ME 325, Computer Application, Spring, 2016

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Classroom; Days/Time:	HH 211; M/W 2:00 – 3:15 pm
Prerequisites:	MATH 243, PHYS 313
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How to Use This Syllabus

This syllabus provides you with information specific to this course, and it also provides information about important university policies. This document should be viewed as a course overview; it is not a contract and is subject to change as the semester evolves.

Academic Honesty

Students are responsible for knowing and following the Student Code of Conduct http://webs.wichita.edu/inaudit/ch8_05.htm and the Student Academic Honesty policy http://webs.wichita.edu/inaudit/ch2_17.htm.

Course Description

This course provides the basic numerical methods to understand, analyze, and design the various engineering systems. This includes linear/nonlinear systems, least square problems, numerical differentiation/integration/ interpolation, and ordinary differential equations. The students will learn not only basic principles of numerical analysis, but also practical applications to the various numerical approaches for scientific/engineering problems through the commercially available computer software, e.g, MS EXCEL and MATLAB.

Definition of a Credit Hour

Success in this 3 credit hour course is based on the expectation that students will spend, for each unit of credit, a minimum of 45 hours over the length of the course (normally 3 hours per unit per week with 1 of the hours used for lecture) for instruction and preparation/studying or course related activities for a total of 135 hours.

Measurable Student Learning Outcomes

- To gain fundamental knowledge of numerical methods.
- To apply principles of numerical methods to understand and design mechanical systems.
- To identify reasonable numerical methods to solve mechanical engineering systems.
- To analyze mechanical engineering systems using engineering software
- To critically evaluate technical articles in mechanical engineering systems.

Required Texts/Readings Textbook

A Practical Introduction to Programming and Problem Solving, 3rd Ed., Elsevier, by Stormy Attaway. Lecture notes (ppt slides) will be also provided.

Other Readings

- Introduction to Numerical Methods, MIT (http://ocw.mit.edu/courses/mathematics/18-335j-introduction-to-numerical-methods-fall-2004/index.htm, http://ocw.mit.edu/courses/mechanical-engineering/2-993j-introduction-to-numerical-analysis-for-engineering-13-002j-spring-2005/lecture-notes/)
- Introduction to Numerical Methods, Prof. Jun Zhang, U of Kentucky, http://www.cs.uky.edu/~jzhang/CS321/cs321.html
- Numerical analysis by Professor Peter Oliver, U of Minnesota (http://www.math.umn.edu/~olver/num.html)
- Numerical method by Prof. Stuart Dalziel, U of Cambridge (http://www.damtp.cam.ac.uk/lab/people/sd/lectures/nummeth98/contents.htm)

Other Equipment/Materials

Students are encouraged to bring personal computer (laptop or tablet PC) with MS-EXCEL and Matlab (FreeMat or Scilab) and/or calculator.

Class Protocol

- The use of laptops is allowed during the lesson but only for work related to the course activities. Discussions related to the grade will take place ONLY in in-person meetings scheduled by appointment via e-mail or during office hours.
- Students are expected to behave courteously and professionally. Disciplinary infractions will be reported to the university authorities.

Grading Policy

The final letter grade will be given based on the student performance on assignments and exams. The details are given as follows

Assignments and Exams	Contribution to Final Grade
Homework (10-12 assignments)	10%
Quiz (10-12 sets)	10%
Midterm Exam I	20%
Midterm Exam II	20%
Final Exam (Comprehensive)	30%
Final Project	10%

The student performance will be scaled to 100% based on the grading policy (see the table above) and the letter grade will be given the percentage as shown below.

Student Performance (100%)	Letter Grade	Interpretation
100-93	A	*The A range denotes excellent performance.*
85-92	A-	
75-84	B+	
70-74	B	*The B range denotes good performance.*
65-69	B-	
60-64	C+	
55-59	C	*The C range denotes satisfactory performance.*
53-54	C-	
50-52	D+	
45-49	D	*The D range denotes unsatisfactory performance.*
40-45	D-	
< 40	F	*F denotes failing performance.*

Assignments and exams

- Students are strongly encouraged to read course content before the class.

- 10-12 homework sets will be given (weekly basis)
- 10-12 short quizzes will be given based on the homework problems.
- Two midterm exams and one (comprehensive) final exam will be given.
- One final project (an extended hw problem) will be given.

Extra Credit
- NO extra credit work, i.e., late quiz/exam, will be assigned/accepted.

Late Assignments
- NO late assignments, i.e., hw/quiz/exam/project, will be given.

Missed Assignments and Exams
- Make-up hw/quiz/project/exam will be administered **only upon the submission of the relevant documents**, explaining the reasons for the missing ones. The student **MUST** contact to instructor about this **24 hr prior to the assignment due date** to schedule the make-up assignment.
- One minimum hw and one minimum quiz can be dropped.

Important Academic Dates
For spring semester of 2016, classes begin **01/19**, and end **05/05**. The last date to drop a class and receive a W (withdrawn) instead of F (failed) is **04/01**. There are no classes on **03/14** and **03/16**. The final exam is on **05/04**.

Disabilities
If you have a physical, psychiatric/emotional, or learning disability that may impact on your ability to carry out assigned course work, I encourage you to contact the Office of Disability Services (DS). The office is located in Grace Wilkie Annex, room 150, (316) 978-3309 (voice/tty) (316-854-3032 videophone). DS will review you concerns and determine, with you, what academic accommodations are necessary and appropriate for you. All information and documentation of your disability is confidential and will not be released by DS without your written permission.

Counseling & Testing
The WSU Counseling & Testing Center provides professional counseling services to students, faculty and staff; administers tests and offers test preparation workshops; and presents programs on topics promoting personal and professional growth. Services are low cost and confidential. They are located in room 320 of Grace Wilkie Hall, and their phone number is (316) 978-3440. The Counseling & Testing Center is open on all days that the University is officially open. If you have a mental health emergency during the times that the Counseling & Testing Center is not open, please call COMCARE Crisis Services at (316) 660-7500.

Diversity and Inclusive
Wichita State University is committed to being an inclusive campus that reflects the evolving diversity of society. To further this goal, WSU does not discriminate in its programs and activities on the basis of race, religion, color, national origin, gender, age, sexual orientation, gender identity, gender expression, marital status, political affiliation, status as a veteran, genetic information or disability. The following person has been designated to handle inquiries regarding nondiscrimination policies: Executive Director, Office of Equal Employment Opportunity, Wichita State University, 1845 Fairmount, Wichita KS 67260-0138; telephone (316) 978-3186.

Intellectual Property
Wichita State University students are subject to Board of Regents and University policies (see http://webs.wichita.edu/inaudit/ch9_10.htm) regarding intellectual property rights. Any questions regarding these rights and any disputes that arise under these policies will be resolved by the President of the University, or the President's designee, and such decision will constitute the final decision.

Shocker Alert System
Get the emergency information you need instantly and effortlessly! With the Shocker Alert System, we will

contact you by email the moment there is an emergency or weather alert that affects the campus. Sign up at www.wichita.edu/alert.

Student Health Services
WSU's Student Health clinic is located in 209 Ahlberg Hall. Hours are 8:00am to 7:00pm (8:00 am to 5:00 pm on Fridays), though the clinic may be closed occasionally on Wednesdays from noon to 1:30pm. The telephone number is (316) 978-3620. In addition to outpatient and preventive care (including immunizations, a prescription service, and testing/counseling for sexually transmitted infections), Student Health can handle minor injuries. All services are confidential. For more information see www.wichita.edu/studenthealth.

The Heskett Center and Campus Recreation
Whether you are wanting to be active on campus, relieve the stress from classes or take care of your body, Wichita State Campus Recreation is the place for you. Campus Recreation, located inside the Heskett Center, contributes to the health, education, and development of Wichita State University students, faculty, staff, alumni, and community members by offering quality programs and services. With many programs and facilities which are free to all students and members, Campus Recreation offers its members limitless opportunities. For more information about our services see www.wichita.edu/heskett.

Video and Audio Recording
Video and audio recording of lectures and review sessions without the consent of the instructor is prohibited. Unless explicit permission is obtained from the instructor, recordings of lectures may not be modified and must not be transferred or transmitted to any other person, whether or not that individual is enrolled in the course.

Tentative Schedule (subject to changes)

Week	Date	Subject	Remark
1	1/20	Introductions and numbers	
2	1/25	Taylor series and error analysis	
2	1/27	Linear algebra	
3	2/1	Matrix operations	
3	2/3	Solve linear equations	
4	2/8	Least square method	
4	2/10	Programing basics	
5	2/15	MS Excel: introduction, writing formulas using operators and logics	
5	2/17	MS Excel: numerical differentiation	
6	2/22	MS Excel: numerical integration/interpolation	
6	2/24	MS Excel: Root finding	
7	2/29	Review	
7	3/2	In-class Midterm Exam I	
8	3/7	MS Excel: VBA	
8	3/9	Matlab: introduction, variable and matrix arithmetic	
9	3/14	No class (spring break)	
9	3/16	No class (spring break)	
10	3/21	Matlab: control structures	
10	3/23	Matlab: program development using m-files	
11	3/28	Matlab: file I/O	
11	3/30	Matlab: data plotting	
12	4/4	Review	
12	4/6	In-class Midterm Exam II	
13	4/11	Matlab: logical statements	
13	4/13	Matlab: linear matrix equations	
14	4/18	Matlab: integration	
14	4/20	Matlab: minimization	
15	4/25	Matlab: ordinary differential equation solver	
15	4/27	Matlab: numerical analysis	
16	5/2	Final Exam Review	
16	5/4	In-class Final Exam	