NTDT 40403  
Research Methods in Nutrition

Semester: Spring 2006

Time: MWF 10:00-10:50 AM

Instructor: Mary Anne Gorman, PhD, RD, LD, FADA;  
Bass Building Room 117; (817) 257-63199; m.gorman@tcu.edu

Office/Hours: Bass 117; M-W 9:00-9:50, 11:00-11:50; other times by appointment

Course Purpose: This course is designed to (1) partially fulfill the TCU Mission of educating individuals to think and act as ethical leaders and responsible citizens in the global community; and (2) meet competencies of Writing Emphasis Courses in The Essential Competencies Curriculum: TCU graduates will demonstrate the ability to use writing as a means for learning and communicating in a specific discipline. The course instructional methodology will include lectures, discussions, research paper, and tests.

Course Description: Fundamentals of research design in nutrition. Completion of an individual research paper that incorporates proper research design, methodology, analysis, writing style, and writing format utilized in nutrition research journals. Primarily designed for students with an interest in Nutrition and Dietetics.

Prerequisites: None, fulfills the requirement for a Writing Emphasis Course in The Essential Competencies Curriculum


Course Objectives:

Upon completion of the course, the following Foundation Knowledge and Skills for Didactic Component of Entry-Level Dietitian Education Programs will be provided:

A. Communications;  
A.1.2. Knowledge about lay and technical writing;  
A.3.5. Demonstrated ability to use current information technologies;

D. Research;  
D.1.1. Knowledge about research methodologies  
D.1.3. Knowledge about outcome based research;  
D.2.1. Knowledge of the scientific method;  
D.3.1. Demonstrated ability to interpret current research; and  
D.3.2. Demonstrated ability to interpret basic statistics.

In addition to the acquisition of the above competencies, students completing this course will be able to:

- Develop a research proposal;
- Utilize proper research design, methodology, writing style, and writing format in the completion of a research manuscript of at least 30 pages in length;
- Design and prepare visual materials appropriate for the presentation of research at a professional meeting;
- Develop techniques to make oral presentations of nutrition research;
- Apply the principles of descriptive and inferential statistics in a variety of nutrition research settings;
- Utilize the scientific method in the design of research;
- Interpret data given frequency distributions, measures of central tendency, of standard scores from normal distributions;
- Identify the analysis technique appropriate for the design of the research;
- Apply tools of nutrition research in the preparation of abstracts, outlines, and research proposals; and
- Design tables, graphs, and figures which accurately present data obtained from computerized data analysis; and
- Demonstrate the ability to use writing as a means for learning and communicating in the nutritional sciences.
Nutrition research project: Students are required to design a nutrition research project, obtain data for analysis, analyze data collected (utilizing appropriate statistical analysis techniques in Microsoft Excel or SPSS (Statistical Package for the Social Sciences), and write a manuscript suitable for publication in a refereed nutrition journal such as the *Journal of the American Dietetic Association*. Students are encouraged to meet with the professor numerous times throughout the semester to discuss various aspects of the research design, data collection, data analysis process, and writing of the research manuscript. Students are also encouraged to interact with the professor regarding submission of chapters for review and interpretation of revisions/corrections to chapters submitted. Proper research design, methodology, writing style, and writing format should be utilized in the preparation of an abstract and research document of at least 30 pages in length that is based on independent research. Lectures and tests on various statistical techniques/procedures are discussed throughout the semester while the student is conducting and completing requirements associated with the nutrition research project.

Course Objectives in Terms of Student Learning Outcomes (LO), Student Action Steps (AS), and Applications/Examples (A/E):

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<td>Indicate which of the following are appropriate to your course.</td>
<td>Indicate which are to be used in your course or add others you will use to reach the selected Learning Outcome(s) (LO).</td>
<td>Explanation of how students will, through the use of Student Action Steps (AS), achieve the Writing Emphasis Learning Outcomes (LO).</td>
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I. Students will demonstrate a working knowledge of the rhetorical conventions of the target discipline (nutritional sciences).

I.1. Students will discuss and employ, in writing, the conventions of the discipline (nutritional sciences).

I.1.a. Students will obtain copies of the most recent guide for authors provided by editors of the *Journal of the American Dietetic Association* (or other refereed nutrition-related journal) and discuss specific writing formats for scientific professionals during lectures on nutrition-specific rhetorical conventions.

I.1.b. After conducting a research project, students will utilize the format of the *Journal of the American Dietetic Association* (or other refereed nutrition-related journal) to complete a research manuscript suitable for submission to the *Journal of the American Dietetic Association*. The manuscript will consist of four chapters (Introduction, Review of the Literature, Methods, Results, and Conclusions) and will also include a Cover Page, Table of Contents, Table of Tables/Figures, Abstract, References, and Appendices.

II. Students will exhibit the ability to use writing as a means of gaining and expressing an understanding of discipline-specific content (nutritional sciences).

II.1. Students will use writing to conduct inquiry into an appropriate discipline-specific topic (nutritional sciences).

II.1.a. Students will design their own research project, formulate hypotheses, collect data, analyze data (utilizing appropriate statistical analysis procedures), formulate conclusions based on hypotheses, and write a manuscript (described in I.1.b.) to convey research results/conclusions.

**COURSE OUTLINE**

(Learning Outcomes, Student Action Steps, and Applications/Examples are noted below in the Course Outline):

Fundamentals of research design in the Nutritional Sciences:
- Research in the nutritional sciences; Developing hypotheses for investigation;
- Utilization of library resources; Reviewing literature; Refereed vs. non-refereed journals
- Funding sources and grant writing
- Obtaining permission to conduct nutrition research projects:
  - Human Participant Protections Education for Research Completion Certificate - (sponsored by the National Institutes of Health)
NTDT / TCU Safeguards in Human Research Committees

- Descriptive and Inferential Statistical Research Designs
- Descriptive analysis studies, epidemiological research, case studies, clinical trials
- Computerized data analysis techniques using Microsoft Excel or SPSS (Statistical Package for the Social Sciences)

Preparation of the research paper in the Nutritional Sciences:

- Techniques in obtaining/utilizing Guide for Authors from refereed journals; differences in rhetorical conventions utilized in the nutritional sciences; discussion of discipline-specific writing conventions utilized in research in the nutritional sciences (LO I, AS 1, A/E a)
- Techniques utilized in writing a nutrition research proposal (LO I, AS 1, A/E b)
- Techniques utilized in abstracting nutrition research (LO I, AS 1, A/E b)
- Techniques utilized in writing research outlines (LO I, AS 1, A/E b)
- Techniques utilized in writing abstracts (LO I, AS 1, A/E b)
- Techniques utilized in the preparation of tables, graphs, and figures (LO I, AS 1, A/E b)
- Acknowledging references within the research manuscript (LO I, AS 1, A/E b)
- Reference format (LO I, AS 1, A/E b)

Writing the abstract/chapters of the research document (LO II, AS 1, A/E a):

- Abstract
- Chapter I: Introduction
- Chapter II: Review of the Literature
- Chapter III: Methods
- Chapter IV: Results
- Chapter V: Discussion and Conclusions

Preparation of the finished nutrition research manuscript (LO II, AS 1, A/E a):

- Title Page
- Table of Contents
- Table of Tables
- Table of Figures
- Acknowledgments
- Abstract
- Manuscript Chapters
- Inserting Tables and Graphs
- References
- Appendices

Statistical Analysis in the Nutritional Sciences:

- Descriptive statistics in nutrition research:
  - Scientific method;
  - Scales of measurement;
  - Discrete vs. continuous variables;
  - Frequency distributions: bar graphs, histograms, frequency, polygons;
  - Measures of central tendency: mean, median, mode;
  - Measures of variability: range, standard deviation, variance, standard error;
The normal curve

Test 1 – Chapters 1-5

- Regression; Correlation
- Inferential statistics in nutrition research:
  Random sampling;
  Probability;
  Binomial distribution

Test 2 – Chapters 6-9

- Inferential statistics continued:
  Hypothesis testing –Sign Test;
  Type I and Type II errors;
  Alpha level and the decision process;
  Power and Beta;
  Sampling distribution of the mean;
  t-test for correlated and independent samples;
  Analysis of variance;
  Multiple comparisons;
  Two factor analysis of variance;
  Chi-square goodness-of-fit and test of independence;
  Other non-parametric tests

Test 3 – Chapters 10-18

Final Exam (at time and day assigned by TCU)

Textbook and other assigned readings: Students are expected to read assigned materials prior to coming to class;

Tests: Students should take tests on the assigned dates. Arrangements should be made with the instructor regarding the possibility of make-up tests.

Evaluation: Student grades will be determined as follows:

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<th>Assignment of grade:</th>
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<tr>
<td>Exams (3)</td>
<td>300 points</td>
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<td>A = 90-100% of total pts</td>
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<td>Final Exam</td>
<td>200 points</td>
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<td>B = 80-89% of total pts</td>
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<td>Research Manuscript</td>
<td>200 points</td>
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<td>C = 70-79% of total pts</td>
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<td>D = 60-69% of total pts</td>
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<td>F = &lt; 60 % of total pts</td>
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Additional course requirements:

All students enrolled in NTDT 40403 (Research Methods in Nutrition) are required to complete the Human Research Tutorial during the first week of class. Each student must receive a score of at least 80% correct to complete this course requirement. Print out Course Completion Certificate (following documentation of the course with a score of at least 80%) and bring it to the next class that meets on a Monday. The Human Research Tutorial can be found at the following website: [http://cme.cancer.gov/c01/](http://cme.cancer.gov/c01/). If appropriate, students must complete forms and receive approval from the NTDT / TCU Safeguards in Human Research Committee.

Your completed Course Completion certificate should look like the following:
Human Participant Protections Education for Research Completion Certificate

This is to certify that

Mary Anne Gorman

has completed the Human Participants Protection Education for Research Teams online course, sponsored by the National Institutes of Health (NIH), on 01/12/2004.

This course included the following:

- key historical events and current issues that impact guidelines and legislation on human participant protection in research.
- ethical principles and guidelines that should assist in resolving the ethical issues inherent in the conduct of research with human participants.
- the use of key ethical principles and federal regulations to protect human participants at various stages in the research process.
- a description of guidelines for the protection of special populations in research.
- a definition of informed consent and components necessary for a valid consent.
- a description of the role of the IRB in the research process.
- the roles, responsibilities, and interactions of federal agencies, institutions, and researchers in conducting research with human participants.

National Institutes of Health
http://www.nih.gov
Attendance Policy: Regular and punctual class attendance is essential to the completion of course objectives, student action steps, and student learning outcomes. The University policy on excused absences will be followed in this course. Students will be allowed to make-up tests/assignments missed due to Official University Absences, serious illness, or family-related emergencies verified by Campus Life. If a student must be absent from class, it is the student’s responsibility to inform the instructor prior to the absence to discuss the possibility of making up tests/assignments due. Individual absences will affect the grade received by the entire group when group assignments are due.

Academic Honesty: The University policy on academic honesty will be strictly enforced. The usual consequences of academic dishonesty are (a) failure in the course and (b) referral of the case to the Dean of the School of Science and Engineering. Academic Misconduct (Sec. 3.4 from the Student Handbook) – Any act that violates the academic integrity of the institution is considered academic misconduct. The procedures used to resolve suspected acts of academic misconduct are available in the offices of Academic Deans and the Office of Campus Life. Specific examples include, but are not limited to:

- Cheating: Copying from another student’s test paper, laboratory report, other report, or computer files and listings; Using, during any academic exercise, material and/or devices not authorized by the person in charge of the test; Collaborating with or seeking aid from another student during a test or laboratory without permission; Knowingly using, buying, selling, stealing, transporting, or soliciting in its entirety or in part, the contents of a test or other assignment unauthorized for release; Substituting for another student or permitting another student to substitute for oneself;
- Plagiarism: The appropriation, theft, purchase or obtaining by any means another’s work, and the unacknowledged submission or incorporation of that work as one’s own offered for credit. Appropriation includes the quoting or paraphrasing of another’s work without giving credit therefore; and
- Collusion: The unauthorized collaboration with another in preparing work offered for credit.

Disabilities Statement: (Disability Statement approved Spring 2003 by the Undergraduate Council) Texas Christian University complies with the Americans with Disabilities Act and Section 504 of the Rehabilitation Act of 1973 regarding students with disabilities. If you require accommodations for a disability, please contact the Coordinator for Students with Disabilities in the Center for Academic Services, located in Sadler Hall 11. Further information can be obtained from the Center for Academic Services, TCU Box 297110, Fort Worth, TX 76129, or at 817-257-7486. Adequate time must be allowed to arrange accommodations and accommodations are not retroactive; therefore, students should contact the Coordinator as soon as possible in the academic term for which they are seeking accommodations. Each eligible student is responsible for presenting relevant, verifiable, professional documentation and/or assessment reports to the Coordinator. Guidelines for documentation may be found at http://www.acs.tcu.edu/DISABILITY.HTM. Students with emergency medical information or needing special arrangements in case a building must be evacuated should discuss this information with their instructor/professor as soon as possible.

TCU Campus Resources for Students: Many resources exist on the TCU campus that may be helpful to students: Mary Couts Burnet Library (257-7117); Center for Academic Services (257-7486, Sadler Hall. 11); the William L. Adams Writing Center (257-7221, Rickel Bldg. 244); Student Development Services (257-7855, Student Center Rm. 220); and University Ministries (257-7830, Student Center Rm. 111).
THE EFFECT OF DIETARY PROTEINS
ON SERUM LIPIDS AND BILIARY CONSTITUENTS
IN THE HAMSTER

A RESEARCH MANUSCRIPT
SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS
FOR THE DEGREE OF BACHELOR OF SCIENCE
IN THE DEPARTMENT OF NUTRITIONAL SCIENCES OF
TEXAS CHRISTIAN UNIVERSITY

COLLEGE OF SCIENCE AND ENGINEERING

BY

MARY ANNE GORMAN

FORT WORTH, TEXAS
MAY, 2006
The abstract is written following JADA guidelines. Students should get a copy of guidelines for writing an abstract from the JADA. In general, the abstract should contain a learning objective, introduction, methods, results, and conclusions/implications for dietetic practice. The title format and author information/affiliations should be listed as stated in JADA abstract guidelines. The abstract should be single-spaced and not exceed 250 words in length.
CHAPTER I

INTRODUCTION

The Introduction Chapter is brief (usually 1-3 pages in length). This chapter justifies the need to conduct the research. In this chapter, the author presents statistics that describe the nature of the problem ... or statistics that present a question that will be answered by the paper. A description of how your research will solve the problem or answer the question follows.

The Research Objectives must be included at the end of the Introduction Chapter. The Research Objectives (purpose for conducting the research) are identified by the use of a Subheading entitled "Research Objective" or "Research Objectives". The specific objectives of the research are then LISTED. Note: The author MUST meet (answer) all research objectives ... although the answers to the research questions are not stated until Chapter V - Conclusions.

Number all references sequentially throughout the entire paper (Chapters I - V). Use the ADA reference citation format or the format of another refereed journal approved by the instructor.
CHAPTER II

LITERATURE REVIEW

The literature review is a complete description of published articles related to the topic. If the topic involves a disease state, the literature review includes a complete referenced discussion of the etiology of the disease and the relation of the disease to the research topic being investigated. If the topic involves a particular nutrient, the literature review includes a complete, referenced discussion of the metabolic processes related to the nutrient.

Subheadings are used to help the reader understand subtopics related to topic. It is usually best to group articles (as they are found) into subtopics for later writing ease.

To gain assistance in the utilization of library databases and research methods, the TCU library is offering various courses weekly throughout the semester. Students should contact the library and sign-up for these courses as soon as possible.

Internet research sources are not sufficient as the sole research articles. At least 15 research sources must come from traditional refereed journal articles.
Chapter III (Methods) explains to your reader exactly how you accomplished your research goals (conducted your experiment). This chapter is written in paragraph form. The author must be SPECIFIC and DETAILED in the description of how the research was conducted. Anyone should be able to duplicate the experiment by following your directions in this chapter.

All materials related to the research methodology are included in the Appendices. Questionnaires developed, letters to subjects, letters requesting permission to conduct the research, etc. are included in the Appendices.
CHAPTER IV

RESULTS

This chapter contains the results of the research objectives outlined in Chapter I. If additional results are obtained, these findings are also included. Figures and tables should be utilized to summarize results. The text of this chapter, introduces figures and tables, and summarizes important findings from the figures and tables. The author should not speculate in this chapter on why the results occurred ... only report what you found.
CHAPTER V

CONCLUSIONS

Conclusions reached by conducting the research are included in this chapter. Answers to research objectives must be included. In this chapter, the author may speculate on why certain results occurred and cite results obtained by other researchers who conducted similar studies.

A subheading on "Suggestions for Future Research" is usually included. In this subheading, the author should suggest additional research studies that should be conducted next.
Additional Rules/Suggestions for the Research Paper/Manuscript:

1. Use the following chapter titles:

   CHAPTER I - INTRODUCTION
   CHAPTER II - REVIEW OF THE LITERATURE
   CHAPTER III - METHODS
   CHAPTER IV - RESULTS
   CHAPTER V - CONCLUSIONS

   (Note that chapter numbers and titles are written in all capital letters, triple space between the chapters number and the chapter title, and triple space after the chapter title) Double space in the body of the paper.

2. Use third person throughout the paper - avoid pronouns

3. Use Subheadings to let your reader know the nature of the next paragraph(s).

4. DO NOT start sentences with numbers or abbreviations. The first time you use an abbreviation, spell it out for your reader. Example: "For all subjects, body mass index (BMI) was computed". From that point on, you may use the abbreviation BMI to stand for body mass index.

5. Place cover letters, instruments, supporting information in Appendices.

6. Place Tables, Graphs, and Figures on the page immediately following the page on which the Table or Figure is first identified. If more than 1 Table or Figure are identified on one page, all Tables and Figure, appear on the NEXT pages.

7. Use ADA, APA, MLA, TCU format for references and referencing authors in the paper.

8. Place the page number of the first page of each chapter, Tables, and Figures on the bottom center of the page.

9. Place other page numbers in the upper right hand corner of the page (down approximately 1/2" from the top of the page and 1/2" from the right hand corner of the page) ... the computer knows where to place the page numbers ... if you tell the computer where you want the page numbers.

Spring 2006 Timetable for Completion of Research Paper:

- Feb 27  Chapters I and III due for editing
- March 1  Chapters I and III returned with revisions
- March 15 Chapter II due; data collection should be complete
- March 29 Chapter II returned
- April 3  Chapter IV due
- April 10 Chapter IV returned
- April 19 Chapter V due
- April 26 Chapter V returned
- April 28 Final Paper DUE