

RESEARCH METHODOLOGY IN PHYSICS EDUCATION (Code:.....)

Syllabus

Physics Education Study Program Faculty of Mathematics and Science

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1. COURSE DESCRIPTION

This is an introductory course in research methods and proposal writing of Physics Education. The course is designed to give students experience in hypothesis and specific aims development and an overview of the use of the scientific study design for solving education problems. The governing principle of the course is to provide students with an interactive “how to” learning experience during which they receive regular feedback on their work. The course objectives will be accomplished through didactic lectures and small group and individual assignments. Ultimately, each student will write a brief research proposal that follows a similar format to the Yogyakarta State University Investigation proposal. This will be accomplished through a series of individual assignments. In addition, students will present a research proposal from work accomplished through small group assignments to peers and Mathematics and Science faculty in a poster session at the end of the semester.

2. OBJECTIVES

- Understand the underlying principles of research in general and educational research in particular.
- Develop the skill of preparing complete proposals in any educational topic
- Demonstrate the knowledge and skill of writing valid and reliable tools of data collection.
- Choose and apply the appropriate tools of data analysis and interpret to reach up on the actual findings.
- Demonstrate Skill of Producing scholarly Thesis, articles and book reviews.

3. CONTENTS

UNIT 1. FUNDAMENTALS OF EDUCATIONAL RESEARCH

- 1.1. Nature and characteristics of Research
- 1.2. Objectives of Research
- 1.3. Types of Educational Research
- 1.4. Ethical considerations in Research
- 1.5. Unique Features of Educational Research

UNIT 2. RESEARCH DESIGN IN EDUCATION

- 3.1. Problem Identification
- 3.2. Formulation of Hypothesis
- 3.3. Sampling Technique/Design
- 3.4. Proposal development
- 3.5. Review of Related Literature and Search Engine

UNIT 3. DEVELOPMENT AND STANDARDIZATION OF TOOLS OF DATA COLLECTION

- 3.1. Types of tools of Data Collection
- 3.2. Structured and Unstructured Data
- 3.3. Standardization of Tools of Data Collection
- 3.4. Measure of Validity
- 3.5. Measure of Reliability

UNIT 4. RESEARCH DATA PROCESSING AND ANALYSIS

- 4.1. Phases of Data Processing
- 4.2. Types of Data Analysis
- 4.3. Qualitative Methods
- 4.4. Quantitative Methods
- 4.5. Mixed Methods

UNIT 5. RESEARCH REPORTING

- 5.1. Structure and Components of Research Report
- 5.2. Types of Report
- 5.3. Thesis and Dissertations
- 5.4. Journals, Articles and Book Review
- 5.5. Criteria of Good Research Report

4. EXAMINATIONS AND GRADING

There are no examinations in this course. However, there are a series of written independent assignments with specific deadlines. **Independent assignments are intended to be completed individually (without collaboration or consultation with your peers, faculty, or co-workers) per the honor code.** Please carefully review the assignments and the respective due dates. There are also small group assignments. This work will be done outside of class but will be presented by group members in class. Please see the “assignments” section and schedule of the syllabus for more detail.

There are several individual assignments and a group assignment during the semester including a final research proposal and poster presentation. The final product of the individual assignments is a referenced research proposal. The final product of the group assignments is a poster that will be presented by each student from each group at a poster session at the end of the semester. There are no exams. **Rubrics have been developed for grading and also serve as guides for essential elements of each assignment.**

The final grade for this course will be determined by the following components (total 405 points):

- **Individual Assignments** (80 points; ~20% of the final grade): There are four individual assignments with specific due dates. These assignments should be submitted via email.
- **Group assignments** will be completed outside of class and presented in a small group format at the group sessions. You will not be graded on these presentations but your attendance is worth 10 points (70 points; ~17% of the final grade).
- **Poster** (65 points; 16% of the final grade): Each **group** will be responsible for preparing a poster. The poster will be used by each member of the group for the presentation of the group's research idea to other groups in the class and faculty at the end of the semester at a poster session.
 - Content/appearance/organization ~31%
 - Individual student's presentation ~69%
- **Poster session attendance** (30 points; 7.4% of the final grade): You will be required to attend the poster session in order to present your poster and to serve as a student evaluator. Your attendance will be measured by the submission of your evaluations of the posters you are assigned to review.
- **Final paper** (160 points; 39.5% of the final grade): Each **student** will be responsible for submitting a final research proposal.

Percentages will be converted into letter grades according to the following scale*:

93-100%	A	83-86%	B	73-76%	C	63-66%	D
90-92%	A-	80-82%	B-	70-72%	C-	60-62%	D-
87-89%	B+	77-79%	C+	67-69%	D+	<60%	E

*the minimum passing score is 70%.

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