Syllabus

BINF 739 | BIOL 691 | BIOS 710 | NEUR 592:

MATLAB for Brain, Biological, and Cognitive Scientists

Spring Semester 2020

Weekly schedule: Each week runs from Monday (12:01 am) to Sunday (11:59 pm) starting on January 21st, 2020.

Instructor: Frank Krueger, Ph.D.

Department: School of Systems Biology

Phone: 703-993-4358

Email: FKrueger@gmu.edu (preferred)

Office Hours: By appointment (via Blackboard Collaborate Ultra)

Course Description

The objective of this asynchronous online course is to provide students an introductory programming course in MATLAB, which is a special-purpose language that makes it possible to write a powerful moderate-size program to solve computational problems. With a focus within the fields of biology, neuroscience, and cognitive sciences, the course includes two major parts that include programming assignments (first part) and a data project (second part): first, students will learn about MATLAB fundamentals through an illustration of important computational concepts, and second, they will learn about data collection, analysis, and modeling through the implementation of a data project.

Course Materials

Required Texts:

- **Fitzpatrick JM & Ledeczi A.** (2015). *Computer Programming with MATLAB.*

- Additional readings will be assigned.

Course Logistics

This course will use a distance learning format (i.e., synchronous mode, asynchronous mode); the primary meeting space will be on Blackboard; and we will use other means of keeping in touch such as: email, telephone, and Blackboard Collaborate Ultra. This is a rigorous course —in a typical week, we will cover one to two topics and you will:

- read about 20-40 pages and discuss the material with your classmates;
- accomplish online/offline activities and respond to weekly requirements; and
- work on assignments to be submitted according to the assignment schedule.

Though the delivery method is different, it should take you the same amount to time as a typical full-semester course. You should expect to spend **approximately 9 hours** on coursework each week (this includes the time you would have spent in a classroom). I will provide a weekly module each week to specify required activities and assignments.

Course Policies

It is critical to keep up with weekly requirements and to complete all work on schedule, but if there are extenuating circumstances —such as sickness, family issues, or religious observances that conflict with our schedule— please let me know as soon as possible. Note that a doctor's note for illness or service leaflet for a death in the family is required for missed activities.

Missed work will not be accepted late. No extensions will be made on assignments, and late work will not be accepted for a grade. All work must be submitted or receive a zero grade.

It is your responsibility to be sure you are using a stable Internet connection before the course begins. Since "my computer crashed" cannot be documented or verified, I cannot accept this excuse for missing or not completing an assignment. If Blackboard shuts down, take a screenshot of Blackboard with a time stamp, email courses@gmu.edu (Blackboard help desk) immediately and cc me, and ask the help desk to use "reply all" when answering your query.

Blackboard (Available on January 21th, 2019)

We will use Blackboard for the course. Additional guidance on individual assignments and discussion questions will be posted there. Please visit the Blackboard site regularly.

Access Blackboard by following these steps:

1. Go to http://mymason.gmu.edu,
2. Log in using your NETID and password,
3. Click on the 'Courses" tab, and
4. Click on the link for this course that appears under the "Course List" heading.

Instructor-Student Communication

I will respond to your emails within 24 hours (*Monday through Friday*). If I am away from email for more than two days, I will send an announcement to the class.

When you email me, be sure to include *BINF 739, BIOL 691, or BIOS 710* at the beginning of the subject heading to alert me that I have received a message from one of my online students.

Before sending an email, please check the following (available on your Blackboard course menu) **unless the email is of a personal nature**:

- Syllabus,
- Blackboard Tutorials on how to use Blackboard features,
- Blackboard Q&A (resources specific to Mason), and
- Technology Requirements.

Mason EMAIL

Mason requires that Mason email be used for all courses. I will be sending messages to your Mason email, and you are responsible for making sure you have access to these messages.

You may forward your Mason email to other accounts but always use your Mason e-mail when communicating with me to allow verification of your identity.

You are required to check your Mason email account regularly and to keep your mailbox maintained so that messages are not rejected for being over quota.

Participation

Netiquette for Online Discussions [1]: Our discussion should be collaborative, not combative; you are creating a learning environment, sharing information and learning from one another. Respectful communication is essential to your success in this course and as a professional. Please re-read your responses carefully before you post them so others will not take them out of context or as personal attacks. Be positive to others and diplomatic with your words and I will try my best to do the same. Be careful when using sarcasm and humor. Without face-to-face communications, your joke may be viewed as criticism. Experience shows that even an innocent remark in the online environment can be easily misconstrued.

[1] Netiquette prepared by Charlene Douglas, Associate Professor, College of Health & Human Services, GMU.

Technology Requirements

Technology requirements for the course are:

- Internet connection (DSL, LAN, or cable connection desirable);

- PC desktop/ laptop with microphone headset;

- Supported Web browser (e.g., Internet Explorer, Chrome, Safari) to use Blackboard Collaborate Ultra for Live Class Sessions; and

- Software tool packages: MS Office 365 ProPlus (Word, Excel, PowerPoint software tool packages) provided at no cost via the Microsoft Student Advantage Program (Access is tied to your @masonlive.gmu.edu email address).

Student Responsibilities

MasonLive/Email:

Students are responsible for the content of university communications sent to their George Mason University email account and are required to activate their account and check it regularly. For accessibility and privacy, the university, school, and program will send communications to students solely through their Mason email account—students should respond accordingly [See Masonlive login information].

Patriot Pass

Once you sign up for your Patriot Pass, your passwords will be synchronized, and you will use your Patriot Pass username and password to log in to the following systems: Blackboard, University Libraries, MasonLive, myMason, Patriot Web, Virtual Computing Lab, and WEMS. [See Password].

Students with Disabilities

Students with disabilities who seek accommodations in a course must be registered with the George Mason University Office of Disability Services (ODS) and inform their instructor, in writing, at the beginning of the semester [See Office of Disability Services).

Academic Integrity

Students must be responsible for their work, and students and faculty must take on the responsibility of dealing explicitly with violations. The tenet must be a foundation of our university culture. [See Office of Academic Integrity].

Honor Code and Virtual Classroom Conduct:

Students must adhere to the guidelines of the George Mason University Honor Code [See Honor Code].

We value critical thinking and; therefore, it is imperative that students read the assigned books and articles before the class with a critical eye. Active thought, quality of inputs, and a conflict resolution attitude should be your guiding principles.

The principle of academic integrity is taken very seriously, and violations are treated gravely. What does academic integrity mean in this course? Essentially this: when you are responsible for a task, you will perform that task. When you rely on someone else's work in an aspect of the performance of that task, you will give full credit in the proper, accepted form.

Another aspect of academic integrity is the free play of ideas. Vigorous discussion and debate are encouraged in this course, with the firm expectation that all aspects of the class will be conducted with civility and respect for differing ideas, perspectives, and traditions. When in doubt (of any kind) please ask for guidance and clarification.

Plagiarism is the equivalent of intellectual robbery and cannot be tolerated in the academic setting. If you have any doubts about what constitutes plagiarism, please see me.

University Policies

Students must follow the university policies. [See University Policies].

Responsible Use of Computing

Students must follow the university policy for Responsible Use of Computing. [See Responsible User of Computing].

University Calendar

Details regarding the current Academic Calendar. [See Calendar].

University Catalog

The current university catalog. [See University Catalog].

Student Services

Writing Center

The George Mason University Writing Center staff provides a variety of resources and services (e.g., tutoring, workshops, writing guides, handbooks) intended to support students as they work to construct and share knowledge through writing. [See Writing Center]. ESL Help: The program was designed specifically for students whose first language is not English who feel they might benefit from additional, targeted support over the course of an entire semester. [See Writing Center].

University Libraries

University Libraries provides resources for distance students. [See Library].

Counseling and Psychological Services

The George Mason University Counseling and Psychological Services (CAPS) staff consists of professional counseling and clinical psychologists, social workers, and counselors who offer a wide range of services (e.g., individual and group counseling, workshops and outreach programs) to enhance students' personal experience and academic performance [See CAPS].

Family Educational Rights and Privacy Act (FERPA)

The Family Educational Rights and Privacy Act of 1974 (FERPA), also known as the "Buckley Amendment," is a federal law that gives protection to student educational records and provides students with certain rights. [See FERPA].

Major Assignment Components, Descriptions, and Grading

Major Assignment Components

The course has four major assignment components: software tools, research paper, conference talk, and conference poster. For each of those components, students will provide peer feedback to their fellow students and receive comments from the instructor.

Course Schedule and Major Assignment Grading

The table below lists the weekly schedule, major activities, major assignment, points, and due dates for this course. Final grades will be based on the total number of points earned in the course.

Weeks	Major Activities (include readings, mini-lectures, videos, websites to review, etc. that are content-related)	Assignments (graded)	Points	Due Date
Week 1 Monday, Jan. 20 - Sunday, Jan. 26	Organization: MATLAB Reading: pp. 11-61	Introduce Yourself Orientation Quiz Glossary	5 5 10	Sunday, Jan. 26 Sunday, Jan. 26 Sunday, Jan. 26
Week 2 Monday, Jan. 27 - Sunday, Feb. 2	Fundamentals: Matrices & Operators Reading: pp. 63-84	Glossary	10	Sunday, Feb. 2

Week	Topic	Assignment	Points	Due
Week 3 Monday, Feb. 3 - Sunday, Feb. 9	Fundamentals: Functions Reading: pp. 85-112	Programming Glossary	25 10	Thursday, Feb. 6 Sunday, Feb. 9
Week 4 Monday, Feb. 10 - Sunday, Feb. 16	Fundamentals: Programmer's Toolbox Reading: pp. 113-138	Programming Glossary	25 10	Thursday, Feb. 13 Sunday, Feb. 16
Week 5 Monday, Feb. 17 – Sunday, Feb. 23	Fundamentals: Selection Reading: pp. 139-195	Programming Glossary	25 10	Thursday, Feb. 20 Sunday, Feb. 23
Week 6 Monday, Feb. 24 - Sunday, Mar. 1	Fundamentals: Loops Reading: pp. 196-227	Programming Glossary	25 10	Wednesday, Feb. 30 Sunday, Mar. 1
Week 7 Monday, Mar. 2 - Sunday, Mar. 8	Fundamentals: Data Types Reading: pp. 228-262	Programming Glossary	25 10	Thursday, Mar. 2 Sunday, Mar. 8
Week 8 Monday, Mar. 9 – Sunday, Mar. 15	SPRING BREAK			
Week 9 Monday, Mar. 16 - Sunday, Mar. 22	Fundamentals: File Input/ Output Reading: pp. 263-284	Programming Glossary	25 10	Thursday, Mar. 19 Sunday, Mar. 22
Week 10 Monday, Mar. 23 - Sunday, Mar. 29	Fundamentals: Functions Reloaded Reading: pp. 333-350	Programming Glossary	25 10	Thursday, Mar. 26 Sunday, Mar. 29
Week 11 Monday, Mar. 30 - Sunday, Apr. 5	Advanced Concepts: Graphical User Interfaces	Programming	25	Thursday, Apr. 2
Week 12 Monday, Apr. 6 - Sunday, Apr. 12	Data Project: Machine Learning I	Glossary Data Set	15 10	Sunday, Apr. 12 Sunday, Apr. 12
Week 13 Monday, Apr. 13 - Sunday, Apr. 19	Data Project: Machine Learning II	Programming	25	Thursday, Apr. 16
Week 14 Monday, Apr. 20 - Sunday, Apr. 26	Data Project: Machine Learning III	Programming	25	Thursday, Apr. 23
Week 15 Monday, Apr. 27 - Sunday, May 3	Data Project: Machine Learning IV	Programming	25	Thursday, Apr. 30

Grading Scale (points)

Final grades assigned for this course will be based on the percentage of total points earned and are assigned as follows:

Letter Grade	Percentage	Points	Performance
A	93-100%	372-400	Excellent Work
A⁻	90-92%	360-371	Nearly Excellent Work
B⁺	87-89%	348-359	Very Good Work
B	83-86%	332-347	Good Work
B⁻	80-82%	320-331	Mostly Good Work
N/A	<80%	<320	Failing Work