Syllabus for Introduction to Engineering Analysis

Purpose

Course Content:

Part One: Computational Thinking and Computer (Week 5-12)

Part Two: Matlab (Week 13-20)

Basing on characteristics and professional requirements of science and engineering students, the course is aimed at guiding students to comprehend and build computational thinking. Then, it is focused on train students to use computational thinking consciously and actively, and analyze data by Matlab skillfully.

Part One: Computational Thinking and Computer (Week 5-12)

■ Instructor: Xia Xin(xiaxin@scu.edu.cn), Ge Long(gelong@scu.edu.cn)

■ Lecture: 16:45-18:25, Tuesday, Week 5-12

■ Lab: 16:45-18:25, Thursday, Week 6-12 (Bi-weekly)

■ Five Modules of the Course:

(1) Combination between computational thinking and science and engineering

(2) Indication of information in computer

(3) Constitution of systems in computer

(4) Basis and algorithms of program design

(5) Application of data analysis and common functions in Excel

■ Contents of Lab:

(1) Handware experiment in micro-computer

(2) Application of data analysis and common functions in Excel

(3) Experiments of algorithms and program design

(4) Network application

(5) Advanced application in Office (self-learning)

■ Contents of Lecture:

(1) Computational Thinking and Computer(2 classes）：Definitions of computational thinking, computer science, and the combination

(2) The expression of information(4 classes): Operation basis, positional number system, system transformation; expression of information, numeric data, character type, audio information, image information, as

well as video information

(3) Computer System(4 classes): Constitution and structure of computer system, hardware and software, and frequently-used fault defect

(4) Basis and Algorithm of Program Design(4 classes): Program and program design, steps and common programming language, basic approaches of program design.

(5) Data analysis in Excel(2 classes): Common functions, such as Sum, Sumif, Averarge, Averageif, Count, Countif, Max, Min, If, Vlookup

■ Main Contents of Lab(8 classes):

(1) Hardware of micro-computeer(2 classes)

(2) Algorithms and program design(2 classes)

(3) Network Application(2 classes)

(4) Application of Excel(2 classes)

■ Evaluation Mode: Computer test in lab(Week 12, by random questions)

Part two: Matlab（week 13-20）

Semester	Fall 2020
Course Number & Course Title	ENGR 0011 Introduction to Engineering Analysis
Instructor	Ping C. Sui, Ph.D Office: TBA e-mail: ping.sui@scupi.cn
Teaching Assistant	TBA
Office Hours	Tuesday & Wednesday 10:00AM-11:30AM
Lecture Time	Tuesday 13:50-16:25 Wednesday 13:50-16:25
Lecture Room	TBA

Prerequisites	No prior programming experience or knowledge of MATLAB is assumed.
	It is advisable to have a good familiarity with PC operations and a working knowledge of some basic application software, such as MS Excel. Basic knowledge of computer programming and an understanding of matrix and linear algebra and statistics are highly beneficial.
Textbook	Stephen J. Chapman, 2020, MATLAB Programming for Engineers, 6th Edition
	Cengage Learning Inc., Boston, MA.
Useful References	MATLAB help and User's Guide https://www.mathworks.com/help/matlab/index.html
	MATLAB Newsletters www.mathworks.com/company/newsletters.html
Course Description	This course is a 3 credit hour class.
	The course provides a gentle introduction to the MATLAB computing environment and is intended for beginning users. It is designed to give students a basic understanding of MATLAB by acquiring basic operational skills. The course consists of interactive lectures and sample MATLAB problems given as assignments and discussed in class. Concepts covered include basic use and toolboxes use, graphical representations and tips for designing and implementing MATLAB code.
Course Reminder	The course presents the software MATLAB with its main features; therefore, it does not represent a "substitute" of a formal statistics or econometrics course, therefore the details of any statistical or econometric methods will not be discussed.
Course Outcome	Upon successful completion of this course, the student should be able to:

- Understand the main features of the MATLAB development environment
- Use the MATLAB GUI effectively
- Design simple algorithms to solve problems
- Write simple programs in MATLAB to solve scientific and mathematical problems
- Know where to find help for advanced usage

Session	Course Outline	Lab Assignment
1	Course Overview Ch.01 Introduction to MATLAB	
2	Ch.02 MATLAB Basics	Lab Assignment 01

3	Ch.03 Two-Dimensional Plots	Lab Assignment 02
4	Ch.09 Additional Data Types	Lab Assignment 03
5	Ch.04 Branching Statement and Program Design	Lab Assignment 04
6	Ch.05 Loop and Vectorization	Lab Assignment 05
7	Ch.06 Basic User-Defined Functions	Lab Assignment 06
8	Ch.11 Input-Output Functions	Lab Assignment 07
9	Ch.07 Advanced Features of User-Defined Functions	Final Project

Homework	Problem sets will be distributed each week after the class. Each problem set is designed to build upon the material covered in the preceding lectures and recitations.
	Homework assigned in a particular class is due at 12 PM on the day of the next class period, unless otherwise posted.
	<u>Late HW will not be accepted.</u> Homework missed due to unpredictable events will be dealt with on a case-by-case basis.
Exams	There will be four section exams and all exam will be comprehensive.
	The exams in this course will be closed book and closed note.
	<u>No make-up will be given for the missing exam.</u> Exams missed due to unpredictable events will be dealt with on a case-by-case basis.
Final Project	Each student will select a topic of their interest and work independently to deliver the final project. Work scope of the project must involve extensive usage of the MATLAB knowledge.
	Each student will submit a one-page proposal to outline the project subject, objective, and technical approach. Proposal deadline is 12PM, Nov 26.
	Deliverable of the final project will at least include
	• a final report, and
	• the MATLAB source code to demonstrate the application.
Grades	Homework: 30%
	Section Exams: 50%
	Final Project: 20%
	Grades will be assigned per following scales:
Class Attendance	Students are expected to attend every class period.
	Early is on time, on time is late. As a courtesy to your fellow classmates, be punctual and arrive no later than the class starting time.

Academic Honesty	All of us are equally responsible for ensuring a fair and positive learning environment.
	Students are permitted to discuss homework assignments together, but should do their own work when preparing a problem solution.
	All exams are to be completed without unauthorized assistance. Any student caught cheating on an assignment or exam will receive disciplinary action, up to and including receiving a grade of "F" for the course.