

**University of Arkansas for Medical Sciences  
Office of the University Registrar  
GUS Course Catalog Form**

This form should be used for courses offered at UAMS. If a course addition will change the curriculum for one or multiple degree plans, you will be asked to update a curriculum template for each degree program affected. Please remember to submit a copy of the syllabus with this form.

**Course Changes and Additions Submission Timeline**

Fall Semester            February 1<sup>st</sup> (same calendar year)  
Spring Semester        September 1<sup>st</sup> (preceding calendar year)  
Summer Semester       December 1<sup>st</sup> (preceding calendar year)

---

This request is for a:    New Course             Course Change             Course Retirement  (skip to p. 4)

College: Graduate School

Department/Program: Department of Biomedical Informatics

Course Title: Research Design in Biomedical Informatics

Course Description: This course provides an introduction to research design in biomedical informatics. Topics include epistemology, concept, construct and theory development, qualitative and mixed methods approaches as well as experimental and quasi-experimental design. This course will aid students in selecting, articulating and defending research designs for thesis or doctoral research.

Course Instructor: Meredith Zozus, PhD

Course Instructor Email: mzosus@uams.edu    Course Instructor Phone: (501) 603-1766

Additional Instructors: [Click here to enter additional instructor names and email addresses](#)

[Click here to enter additional instructor names and email addresses](#)

*[Click here to enter additional instructor names and email addresses](#)*

**GENERAL COURSE INFORMATION**

First term course will be offered/changed:    Fall             Spring             Summer

First year course will be offered/changed: 2017

Meeting dates differ from standard semester? Yes  No

If yes, describe meeting pattern: (i.e. last 4 weeks of semester, 8 Wednesdays beginning 2<sup>nd</sup> week, etc.)

Grading Basis: Letter Grade                      Number of Units: 1

If Variable Credit, list the maximum number of units: 3

Component Type: *Lecture*

Repeat for credit? Yes     No

If yes, limit to number of enrollments allowed per student: None

Preferred Catalog Number: *[Click here to enter text.](#)*

\*Note: Preferred Catalog Numbers are not guaranteed to be used.

## ENROLLMENT CONTROLS

### PREREQUISITES

Subject Area	Catalog #	Course Title	Course ID (if known)
<i>Subj. Area</i>	<i>Catalog #</i>	<i>Course Title</i>	<i>Course ID</i>
<i>Subj. Area</i>	<i>Catalog #</i>	<i>Course Title</i>	<i>Course ID</i>

### CO-REQUISITES

Subject Area	Catalog #	Course Title	Course ID (if known)
<i>Subj. Area</i>	<i>Catalog #</i>	<i>Course Title</i>	<i>Course ID</i>
<i>Subj. Area</i>	<i>Catalog #</i>	<i>Course Title</i>	<i>Course ID</i>
<i>Subj. Area</i>	<i>Catalog #</i>	<i>Course Title</i>	<i>Course ID</i>

Please list any other non-course prerequisites attached to this course (e.g. minimum GPA, exam, year in program)  
[Click here to enter text.](#)

Minimum Number of Students to Enroll: No Minimum

Maximum Number of Students who may Enroll: No Maximum

Is enrollment in this course limited to certain groups of students (i.e. PhD students only)? Yes  No

Please describe enrollment limits by groups: [Click here to enter max enrollments.](#)

Is advisor or instructor consent required for students to take this course? Instructor Consent

**INSTRUCTION MODE**

Please provide information about the first semester this course will be offered. You will have the opportunity to change this information if this form is provided prior to the last date for scheduling requests.

**INSTRUCTION INFORMATION**

Instruction Mode: *Online - 75-99% some face/face*

FOR ONLINE COURSES ONLY: Will this course be offered to students out of state? Yes  No

Please select all locations where this course will be taught:

Main Campus  Northwest Campus  UAMS Southwest  Other

If "Other" Location, please describe: *Click here to enter text.*

**EXAM AND PROGRESSION**

Will the course have a final exam? Yes  No

Will the final exam occur during the normally scheduled course time? Yes  No

Is there a minimum grade required for the student to progress? Not Required

**ADDITIONAL INFORMATION**

Are any degrees affected by this course addition? Yes  No

If "Yes," please list all degrees affected by this change: *Click here to enter text.*

**Does this course address/include:**

Service Learning <sup>1</sup> :	Partially <input type="checkbox"/>	100% <input type="checkbox"/>	Does not address <input checked="" type="checkbox"/>
Inter-professional Education <sup>2</sup> (IPE)	Partially <input type="checkbox"/>	100% <input type="checkbox"/>	Does not address <input checked="" type="checkbox"/>
Cultural competency <sup>3</sup>	Partially <input type="checkbox"/>	100% <input type="checkbox"/>	Does not address <input checked="" type="checkbox"/>
Patient-Family Centered Care <sup>4</sup>	Partially <input type="checkbox"/>	100% <input type="checkbox"/>	Does not address <input checked="" type="checkbox"/>
Interdisciplinary Education <sup>5</sup>	Partially <input checked="" type="checkbox"/>	100% <input type="checkbox"/>	Does not address <input type="checkbox"/>

**ADDITIONAL INFORMATION:**

*Click here to enter text.*

<sup>1</sup> A structured learning experience that combines community service with preparation and reflection. Students engaged in service-learning provide community service in response to community-identified concerns and learn: the context in which the service is provided, the connection between their service and their academic coursework, and their roles as citizens.

<sup>2</sup> Defined as students of two or more professions engaged in learning with, from and about each other.

<sup>3</sup> An ability to interact effectively with people of different cultures and ethnic backgrounds. Comprises four components: Awareness of one's own cultural worldview, attitude towards cultural differences, knowledge of different cultural practices and worldviews, and cross-cultural skills. Developing cultural competence results in an ability to understand, communicate with, and effectively interact with people across cultures.

<sup>4</sup> An approach to the planning, delivery, and evaluation of health care that is grounded in mutually beneficial partnerships among health care providers, patients, and families. It redefines the relationships in health care. The core concepts include: Dignity and respect, information sharing, participation, and collaboration.

<sup>5</sup> Defined as the degree to which individuals have the capacity to obtain, process and understand basic health information and services need to make appropriate health decisions.

**COURSE RETIREMENT ONLY – Course Additions and Changes can skip to pg. 5**

College: *Choose an item.*

Department/Program: *Click here to enter text.*

Course Title: *Click here to enter the current title.*

Catalog Name and Number: *Click here to enter text.*

Course ID (if known): *Click here to enter text.*

What semester and year will this course be retired? *Click here to enter text.*

Are any degrees affected by this course retirement? Yes  No

If "Yes," please list all degrees affected by this change (updated Curriculum Templates for any degree that will change as a result of this retirement are required to be submitted to the Office of the University Registrar):

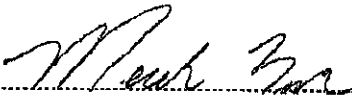

*Click here to enter text.*

**ADDITIONAL INFORMATION:**

*Click here to enter text.*

**APPROVALS**

Proposal will not be processed without all required signatures.

 ..... Course Instructor signature	Meredith Zozus, PhD
 ..... Associate Dean signature	Enter Associate Dean Name
Today's Date: October 5, 2016 Preparer's Email: tbwilliams@uams.edu	Preparer's Name: Tremaine Williams

Please submit this form and a copy of the syllabus to:

Angela Wilson, Registrar  
Email: [awilson5@uams.edu](mailto:awilson5@uams.edu)  
Mail Slot #767  
Questions? 501-526-6612

<p><b>Office use only</b></p> Received: _____ Entered into GUS <input type="checkbox"/> Entered into Schedule of Courses <input type="checkbox"/> Curriculum Registrar Initials: ____ Schedule Registrar Initials: ____	<p><b>Notes/Follow-up:</b></p>
---	--------------------------------

**COURSE APPROVAL FORM, Graduate School  
University of Arkansas for Medical Sciences**

This form and attached materials are due in the Graduate School Office on the first Monday of the month. All forms will be submitted to the UAMS Graduate Council Curriculum Committee for review and approval prior to consideration by the Graduate Council.

This form is not required for minor stylistic or editorial corrections to the title or course descriptions. These may be made when revising the catalog copy.

1. **Program:** Department of Biomedical Informatics

B	I	O	M				
---	---	---	---	--	--	--	--

  
*Department* *Alpha (Department) Code*

2. **Action proposed** (indicate one or more items): Effective term: Fall 2017

- |  |   |       |
|--|---|-------|
| <input checked="" type="checkbox"/> Add course                   | <input type="checkbox"/> Change title                                 |       |
| <input type="checkbox"/> Eliminate course<br>(No outline needed) | <input type="checkbox"/> Change credit hours from: _____ to _____     |       |
|  | <input type="checkbox"/> Change course number<br>from: _____ to _____ |       |
|  | <input type="checkbox"/> Change description                           | _____ |

3. **Course ID, title and description:**

B   I   O   M		Research Design in BIOM
<i>prefix</i>	<i>number</i>	<i>title (20 characters)</i>
Research Design in Biomedical Informatics		
<i>catalog name (40 characters)</i>		

Scheduled offering:  Fall  Spring  Summer  On demand

To cross list a course, use the Course Cross Listing Form.

Describe the course in sentence form using 50 words or less as it is to appear in the catalog. List prerequisites, co-requisites and possible off-site instructional opportunities or requirements.

This course provides an introduction to research design in biomedical informatics. Topics include epistemology, concept, construct and theory development, qualitative and mixed methods approaches as well as experimental and quasi-experimental design. This course will aid students in selecting, articulating and defending research designs for thesis or doctoral research.

4. **Justification:**

Justify this change in terms of course needs or curriculum improvement. State the effect of this change on any degree programs. Identify the courses to be eliminated, if any, if this course is approved. (Course Approval Forms must also be submitted for these courses) Identify any existing course or courses that would extensively overlap or be duplicated if the proposed curricular change occurs. Provide statements of concurrence with the change from the chairperson(s) and dean(s) of the programs/areas offering the affected courses.

There will be no change to current degree plans.

## SYLLABUS

**COURSE NUMBER:** BIOM \_\_\_\_\_

**COURSE TITLE:** Research Design in Biomedical Informatics

**COURSE DESCRIPTION:**

This graduate course provides an introduction to research design in biomedical informatics. Topics include epistemology, concept, construct and theory development, qualitative and mixed methods approaches as well as experimental and quasi-experimental design. The purpose of this course is to aid students in selecting, articulating and defending appropriate research designs for thesis or doctoral research. Consent of instructor required.

**PRE-REQUISITES:** None

**GENERAL INFORMATION:**

**CREDITS:** 3

**SEMESTER:** Fall as needed, Spring routinely

**LOCATION:** Campus and Online (hybrid)

**FACULTY:** Meredith Zozus

**SPECIAL ASSISTANCE:** Students who believe they may need accommodations in this class based on mental or physical impairments must contact the Students with a disability that need accommodations should contact the Associate Dean for Academic Affairs at (501) 686-5730 to schedule an appointment to discuss your needs. Please make arrangements as soon as possible so accommodations can be made in a timely manner.

**COURSE OBJECTIVES:**

Upon successful completion of this course, the student is able to:

Evaluate the literature in an area of inquiry and articulate reasonable next questions

Formulate a problem statement and research question for a research project

For a given research question, articulate and operationalize the concepts, constructs and theories involved  
Characterize the reliability and validity of concepts and constructs involved in a proposed study

Select and defend an appropriate research design for a given research question

### **MAJOR TOPICS:**

Introduction to Philosophy of Science and epistemology

Philosophical worldviews

Research designs

Literature review and synthesis

Formulating a problem statement and associated research question

Concepts, constructs and theories and their operationalization

Hypothesis generation versus hypothesis testing in the generation of new knowledge

Qualitative methods including focus groups, interviews, ethnography, grounded theory, document analysis, and case studies

Experimental and quasi-experimental design

Mixed methods

### **COURSE OUTLINE:**

Week 1 Introduction to the Philosophy of Science and epistemology

*Assignment:* Each student will be randomly assigned one philosophical worldview and one research design. For your assigned pairing, describe a research project that demonstrates great alignment between the two, or defend the position that the assigned research design cannot be performed consistently with the assigned philosophical worldview. Post your half page or less work in the discussion forum. Comment on the posts of at least two other students.

*Reading:* Creswell, Chapter 1

Week 2 Literature review

*Assignment:* For a proposed research question, describe the relevant literature. Create a query to identify relevant peer reviewed articles and list the databases on which the search was executed. Iteratively work on your query until the search results on your most preferred database is less than 500. Review the title and abstract of the first 50 results and list the ones that appear relevant.

*Reading:* Light and Pillemer, Preface and Chapters 1 and 2, OR Creswell Chapter 2



- Week 3 Literature synthesis, systematic and scoping reviews  
Assignment: Read the five most relevant articles identified in last week's assignment. List from ten to twenty aspects of the articles that you would to abstract if doing a full review. Describe two tables of graphs that you would use to communicate the main points of your literature synthesis to someone.  
Reading: Light and Pillemer, Chapters 3-5
- Week 4 Concepts, constructs and their operationalization  
Assignment: For your chosen research question. List the involved concepts and constructs. Provide complete operational definitions for each. Discuss the reliability and validity of the concepts and constructs or any surrogates used to operationalize them. Reference relevant literature supporting the reliability and validity of your operationalizations if it exists.  
Reading: Carmines and Zeller paper
- Week 5 Theory development and testing  
Assignment: Describe the relationship of theory to your proposed research question. For example, is your research question one of hypothesis generation or testing? Where does your proposed research fall in the Describe-Explain-Predict framework?  
Reading: Creswell, Chapter 3
- Week 6 Qualitative methods  
Assignment: For a given qualitative research question, select, describe a research plan, and state how your selected method will answer the stated research question.  
Reading: Creswell, Chapter 9
- Week 7 Qualitative methods continued  
Assignment: Comment on last week's posts. Please comment of posts from at least two students.  
Reading: FHI Qualitative Research module
- Week 8 Quantitative methods  
Assignment: For a given research question, describe an appropriate quantitative study.  
Reading: Creswell, Chapter 8
- Week 9 Design of experiments, i.e., prospective, controlled, interventional studies  
Assignment: Work example problems.  
Reading: Shadish, Cook, and Campbell Chapters 1-3

- Week 10 Randomization, blinding and control  
*Assignment:* For a given research question, describe an experiment that will answer it. Include a description for how you will implement blinding, randomization, and for which variables you will control or state why one or more of these are not possible.  
*Reading:* Shadish, Cook, and Campbell Chapter 8
- Week 11 Quasi-experimental designs  
*Assignment:* Multiple choice questions. Match a study to the correct design.  
*Reading:* Shadish, Cook, and Campbell Chapter 4
- Week 12 Quasi-experimental designs  
*Assignment:* Multiple choice questions. Match a study to the correct design.  
*Reading:* Shadish, Cook, and Campbell Chapter 5
- Week 13 Quasi-experimental designs  
*Assignment:* Multiple choice questions. Match a study to the correct design.  
*Reading:* Shadish, Cook, and Campbell Chapters 6 and 7
- Week 14 Mixed Methods  
*Assignment:* For the research question assigned in week \_\_, describe a way in which mixed methods might enhance the research. Post your less than half page proposal in the discussion forum. Comment on posts from at least two other students.  
*Reading:* Creswell, Chapter 10
- Week 15 Presentations  
*Assignment:* Present your course project. Complete the evaluations for your assigned three students.

**EVALUATION:**

This is a graded course. Grades will be assigned based on their course average according to the following scale: A (93-100), B (85-92), C(75-84), D(65-74), Fail (lower than 64).

The course average will be comprised of course assignments and the Major project.

Assignments.....100%

### **MAJOR PROJECT:**

For your proposed research question, as refined throughout the course, describe in three pages or less your research design including the following: problem statement, potential impact of solving the problem, research question and any associated hypotheses, theoretical frameworks used or tested, research design, concepts or constructs used and their operationalization, sample size and how the sample size was decided, and how the data will be analyzed.

### **TEXTBOOKS:**

Richard J. Light, David B. Pillemer, Summing Up: The Science of Reviewing Research, Harvard College, 1984.

Edward G. Carmines and Richard A. Zeller, Reliability and Validity Assessment (Quantitative Applications in the Social Sciences). A Sage University paper, Sep 10, 2013.

William R. Shadish, Thomas D. Cook, and Donald T. Campbell, Experimental and Quasi-Experimental Designs for Generalized Causal Inference. Cengage Learning, UK, 2002.

### **OTHER RESOURCES:**

Family Health International (FHI), Qualitative Research Methods  
<http://www.ccs.neu.edu/course/is4800sp12/resources/qualmethods.pdf>

Julian C. Stanley Donald T. Campbell, Experimental and Quasi-Experimental Designs for Research Paperback – 1973.

L. M. Friedman, C. D. Furberg, and D. L. DeMets, Fundamentals of Clinical Trials 4th edition. Springer 2010.

Course Approval Form

6. Program Approvals:

Fred Prior, PhD  
(Print or type) Chairperson, Academic Department or Area

*Fred Prior* Digitally signed by Fred Prior Date: 2016.10.11 13:32:23 -05'00' 10/11/16  
(Signature) Chairperson, Academic Department or Area Date

*Robert Self* 10.20.16  
College Dean (Dean McGahee for College of Medicine) Date

7. Graduate School Approvals

*Eric P. ...* 10/20/16  
Chairperson, Graduate Council Date

*Robert Self* 10.20.16  
Dean of the Graduate School Date