

**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: Scientific Data Visualization

Course Description: This graduate course covers guidelines for efficient scientific visualizations of small and large-scale data sets. Students completing this course should be able to present a scientific dataset in a clear, informative and reader-friendly manner.

Course Instructor: Intawat Nookaew, PhD

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

Additional Instructors: None

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: 2018

Meeting dates differ from standard semester? Yes No

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

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: None

Preferred Catalog Number: *Click here to enter text.*

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

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

ADDITIONAL INFORMATION:

Click here to enter text.

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.

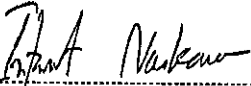

³ An ability to interact effectively with people of different cultures and ethnic backgrounds. Comprises four components: Awareness of one's own cultural worldview, attitude towards cultural differences, knowledge of different cultural practices and worldviews, and cross-cultural skills. Developing cultural 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.

APPROVALS

Proposal will not be processed without all required signatures.

	
Course Instructor signature	Intawat Nookaew, PhD
	
Associate Dean signature	Enter Associate Dean Name
Today's Date: October 7, 2016	Preparer's Name: Tremaine Williams
Preparer's Email: tbwilliams@uams.edu	

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

<p>Office use only</p> <p>Received: _____</p> <p>Entered into GUS <input type="checkbox"/></p> <p>Entered into Schedule of Courses <input type="checkbox"/></p> <p>Curriculum Registrar Initials: _____</p> <p>Schedule Registrar Initials: _____</p>	<p>Notes/Follow-up:</p>
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**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				
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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
(No outline needed) | <input type="checkbox"/> Change credit hours from: _____ to _____ | |
| | <input type="checkbox"/> Change course number
from: _____ to _____ | |
| | _____ Change description | |

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

<table border="1" style="display: inline-table;"><tr><td>B</td><td>I</td><td>O</td><td>M</td></tr></table> prefix	B	I	O	M	<table border="1" style="display: inline-table;"><tr><td> </td><td> </td><td> </td></tr></table> number				<u>Scientific Data Visual</u> title (20 characters)
B	I	O	M						

Scientific Data Visualization
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 graduate course covers guidelines for efficient scientific visualizations of small and large-scale data sets. Students completing this course should be able to present a scientific dataset in a clear, informative and reader-friendly manner.

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 degree plans. The course includes discussion of the figures of selected scientific publications. Students will make criticisms on the figures to identify the strong and weak components and discuss the alternative ways to improve the visualization.

SYLLABUS

COURSE NUMBER: ?????

COURSE TITLE: Scientific Data Visualization

COURSE DESCRIPTION:

This graduate course covers guidelines for efficient scientific visualizations of small and large-scale data sets. Students completing this course should be able to present a scientific dataset in a clear, informative and reader-friendly manner.

The course includes discussion of the figures of selected scientific publications. Students will make criticisms on the figures to identify the strong and weak components and discuss the alternative ways to improve the visualization.

PRE-REQUISITES: BIOS 5013 Biostatistics I or equivalent
_____ R/BioConductor or equivalent

GENERAL INFORMATION:

CREDITS: 1

SEMESTER: Spring

LOCATION: Campus and Online (hybrid)

FACULTY: Intawat Nookaew

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:

- Understand the concepts and importance of visualization.

- Design and create comprehensive quantitative and qualitative visualizations including static and interactive figures for scientific research.
- Read, understand and critique figures from papers published in the field of biomedical research.

ATTENDANCE: Attendance is required for all classes. Excused absences may be obtained only by permission from the course director.

MAJOR TOPICS:

Introduction to Scientific data

What is scientific data?

Quantitative versus Qualitative

Confidence in scientific data

Amount of data, small-scale data to big data

Information graphics and Visualization

Theory and practice in the design of data graphics including cognitive signal detection, pre-attentiveness, and cognitive task analysis related to information visualization

Multi-channel relational information displays

Use R and cityscape as a basis figure generator

Figure quality and manipulations

Interactive visualizations

ASSIGNMENTS:

- Computer exercises, with assigned data set.
- Project, with assigned data set.
- Prepare and present the major course project.

TEXTBOOK:

A Primer in Biological Data Analysis and Visualization Using R. Gregg Hartvigsen, ISBN-13: 978-0231166997

Functional Art, The: An introduction to information graphics and visualization. Alberto Cairo, ISBN-13: 978-0-321-83473-7

Visual display of Quantitative information. Edward Tufte, SBN-13: 978-1930824133

STUDENT EVALUATION & GRADING

Assignment

25%

There are 3 computational workshops that student need to submit the assignments to show their capability in figure generation.

Journal Club**35%**

During the second half of the semester, students will present and critique selected articles in the field of biomedical research. The grade will be based on how well the students have critiqued the figures in the paper, as well as the quality of their presentation.

Presentation of assigned project**40%**

An assigned project based on different scientific dataset will give the student opportunity to create a visualization of a dataset and present the work. Grades will be determined by adherence to principles and methods of data visualization and the quality of the work presented.

COURSE EVALUATION:

At the end of the course, students will be provided with a Course Evaluation Form to anonymously assess the content and delivery of the course. Faculty will assess the course each term and make any appropriate modifications and updates.

TOPICS AND ASSIGNMENTS BY WEEK:

- Week 1: Introductory of the class and terminology; Scientific data and statistics – Basic charts and plots
- Week 2: Multi-channel relational information displays and Principles of good figure- Perception, Color, Design, and Evaluation
- Week 3: Cognitive Task Analysis for information visualization design
- Week 4: Multivariate data and hierarchical data visualization
- Week 5: Network and graph visualization
- Week 6: R-workshop: Hands-on computational work
- Week 7: R-workshop: Hands-on computational work
- Week 8: Introduction to interactive visualization
- Week 9: Cytoscape-workshop: Hands-on computational work
- Week 10: Figure quality and manipulations

Week 11: Project assignment

Week 12: Journal club

Week 13: Journal club

Week 14: Journal club

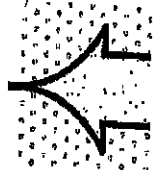
Week 15: Project presentation

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: 2016.10.05 15:03:48 -05'00' 10/5/16
(Signature) Chairperson, Academic Department or Area Date



[Signature] 10-20-16
College Dean (Dean McGehee for College of Medicine) Date

7. Graduate School Approvals

[Signature] 10/20/16
Chairperson, Graduate Council Date

[Signature] 10-20-16
Dean of the Graduate School Date