

Instructor:	Dr. Jessica Kintner
Office:	Galileo 106 B
Office hours:	W 11:45-12:45, Th 11-12:30
E-mail:	jkintner@stmarys-ca.edu
Text:	Essential MATLAB for Engineers and Scientists (6 th Edition) by Hahn and Valentine.
Software:	MATLAB (student version) by Mathworks. Check course web page for links. This is required!
Laptop?:	If you have your own laptop, please feel free to bring it to class each day—with your working MATLAB
Meetings:	M F 1:00-2:35, Gal 205
Web page:	http://physics.stmarys-ca.edu/

- **Course Description:** Today science, engineering and mathematics, are critically dependent on the computational power provided by digital computers. This course will be an introduction to the use of computational techniques to understand physical systems that are unapproachable via analytical methods. The class will also be an introduction to effective programming in Matlab. Topics will include data analysis, integration, solutions to transcendental equations, ordinary differential equations, and partial differential equations.
- **Course Goals:** To learn effective programming techniques; To learn MATLAB; To learn the basics of the content mentioned above; To develop stronger problem solving and critical thinking skills; To gain confidence in using previously learned material.
- **Homework:** Homework will be of a couple types. Programming is something you must *do* rather than read. As you read the text, you should have an open MATLAB session, and you should enter every command in the text book into your own session. I will have you turn these in the first two or three weeks, and by later in the semester you will probably be primarily turning in script files (.m files).

In addition to the reading work, physics and/or programming problems may be assigned each day. We will present and discuss these problems the very next class period, so it is very important that you attempt them in between each class meeting. I know this could be a challenge between Friday and Monday. (See the next section on In Class Work.)

Since homework is a fairly large percentage of your grade in this class, it is important how you work. I encourage you to *discuss* problems with each other, but write up your own solutions individually. Direct copying is prohibited and will be considered a violation of the Honor Code! You should also cite any sources and give credit to anyone you worked with. (Citing someone you work with is clearly not a violation of the Honor Code—so do it!! I consider this sort of practice for co-authoring papers or journal articles.) Exceptions to this are only work done by me, or perhaps in my office, or if we have all discussed the problem in class. Of course, if you use another source, you should credit that as well

(just as if you were writing a paper!) You will not lose any points for this!!! You will, on the other hand, get in big trouble for plagiarism.

Chris Ray had this paragraph in his syllabus for the course: *Regarding the sharing of code: Don't do it. It is great to help each other figure out how to solve problems, but it is very hard to help someone understand by sharing code. So if you are not able to share code how can you help each other? The way to support each other in learning to code is to talk about it, talk about the ideas behind what you are doing. This helps everyone a lot, because there is a language used to talk about programming and computation, and learning to use that language is part of learning the ideas. If you find yourself saying something like "Type ex equals sign zee left parenthesis one colon five right parenthesis semicolon" then you are not doing the right thing. Say instead something like "you need to specify a subsection of the array".*

Doing the homework is the best way to learn the material. Please take it seriously and make every effort to do it on time.

- **In Class Work:** When you come into class, you should be prepared to put homework problems on the projector or board as appropriate and/or ask questions about any problems you got stuck on or are confused about. You also might ask questions about the last lecture or sections of the book you've been reading.

Studies show that lecture is the worst way for students to learn physics. Believe it or not, even spending the hour doing homework problems is more effective than pure lecture. (See any of tons of papers by Eric Mazur.) We will use a variety of activities in class such as board work, small group work, problem solving, and coding. **If you have your own laptop with your version of MATLAB, you are welcome to bring it to class each day!** It's easier for me to see if you work on the lab computers, so I like that too, but you will want to access all the things you've worked on, which means you won't want to leave them on the lab computers. Some of the problems we do in class will be homework problems, and some will be "new" to the class that day. For those, I will typically have you work in small groups – but each of you entering things in your own MATLAB.

And some days, I will do lectures with every attempt to keep you involved.

If I find that it's necessary, I might add more traditional "quizzes" to the mix. They will count in this category.

- **Project:** You will do an independent project in which you use computational physics to investigate something that you would like to understand more fully, and report your findings in a technical note and presentation to the class.
- **Exams:** There will be two one-hour exams and a final. The final exam will be two hours long, and it will be cumulative. The nature of the course is such that each exam will depend to some extent on the material before. See the attached schedule for planned dates. (Dates will stay set even if material changes.)
- **Attendance:** Although attendance will not be taken each day, it is strongly recommended that you attend lecture. The text for this class is challenging. And your In

Class Work grade will be affected by absences. You will be responsible for any material presented in class.

Exams cannot be made up without an approved excuse. Approved excuses are such things as illness and family or personal emergencies. If you must miss an exam, you must contact me prior to the exam. Each student is responsible for all assignments, etc, which are given during lecture.

- **Grading:** The *approximate* weighting for the course is shown below.

Homework and In class work	40%
Project	10%
Exams	25%
Final Exam	25%

- **College Policies:** There have grown to be so many that are the same for all your SMC classes that I will refer you to the Student Handbook. We all should agree to abide by all of these. They include things like the Honor Code (already mentioned) and Disability Services.