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 (DBMI) *Department* | B | I | O | M | | | | | *Alpha (Department) Code*

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

☒ Add course	☐ Change title		
☐ Eliminate course (No outline needed)	☐ Change credit hours from:	_____	to _____
	☐ Change course number from:	_____	to _____
	☐ Change description		

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

B	I	O	M					Fundamentals of MRD
prefix				number				title (20 characters)

Fundamentals of Managing Research Data
catalog name (40 characters)

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 presents the fundamental concepts involved in managing research data across the spectrum of Biomedicine. This pragmatic course covers basic data types, corresponding collection and management methods, and resource estimation. It will prepare doctoral students for the data collection and management aspects of their dissertation.

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.

This course will prepare doctoral students for the data collection and management aspects of their dissertation research and beyond.

COURSE NUMBER: ?????

COURSE TITLE: Fundamentals of Managing Research Data

COURSE DESCRIPTION:

This graduate course presents the fundamental concepts, theories and principles involved in managing research data across the spectrum of Biomedicine from molecules to populations. This introductory pragmatic course covers basic types of data, corresponding collection and management methods. Resource estimation and oversight will also be covered and will prepare doctoral students for the data collection and management aspects of their dissertation research and beyond.

PRE-REQUISITES: Students should take this course when they are planning their doctoral research.

GENERAL INFORMATION:

CREDITS: 1

SEMESTER: Spring 2017

LOCATION: Campus and Online (hybrid)

COURSE DIRECTOR: 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.

ATTENDANCE: Attendance is required for all classes. Excused absences may be obtained only by permission from the course director. Make-up exams will only be given under the most extenuating circumstances.

COURSE OBJECTIVES:

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

Describe sources of error corresponding to the fundamental types of data and prevention or mitigation strategies for each.

Develop a data collection strategy for a given research protocol.

Develop a data management plan using accepted standards and a Quality Management System approach for data collection and processing for a given study.

Describe and choose the best option from possible data collection and management options for a given research study.

Identify and select appropriate software for data collection and management.

Describe security risks and risk prevention or mitigation strategies for research data.

Estimate the resources required to collect and manage data for a research project.

Develop and describe a strategy for assuring appropriate and consistent data quality when data are collected or processed by multiple others.

Describe documentation necessary to support sharing of data from a research project.

MAJOR TOPICS:

Basic types of data and corresponding error sources
Defining and documenting data for a research project
Data management planning for secondary data use and *de novo* collection of data
Data collection and processing methods commonly used in biomedical research
Documentation supporting traceability, reproducibility, and re-use
Software selection for collecting and managing research data
Resource estimation for data collection and processing
Quality management and control of research data
Special considerations for genomic, proteomic and metabalomic data
Presenting research data
Protecting research data from loss
Systems used in the course: REDCap, Microsoft Excel, common lab analyzer platforms, and institutional data storage and processing options

ASSIGNMENTS:

Weekly assignments, discussion forum posts, project presentation and report will require the following of the students.

1. Classify the basic types of data for a particular study. List two sources of error for each and devise a strategy for prevention of mitigation.

2. For a given research study and scenario, devise and describe the optimal data collection strategy.
3. Critique and improve a data management plan for a research project.
4. Given a raw dataset and analysis plan, develop and describe the needed data processing.
5. Develop a data collection form for a study.
6. Given a research study and scenario, identify and select appropriate software for data collection and processing.
7. Identify security risks for a particular research scenario and propose strategies to prevent or mitigate data loss.
8. Describe a data management quality system for a research group.
9. Draft a data sharing plan for a research project and list documentation that should accompany shared data.

STUDENT EVALUATION & GRADING

Weekly discussion forum posts **36%**

Weekly assignments must be posted in the discussion forum by class time the following week (1 pt). Due at the same time are comments on at least two posts by other students. Credit worthy comments contain new intellectual content including constructive suggestions for improvement.

Project poster presentation **12%**

A poster presentation of the students' data management plan is provided at the course poster session. Students should be able to discuss and defend data management plans according to first principles, published evidence or established best practice. Graders will asked standardized questions at the poster session and assign scores to questions. Best poster (highest score) is awarded 5 extra credit points toward final grade, second place will receive two points and third receives one point. Ties all receive the points.

Final project **12%**

The written data management plan for the planned research must be submitted by exam start time for the course. DMPs will be graded based on completeness and appropriateness of data management plans.

Final exam **40%**

The final exam will consist of 30 questions, be closed book and be administered during the scheduled exam time for the course.

TEXTBOOK:

Meredith Zozus, Managing Research Data. Taylor Francis/CRC Press, 2017.

TENATIVE COURSE SCHEDULE:

Week 1: Course overview and introduction to fundamental types of data and managing them
Assignment: Identify the fundamental types of data involved in the student's planned research

Week 2: The nature and structure of data. Lectures on 1.) genomic data, 2.) transcriptomic data, 3.) proteomic data, 4.) metabalomic data, 5.) cellular data, 6.) tissue data, 7.) organismal data, 8.) population data, and 9.) environmental data will be given, students will rotate among those most applicable to the planned doctoral research.

Extended 2 hour session.

Week 3: Identifying and defining data for a biomedical study
Assignment: Identify and define the data elements to be collected in the student's planned research; specify the data collection format.

Week 4: Research reproducibility, data management planning and data management documentation. Data and information flow.
Assignment: Draw a one page diagram showing all data sources and stores as well as major data processing steps for the student's planned research.

Week 5: Data observation, recording and direct electronic acquisition
Assignment: Start a data management plan for the student's planned research. Complete the sections on data flow, and data acquisition.

Week 6: Data processing, traceability and provenance
Assignment: no assignment.

Week 7: Data processing, traceability and provenance cont.
Assignment: Complete the data management plan sections on data processing, traceability and provenance.

Week 8: Data structure and integration
Assignment: Create a data model for the student's planned research.

Week 9: Selecting data management software and storage
Assignment: Draft the software related sections of the data management plan for the student's planned research.

Week 10: Assuring and controlling data quality
Assignment: Complete the quality management sections of the data management plan for the student's planned research.

Week 11: Resource estimation and staffing

Assignment: Estimate the resources needed to collect and manage the data for the student's planned research. Draft a budget and staffing plan.

Week 12: Data ownership, security, and archiving
Assignment: Complete the data ownership, security, and archiving sections of the data management plan.

Week 13: Data sharing, data sharing requirements and public repositories
Assignment: Complete the data sharing section of the data management plan.

Week 14: Project work

Week 15: Project presentations at poster session.

6. **Program Approvals:**

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

(Signature) Chairperson, Academic Department or Area — Date: 08/12/2016

College Dean (Dean McGehee for College of Medicine) — Date: 8-23-16

7. **Graduate School Approvals**

Chairperson, Graduate Council — Date: 8/18/2016

Dean of the Graduate School — Date: 8-23-16

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 1st (same calendar year)
Spring Semester	September 1st (preceding calendar year)
Summer Semester	December 1st (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: Fundamentals of Managing Research Data

Course Description: This course presents the fundamental concepts involved in managing research data across the spectrum of Biomedicine. This pragmatic course covers basic data types, corresponding collection and management methods, and resource estimation. It will prepare doctoral students for the data collection and management aspects of their dissertation.

Course Instructor: Meredith Zozus

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

Additional Instructors: None

N/a

N/a

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: We have 2 extended, 2 hour sessions for week 2 and week 15.

Grading Basis: Letter Grade Number of Units: 1

If Variable Credit, list the maximum number of units: *Choose an item.*

Component Type: *Lecture*

Repeat for credit? Yes ☐ No ☒

If yes, limit to number of enrollments allowed per student: N/a

Preferred Catalog Number: None
*Note: Preferred Catalog Numbers are not guaranteed to be used.

ENROLLMENT CONTROLS

PREREQUISITES

Subject Area	Catalog #	Course Title	Course ID (if known)
None	None	None	None
Subj. Area	*Catalog #*	*Course Title*	*Course ID*
Subj. Area	*Catalog #*	*Course Title*	*Course ID*
Subj. Area	*Catalog #*	*Course Title*	*Course ID*

CO-REQUISITES

Subject Area	Catalog #	Course Title	Course ID (if known)
None	None	None	None
Subj. Area	*Catalog #*	*Course Title*	*Course ID*
Subj. Area	*Catalog #*	*Course Title*	*Course ID*
Subj. Area	*Catalog #*	*Course Title*	*Course ID*

Please list any other non-course prerequisites attached to this course (e.g. minimum GPA, exam, year in program)
None

Minimum Number of Students to Enroll: None
Maximum Number of Students who may Enroll: None

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

Please describe enrollment limits by groups: Students should take this course when they are planning their doctoral research.

Is advisor or instructor consent required for students to take this course? No consent required

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 - 51-4% 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: Hybrid, The course will be taught face to face, but that a Blackboard course will be maintained and course sessions will be recorded and streamed for synchronous or asynchronous participation.

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: N/a

Does this course address/include:

Service Learning[1]:	Partially ☐	100% ☐	Does not address ☒
Inter-professional Education[2] (IPE)	Partially ☒	100% ☐	Does not address ☐
Cultural competency[3]	Partially ☐	100% ☐	Does not address ☒
Patient-Family Centered Care[4]	Partially ☐	100% ☐	Does not address ☒
Interdisciplinary Education[5]	Partially ☒	100% ☐	Does not address ☐

ADDITIONAL INFORMATION:

[1] ~~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.
[2] Defined as students of two or more professions engaged in learning with, from and about each other.
[3] 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.
[4] 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.
[5] 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.

Click here to enter text.

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
Enter Course Instructor Name

Associate Dean signature

Enter Associate Dean Name

Today's Date: *Click here to select date.*

Preparer's Name: *Click here to enter name*

Preparer's Email: *Click here to enter email address*

Please submit this form and a copy of the syllabus to:
Angela Wilson, Registrar
Email: awilson5@uams.edu
Mail Slot #767
Questions? 501-526-6612

Office use only	**Notes/Follow-up:**
Received: _____	
Entered into GUS ☐	
Entered into Schedule of Courses ☐	
Curriculum Registrar Initials: ___	
Schedule Registrar Initials:___	