Multimodal Data Mining
BME 6938 Section 075C
Class Period: Tuesday, Period 5-6, 11:45M – 1:40PM
Thursday, Period 6, 12:50PM-1:40PM
Location: BEN 0328
Academic Term: Spring 2019

1. **Instructor:** Ruogu Fang
   - E-mail address: ruogu.fang@ufl.edu
   - Office location: BMS J287
   - Telephone: 352-294-1375
   - Website: Canvas Page
   - Office hours: message the instructor on Canvas for the appointment.

2. **Description:** (3 credit hours) – Computer programming lab to utilize MATLAB to analyze biomedical measurements.

3. **Pre-requisites**: Foundational knowledge in MATLAB or python and computer programming is needed to be successful in this course.

4. **Course Objectives**:
   - Understand multimodal data mining in the biomedical domain.
   - Understand the concept, approaches, and limitations in analyzing different modalities of biomedical data.
   - Learn to use biomedical data programming libraries and skills to analyze multimodal biomedical data.

5. **Contribution of course to meeting the professional component:** 3 credits of engineering topics (no design component)

6. **Class schedule**: One 100 minutes session and one 50 min session per week

7. **Material and Supply Fees**: N/A

8. **Textbooks and Software Required**

   - Lecture notes.

   - Required software: MATLAB (info.apps.ufl.edu or in CSE Active Learning Lab) or Python

9. **Recommended Reading**:
   a. PH525x series - Biomedical Data Science, by Rafa Irizarry, Online Book: http://genomicsclass.github.io/book/
   b. Foundations of statistical natural language processing, by Christopher Manning.

   c. Standard cs231n. http://cs231n.stanford.edu/
   d. Stanford cs244d. http://cs224d.stanford.edu/

10. **Course Outline:** tentative schedule (subject to change)

Week	Date	Topic	Assignments
		Module 1: Biomedical Image Analytics	Project 1
1	1/8	Logistics, Intro to Multimodal Data Mining & Python	
2	1/15	Biomedical Image Analysis	
3	1/22	Linear Algebra and Math Fundamentals	
4	1/29	Biomedical Image Filtering & Edge Detection	
5	2/5	Biomedical Image Segmentation & Clustering	
		Module 2: Machine Learning & Deep Learning	Project 2
6	2/12	Introduction to ML & Classification	Project 1 due
7	2/19	Neural Networks & Evaluation	
8	2/26	Deep Learning – CNN & Keras	
9	3/5	Spring Break	
10	3/12	Deep Learning – RNN & Tensorflow	Final Project Proposal
		Module 3: Clinical Text Mining	Project 3
11	3/19	Intro to Biomedical NLP	Project 2 due
12	3/26	Information Extraction	
13	4/2	Deep learning in NLP (Guest Lecture)	
		Module 4: Genomic Data Mining	
14	4/9	Introduction to Genomic Data Mining	Project 3 due
15	4/16	Genome Data Sequencing & Guest Lecture	
16	4/23	Project Presentation	Final Project due

11. **Attendance and Expectations**: On time class attendance is expected.
    Expectations:
- Be to class on time.
- no cell phone disruptions or e-device distractions.
- Prepare paper presentations and discussions
- better late than never
- ask for help if you need it

12. **Evaluation of Grades**:

Assignments	Percentage of Final Grade
Paper Reading	30%
Quizzes	10%
Mini-Projects	30%
Final Project	30%
Total	100%

- Every week the class will discuss and critique a paper related to the topic of the week. Every student will write a critique due before the class and students will sign up for paper presentation, with discussion and Q&A. We have a detailed rubric on students' presentation and critique.
- Quizzes are graded on attendance and performance.
- Assignments are three small projects related to the three topics covered in the course.
- Final project will be a group work. It will involve a programming-based project. At the final demonstration day, the students are expected to demo the results of the data analysis software. The students are also expected to give a presentation and also a final report of 8 pages, in a journal publication format.

13. **Grading Scale**:

Points	Grade	Grade Points
93.00 - 100.00	A	4.00
90.00 – 92.99	A-	3.67
87.00 – 89.99	B+	3.33
83.00 – 86.99	B	3.00
80.00 – 82.99	B-	2.67
77.00 – 79.99	C+	2.33
73.00 – 76.99	C	2.00
70.00 – 72.99	C-	1.67
67.00 – 69.99	D+	1.33
63.00 – 66.99	D	1.00
60.00 - 62.99	D-	0.67
0 - 59.99	E	0.00

A C- will not be a qualifying grade for critical tracking courses. In order to graduate, students must have an overall GPA and an upper-division GPA of 2.0 or better (C or better). Note: a C- average is equivalent to a GPA of 1.67, and therefore, it does not satisfy this graduation requirement. For more information on grades and grading policies, please visit: https://catalog.ufl.edu/ugrad/current/regulations/info/grades.aspx

14. **Make-up Exam Policy** – Presentations can be rescheduled for an individual due to sickness or religious holidays. The instructor _**must**_ be notified in advance.

15. **Students Requiring Accommodations** – Students Requesting classroom accommodation must first register with the Dean of Students Office. That office will provide the student with documentation that he/she must provide to the course instructor when requesting accommodation.

16. **Course Evaluation** - Students are expected to provide feedback on the quality of instruction in this course by completing online evaluations at https://evaluations.ufl.edu. Evaluations are typically open during the last two or three weeks of the semester, but students will be given specific times when they are open. Summary results of these assessments are available to students at https://evaluations.ufl.edu/results/.

17. **Honesty Policy** – UF students are bound by The Honor Pledge which states, "We, the members of the University of Florida community, pledge to hold ourselves and our peers to the highest standards of honor and integrity by abiding by the Honor Code. On all work submitted for credit by students at the University of Florida, the following pledge is either required or implied: "On my honor, I have neither given nor received unauthorized aid in doing this assignment." The Honor Code (http://www.dso.ufl.edu/sccr/process/student-conduct-honor-code/) specifies a number of behaviors that are in violation of this code and the possible sanctions. Furthermore, you are obligated to report any condition that facilitates academic misconduct to appropriate personnel. If you have any questions or concerns, please consult with the instructor or TAs in this class.

    Note that failure to comply with this commitment will result in disciplinary action compliant with the UF Student Honor Code Procedures.
    See http://www.dso.ufl.edu/sccr/procedures/honorcode.php

    Unless otherwise stated, all homework for this class must be done individually. *In this class it is a violation of the Academic Honesty code to obtain assistance on homework assignments from other individuals without acknowledging such.*

18. **UF Counseling Services** – Resources are available on-campus for students having personal problems or lacking clear career and academic goals. The resources include:
    - UF Counseling & Wellness Center, 3190 Radio Rd, 392-1575, psychological and psychiatric services.
    - Career Resource Center, Reitz Union, 392-1601, career and job search services.
    - SHCC mental Health, Student Health Care Center, 392-1171, Personal and   Counseling
    - Center for Sexual Assault/Abuse Recovery and Education (CARE), Student Health Care Center, 392-1161, sexual assault counseling
    - Career Resource Center, Reitz Union, 392-1601, career development assistance and counseling

19. **Software Use** – All faculty, staff and student of the University are required and expected to obey the laws and legal agreements governing software use. Failure to do so can lead to monetary damages and/or criminal penalties for the individual violator. Because such violations are also against University policies and rules, disciplinary action will be taken as appropriate. We, the members of the University of Florida community, pledge to uphold ourselves and our peers to the highest standards of honesty and integrity.

20. **Student Privacy** – There are federal laws protecting your privacy with regards to grades earned in courses and on individual assignments. For more information, please see: http://registrar.ufl.edu/catalog0910/policies/regulationferpa.html

21. **Campus Resources:**
    Health and Wellness

    U Matter, We Care:

Your well-being is important to the University of Florida. The U Matter, We Care initiative is committed to creating a culture of care on our campus by encouraging members of our community to look out for one another and to reach out for help if a member of our community is in need. If you or a friend is in distress, please contact umatter@ufl.edu so that the U Matter, We Care Team can reach out to the student in distress. A nighttime and weekend crisis counselor is available by phone at 352-392-1575. The U Matter, We Care Team can help connect students to the many other helping resources available including, but not limited to, Victim Advocates, Housing staff, and the Counseling and Wellness Center. Please remember that asking for help is a sign of strength. In case of emergency, call 9-1-1.

Counseling and Wellness Center: http://www.counseling.ufl.edu/cwc, and 392-1575; and the University Police Department: 392-1111 or 9-1-1 for emergencies.

Sexual Assault Recovery Services (SARS)
Student Health Care Center, 392-1161.

University Police Department at 392-1111 (or 9-1-1 for emergencies), or http://www.police.ufl.edu/.

22. **Commitment to a safe and inclusive learning environment**
The Herbert Wertheim College of Engineering values broad diversity within our community and is committed to individual and group empowerment, inclusion, and the elimination of discrimination.
It is expected that every person in this class will treat one another with dignity and respect regardless of gender, sexuality, disability, age, socioeconomic status, ethnicity, race, and culture.
If you feel like your performance in class is being impacted by discrimination or harassment of any kind please contact your instructor or any of the following:

- Your academic advisor or Graduate Program Coordinator
- Robin Bielling, Director of Human Resources, 352-392-0903, rbielling@eng.ufl.edu
- Curtis Taylor, Associate Dean of Student Affairs, 352-392-2177, taylor@eng.ufl.edu
- Toshikazu Nishida, Associate Dean of Academic Affairs, 352-392-0943, nishida@ufl.edu

Sexual Discrimination, Harassment, Assault, or Violence
If you or a friend has been subjected to sexual discrimination, sexual harassment, sexual assault, or violence contact the **Office of Title IX Compliance**, located at Yon Hall Room 427, 1908 Stadium Road, (352) 273-1094, title-ix@ufl.edu

23. **Academic Resources**
E-learning technical suppor*t*, 352-392-4357 (select option 2) or e-mail to Learning-support@ufl.edu. https://lss.at.ufl.edu/help.shtml

Career Resource Center, Reitz Union, 392-1601. Career assistance and counseling. https://www.crc.ufl.edu/.

Library Support, http://cms.uflib.ufl.edu/ask. Various ways to receive assistance with respect to using the libraries or finding resources.

Teaching Center, Broward Hall, 392-2010 or 392-6420. General study skills and tutoring. https://teachingcenter.ufl.edu/.

Writing Studio, 302 Tigert Hall, 846-1138. Help brainstorming, formatting, and writing papers. https://writing.ufl.edu/writing-studio/.

Student Complaints Campus: https://www.dso.ufl.edu/documents/UF_Complaints_policy.pdf.

On-Line Students Complaints: http://www.distance.ufl.edu/student-complaint-process.