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Upper Division General Education (UDGE) 3005 Research Methodology and Composition (4 Units)

Prerequisites: Admission to the Dental Hygiene Completion Program and college level statistics course. STAT 1510 or PSYC 2200 or equivalent with a grade of “C” or better.

Hours and Unit Calculations:

64 hours lecture. 128 Outside of class hours. (192 Total Student Learning Hours) 4 Units

Catalog Description: This course is designed to introduce students to the research process and how it applies to evidence-based patient care. Emphasis on research design and methods, scientific databases, and evidence-based resources. Application of research methods and statistical techniques to the critical evaluation of current scientific literature.

Type of Class/Course: Degree Credit

Textbooks:

Eyler, Amy. *Research Methods for Public Health*. Springer Publishing, 2020.

Forrest, Jane L., et al. *Evidence-Based Decision Making: A Translational Guide for Dental Professionals*, 9th ed. Lippincott, Williams & Wilkins, 2012.

Patten, Mildred L., and Michelle Newhart. *Understanding Research Methods: An Overview of the Essentials*, 10<sup>th</sup> ed., Routledge, 2017.

Chiappelli, Francesco & Brant, Xenia & Oluwadara, Oluwadayo & Neagos, Negoita & Ramchandani, Manisha. 2005.

Introduction: Research Synthesis in Evidence-Based Clinical Decision-Making. Evidence-Based Practice: Toward Optimizing Clinical Outcomes. 3-16. 10.1007/978-3-642-05025-1\_1.

Additional Required Materials: Dental Hygiene Journal

Course Objectives:

By the end of the course, a successful student will be able to:

1. Compile a list of scientific articles for a literature review/research paper.
2. Critically analyze scientific journal articles.
3. Differentiate between components of research design.

4. Apply the principles of scientific writing.

#### Course Scope and Content:

- Unit I            Literature Review
- A. Purpose of the literature review
  - B. Development of a literature review
    - a. identifying the problem
    - b. searching databases
      - i. sources for literature review
        1. scientific peer-reviewed journals
        2. conference proceedings
        3. government reports
      - ii. citing references
      - iii. evaluating sources
        1. scientific peer-reviewed journals
        2. conference proceedings
        3. government reports
  - C. Evaluating data
    - a. summarizing information
    - b. determine importance of information to topic
  - D. Analyzing and drawing conclusions
    - a. finding similarities and differences between articles
- Unit II            Critical analysis
- A. Parts of a scientific journal article
    - a. abstract
    - b. introduction
    - c. methods and materials
    - d. results
    - e. discussion
    - f. conclusion
    - g. references
  - B. Purpose of critical analysis
    - a. evaluate strengths and weaknesses
    - b. determine if research is valid
  - C. Criteria
    - a. type of publications
      - i. textbooks
      - ii. peer-reviewed journals
      - iii. current vs historical resources
    - b. authors' qualifications
    - c. purpose of research
    - d. methods and materials
      - i. validity and reliability
      - ii. sampling methods
      - iii. statistical analysis
      - iv. research design
    - e. results

- f. discussion
  - i. conclusions supported by findings
  - ii. recommendations for future research
- g. references
  - i. comprehensive list
  - ii. combination of historical and current sources

### Unit III Research Design

- A. Study design
  - a. prospective cohort
  - b. retrospective case control
  - c. cross-sectional
  - d. clinical trials
    - i. double blind and single blind studies
    - ii. parallel design
    - iii. crossover design
- B. Sampling methods
  - a. convenience
  - b. judgmental
  - c. stratified
  - d. randomized
  - e. systematic
- C. Controlling bias
  - a. sample size
  - b. examiner calibration
    - i. intrarater reliability
    - ii. interrater reliability
  - c. validity
  - d. sampling method
- D. Hypothesis testing
  - a. alternate hypothesis
  - b. null hypothesis
  - c. Type 1 error
  - d. Type 2 error
  - e. variables
    - i. independent
    - ii. dependent
    - iii. confounding
- E. Research ethics
  - a. informed consent
  - b. Institutional Review Board

### Unit IV

#### Scientific writing

- A. Organization of information
  - a. Outlines
  - b. paragraph order
    - i. topic sentences
    - ii. supporting information
- B. Style

- a. Scientific terminology
- b. use of abbreviations
- c. sentence structure
  - i. past or present tense
  - ii. first or third person
  - iii. basic grammar guidelines
- C. Bibliography
  - a. NLM format (National Library of Medicine)
  - b. how to cite references within paper
- D. Reference sources
  - a. Library catalog
  - b. CREDO Reference
    - i. Books
  - c. Library catalog
  - d. eBook Academic Collection (EBSCOhost)
    - i. Periodicals (journals, magazines, and newspapers)
  - e. Electronic databases, including PubMed, MEDLINE, and Dentistry & Oral Sciences Source
  - f. Internet sources (.gov, .edu, .org, .com, etc)
    - i. Search engines

#### Learning Activities Required Outside of Class

The students in the class will spend a minimum of 8 hours per week outside of the regular class time doing the following:

1. Read a 10-page scientific journal article on a contemporary topic in health care and identify the purpose of the study, hypothesis and independent and dependent variables.
2. Conduct a literature search on a health related topic and compile a list of 10-15 articles from current, peer-reviewed journals.
3. Write a review of the literature using 10-15 articles from current, peer-reviewed journals.

#### Methods of Instruction

1. Lecture presentation, online discussions and case study analysis
2. Presentations of major projects followed by discussion and evaluation.

#### Methods of Evaluation

1. Written Critical Evaluation of a current scientific research.
2. Literature Search based on research problem.
3. Exams (multiple choice, short answer, essay questions).
4. Problem solving exercises.
5. Oral presentation on research.
6. Small group work

#### Supplemental Data:

TOP Code:	499900: Other Interdisciplinary Studies
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SAM Priority Code:	E: Non-Occupational
Distance Education:	Not Applicable
Funding Agency:	Y: Not Applicable (funds not used)
Program Status:	1: Program Applicable
Noncredit Category:	Y: Not Applicable, Credit Course
Special Class Status:	N: Course is not a special class
Basic Skills Status:	N: Course is not a basic skills course
Prior to College Level:	Y: Not applicable
Cooperative Work Experience:	N: Is not part of a cooperative work experience education program
Eligible for Credit by Exam:	NO
Eligible for Pass/No Pass:	NO
Taft College General Education:	Meets General Education requirement for Bachelors Degree
Discipline:	Dental Technology or Interdisciplinary Studies or Psychology or Sociology or Health