Miami Dade College

Course Description

EGS1010| Applied Research Methods | 1.00 - 3.00 credits

This course is designed for STEM majors. Students will learn basic research practices: research methods, experimentation, validation, technical writing, and presentations. Using the Affinity Research Group model, students will work in groups to conduct theory-based STEM research, develop poster presentations, and write conference and journal publications.

Course Competencies

Competency 1: The student will demonstrate an understanding of the Affinity Research Group model by:

1. Describing the Affinity Research Group Model
2. Explaining the Affinity Research Group components
3. Giving examples of the Five Elements of Cooperation
4. Practicing the Five Elements of Cooperation during in-class sessions
5. Defining cooperative learning and situated learning
6. Identifying the major phases of a research project

Competency 2: The student will demonstrate the ability to design research methodology that adequately addresses research questions or hypotheses by:

1. Comparing and contrasting different types of research methods
2. Describing the difference between research problems and research questions
3. Formulating appropriate research problems and research questions
4. Conceptualizing a research design
5. Constructing an instrument for data collection
6. Selecting a sample
7. Collecting data
8. Processing data
9. Displaying data

Competency 3: The student will demonstrate an understanding of qualitative and quantitative analysis by:

1. Distinguishing between qualitative and quantitative study designs
2. Describing the role of statistics in research
3. Applying basic descriptive statistics to data
4. Discussing statistical inference techniques and significance and their relationship to hypothesis testing
5. Processing data in quantitative/qualitative studies using statistical software packages, such as SPSS or R

Competency 4: The student will demonstrate the ability to conduct a literature review by:

1. Discussing the purpose of literature review in research
2. Searching for existing literature that pertains to a particular body of work or area of research.
3. Reviewing the selected literature
4. Developing theoretical frameworks from the literature review that pertain to a particular research problem
5. Developing conceptual frameworks as the basis for a research problem
6. Discussing technical papers and how they relate to a research problem and/or research question.
7. Writing journal and conference paper summaries
8. Writing a literature review summary with properly formatted references according to accepted styles such as APA, MLA, or IEEE reference formatting

Competency 5: The student will demonstrate the ability to communicate research findings by:

1. Creating a research poster
2. Writing a technical research report that includes standard sections (i.e. the Abstract, Introduction, Literature Review, Methodology (if applicable), Research Method, Data, Discussion, Conclusion, References, Bibliography, and Appendices)

3. Writing research proposals
4. Critiquing the research of others
5. Delivering technical research presentations

Competency 6: The student will demonstrate research project management skills by:

1. Identifying the differences between research aims and research objectives
2. Defining Specific, Measurable, Attainable, Relevant and Timely (S.M.A.R.T.) goals for a research project
3. Identifying the classic research project stages
4. Creating GANTT Charts to organize a research project's activities
5. Discussing examples of common risks and their mitigation in research projects
6. Using software project tracking tools such as Microsoft Project, Excel, or Open Workbench to manage research projects

Competency 7: The student will demonstrate an understanding of ethical issues in research by:

1. Describing the institutional review process and ethical issues such as the use of human subjects, information collection, informed consent, subject compensation, animal research, stem cells, euthanasia, etc.
2. Explaining ethical issues related to the researcher, such as avoiding bias, incorrect reporting, plagiarism, etc.

Learning Outcomes:

- Communicate effectively using listening, speaking, reading, and writing skills
- Formulate strategies to locate, evaluate, and apply information
- Use computer and emerging technologies effectively