical research involving human subjects. Amended October 2008

#### **F. Funding Institutions**

1. Canadian Institutes for Health Research (CIHR) Grants and Awards Guide - <http://www.cihr-irsc.gc.ca/>
2. Canadian Foundation for Dietetic Research (CFDR) Research/Grants [www.cfdrc.ca](http://www.cfdrc.ca)
3. Selecting the Appropriate Federal Granting Agency [from among the CIHR, Natural Sciences and Engineering Research Council (NSERC), and Social Sciences and Humanities Research Council (SSHRC)] [www.Science.gc.ca](http://www.Science.gc.ca)
4. Dairy Farmers of Canada [www.dairynutrition.ca/research-funding](http://www.dairynutrition.ca/research-funding)
5. Canadian Diabetes Association [www.diabetes.ca](http://www.diabetes.ca)
6. Lawson Health Research Institute [www.lawsonresearch.com/intra/grant/funding.htm](http://www.lawsonresearch.com/intra/grant/funding.htm)

#### **G. Additional Weblinks**

1. Dissertation Abstracts International. [www.umi.com/en-US/catalogs/databases/detail/dai.shtml](http://www.umi.com/en-US/catalogs/databases/detail/dai.shtml)
2. Dissertation abstracts: <http://www.lib.uwo.ca/business/PDQDigital/Dissertaion.html>

## **Health and Wellness**

As part of a successful graduate student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your graduate degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western's Campus Recreation Centre. Numerous cultural events are offered throughout the year. *for example*, please check out the Faculty of Music web page <http://www.music.uwo.ca/>, and our own McIntosh Gallery <http://www.mcintoshgallery.ca/>. Information regarding health- and wellness-related services available to students may be found at <http://www.health.uwo.ca/>. Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (graduate chair), or other relevant administrators in their unit. Campus mental health resources may be found at [http://www.health.uwo.ca/mental\\_health/resources.html](http://www.health.uwo.ca/mental_health/resources.html).

## **BRESCIA UNIVERSITY COLLEGE ACADEMIC POLICIES AND REGULATIONS**

### **1. POLICY REGARDING MAKEUP EXAMS AND EXTENSIONS OF DEADLINES**

When a student requests academic accommodation (e.g., extension of a deadline, a makeup exam) for work representing 10% or more of the student's overall grade in the course, it is the responsibility of the student to provide acceptable documentation to support a medical or compassionate claim. All such requests for academic accommodation **must** be made through an Academic Advisor and include supporting documentation. Academic accommodation on medical grounds will be granted only if the documentation indicates that the onset, duration and severity of the illness are such that the student could not reasonably be expected to complete her academic responsibilities. Appropriate academic accommodation will be determined by the Dean's Office in consultation with the student's instructor(s). Please note that personal commitments (e.g., vacation flight bookings, work schedule) which conflict with a scheduled test, exam or course requirement are not grounds for academic accommodation.

A UWO Student Medical Certificate (SMC) is **required** if a student is seeking academic accommodation on medical grounds. This documentation should be obtained at the time of the initial consultation with the physician/nurse practitioner or walk-in clinic. A SMC can be downloaded under the Medical Documentation heading of the following website: <https://studentservices.uwo.ca/secure/index.cfm>. If it is not possible to have an SMC completed by the attending physician/nurse practitioner, the student must request documentation sufficient to demonstrate that her ability to meet academic responsibilities was seriously affected. Please note that under University Senate regulations documentation stating simply that the student "was seen for a medical reason" or "was ill" is **not** adequate to support a request for academic accommodation. All documentation is to be submitted to an Academic Advisor.

Whenever possible, requests for academic accommodation should be initiated in advance of due dates, examination dates, etc. Students must follow up with their professors and Academic Advisor in a timely manner.

The full statement of University policy regarding extensions of deadlines or makeup exams can be found at <http://www.westerncalendar.uwo.ca/2015/pg117.html>

### **2. ACADEMIC CONCERNS**

If you feel that you have a medical or personal problem that is interfering with your work, contact your instructor and Academic Advisor as soon as possible. Problems may then be documented and possible

arrangements to assist you can be discussed at the time of occurrence rather than on a retroactive basis. Retroactive requests for academic accommodation on medical or compassionate grounds may not be considered.

If you think that you are too far behind to catch up or that your work load is not manageable, you should consult an Academic Advisor. If you consider reducing your workload by dropping one or more courses, this must be done by the appropriate deadlines (refer to the Registrar's website, [www.registrar.uwo.ca](http://www.registrar.uwo.ca), for official dates). You should consult with the course instructor and the Academic Advisor who can help you consider alternatives to dropping one or more courses. *Note that dropping a course may affect OSAP eligibility and/or Entrance Scholarship eligibility.*

The Dean may refuse permission to write the final examination in a course if the student has failed to maintain satisfactory academic standing throughout the year or for too frequent absence from the class or laboratory.

### 3. ABSENCES

**Short Absences:** If you miss a class due to a minor illness or other problems, check your course outline for information regarding attendance requirements and make sure you are not missing a test or assignment. Cover any readings and arrange to borrow notes from a classmate. Contact the course instructor if you have any questions.

**Extended Absences:** If you have an extended absence, you should contact the course instructor and an Academic Advisor. Your course instructor and Academic Advisor can discuss ways for you to catch up on missed work and arrange academic accommodations, if appropriate.

### 4. POLICY ON CHEATING & ACADEMIC MISCONDUCT

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site: [http://www.uwo.ca/univsec/pdf/academic\\_policies/appeals/scholastic\\_discipline\\_undergrad.pdf](http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf).

Students are responsible for understanding the nature of and avoiding the occurrence of plagiarism and other academic offences. Students are urged to read the section on Scholastic Offences in the Academic Calendar. Note that such offences include plagiarism, cheating on an examination, submitting false or fraudulent assignments or credentials, impersonating a candidate, or submitting for credit in any course without the knowledge and approval of the instructor to whom it is submitted, any academic work for which credit has previously been obtained or is being sought in another course in the University or elsewhere. Students are advised to consult the section on Academic Misconduct in the Western Academic Calendar.

If you are in doubt about whether what you are doing is inappropriate or not, consult your instructor, the Student Services Centre, or the Registrar. A claim that "you didn't know it was wrong" is not accepted as an excuse.

The penalties for a student guilty of a scholastic offence (including plagiarism) include refusal of a passing grade in the assignment, refusal of a passing grade in the course, suspension from the University, and expulsion from the University.

#### **Plagiarism:**

Students must write their essays and assignments in their own words. Whenever students take an idea or a passage from another author, they must acknowledge their debt both by using quotation marks where appropriate and by proper referencing such as footnotes or citations. Plagiarism is a major academic offence (see Scholastic Offence Policy in the Western Academic Calendar).

All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is

subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com.

### **Computer-marked Tests/exams:**

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating. Software currently in use to score computer-marked multiple-choice tests and exams performs a similarity review as part of standard exam analysis.

## **5. PROCEDURES FOR APPEALING ACADEMIC EVALUATIONS**

All appeals of a grade must be directed first to the course instructor. If the student is not satisfied with the decision of the course instructor, a written appeal signed by the student must be sent to the Department Chair. If the response of the department is considered unsatisfactory to the student, she may then submit a signed, written appeal to the Office of the Dean. Only after receiving a final decision from the Dean may a student appeal to the Senate Review Board Academic. A Guide to Appeals is available from the Ombudsperson's Office, or you can consult an Academic Advisor. Students are advised to consult the section on Academic Rights and Responsibilities in the Western Academic Calendar.

## **6. PREREQUISITES AND ANTIREQUISITES**

Unless you have either the prerequisites for a course or written special permission from your Dean to enroll in it, you will be removed from the course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

Similarly, you will also be deleted from a class list if you have previously taken an antirequisite course unless this has the approval of the Dean. These decisions may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course because you have taken an antirequisite course.

## **7. SUPPORT SERVICES**

The Brescia University College Registrar's website, with a link to Academic Advisors, is at <http://brescia.uwo.ca/academics/registrar-services/>. The Western Registrar's website is at <http://www.registrar.uwo.ca/index.html>. The website for the Student Development Centre at Western is at <http://www.sdc.uwo.ca/>. Students who are in emotional/mental distress should refer to Mental Health @ Western <http://www.uwo.ca/uwocom/mentalhealth/> for a complete list of options about how to obtain help.

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Portions of this document were taken from the Academic Calendar, the Handbook of Academic and Scholarship Policy and the Academic Handbook of Senate Regulations. This document is a summary of relevant regulations and does not supersede the academic policies and regulations of the Senate of the University of Western Ontario.