SYLLABUS AND COURSE INFORMATION
Spring2024, Bin 302
MATH 317 – Numerical Analysis, Cross-listed with CSCI317
Meets 8/26/2024 through 12/13/2024, Time: MW 2PM-3:15PM

Instructor: Dr. Nikolay Metodiev Sirakov
Office: Bin 322
Office Hours: T 1PM- 2:30PM
W 3:30PM- 5PM
Th 1PM – 3 PM
Others by appointment
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Friday research meetings

For more information, please visit: URL: http://faculty.tamuc.edu/nsirakov

COURSE TEACHING

The instructor will teach the class following the Text. He will formulate, derive and proof basic theorems and numerical methods. The assignments will include Matlab programs, proofs and numerical problems. As an additional study, a description will be given on the correlations between **Machine Learning** (ML) and numerical methods for differentiation and integration. The participating students may ask questions and discuss the taught material. Hence attending the class carries advantages of better understanding the material and solved examples.

COURSE DESCRIPTION

Text: Applied Numerical Analysis Using Matlab, Lauren V. Fausett, 2nd Ed., Pearson Prentice Hall, 2008.ISBN: 0-13-239728-5

The teacher's notes of a lecture will be posted in D2L before the lecture. Some lectures and proofs go beyond the book and the notes. Hence participating the lectures is useful and necessary.

Helpful Text: Linear Algebra and Optimization for Machine Learning, ISBN 978-3-030-40343-0 ISBN 978-3-030-40344-7 (eBook), ©Springer Nature Switzerland AG 2020 .

Pre-requisite: CSCI 151 Min Grade C or COSC 1436 Min Grade C and MATH 192 Min Grade C or MATH 2414 Min Grade C

Helpful skills: Basic Calculus knowledge and linear algebra concepts, programming skills in Matlab.

Course Content: From the Text Book Sections:1.1-1.3; 2.2-2.3; 3.1; 3.3 8.1-8.3; 9.1;11.1, 11.2.1; 5.1. From the Helpful Text, in case of time permission - 1.5 Optimization for **Machine Learning** (**ML**); 1.5.1-1.5.2 The Taylor Expansion for Function Simplification, along with section 11.1 from the Text.

Students Learning Outcomes:

SLO 1-The student will learn the basic asymptotic notations for numerical methods assessment and some basic concepts from **ML**; will be able to work with and run Matlab numerical programs;
- *They will understand and will be able to apply the basic numerical methods for solving* :

SLO 2- non-linear equations of one variable;
SLO 3- linear systems of equations; data interpolation and approximation, splines;
SLO 4 – Differentiation, integration. Truncation error;
SLO 5 - The students will learn to analyze a method regarding its convergence, and complexity;
SLO 6 - They will learn to find the right method for the solution of a particular problem.

Calendar: *1st week*- Sections 1.1-1.2 ; *2nd week*- Sections 1.2-1.3; *3rd week* - Sections 1.3, Info about 1.4 on my web page; *4th and 5th weeks* – Sections 2.2-2.3; *6th and 7th weeks* -Sections 3.1, 3.2; *7th , 8th weeks* – Sections 3.3 and 8.1; *9th week*- Section 8.3-Splines; *10th week* continuation Section-8.3; 11th week – Section 11.1.1 and ML 1.5.1; *12th week*- Section 11.1.2-11.1.3; *13th week*- Section 11.2.1- could be moved to 3rd or 5th week; *14th week* – Section 5.1.1, upon time permission; *15th week* – summary of the studied methods, preparation for the final exam.

MatLab Guide: http://faculty.tamuc.edu/nsirakov/Teaching/Math%20317-%20Numerical%20Analysis.aspx

COURSE EVALUATION- **Basis for Evaluation:**
In-class exam(s)- 44% ; HW/ Programs Num. Methods/proofs - 18% ; Short quiz(zes)- 14%
Comprehensive final exam - 24%
Grading Policy: ***A:***100%- 90% ; ***B:***89% - 80% ; ***C:***79% - 70%; ***D:***69% - 60%; ***F:***Less than 59 %
The professor reserves the rights to reward students for continuous hard work.
Additional Performances: Home Practice Problems, Extra Credit Problems

Final Test	**Section:** Math/CS	**Date: Monday** December 09, 2024	**Time:** 1:15PM-3:15PM

COURSE POLICIES

HW: *to be solved at home. No makeup is allowed.*
Short quizzes: *are to be solved independently during the class period. No makeup is allowed.*

Tests: *The two in-class tests will be given roughly at regular intervals. Students will be informed of the test dates around a week in advance. The test will take one class period and will be given at the scheduled times only. No opportunity will be given to take the test at earlier or later times except in cases of formal institutional excuses as mentioned above.*

Makeup: *Except in the case of a formal institutional excuse, no individual makeup test will be permitted.*
Cheating: HW, test, quizzes, extra credit problems results will be canceled in case of cheating.
AI use policy TAMUC acknowledges that there are legitimate uses of Artificial Intelligence, ChatBots, or other software that has the capacity to generate text, or suggest replacements for text beyond individual words, as determined by the instructor of the course. Any use of such software must be documented. Any undocumented use of such software constitutes an instance of academic dishonesty (plagiarism). Individual instructors may disallow entirely the use of such software for individual assignments or for the entire course. Students should be aware of such requirements and follow their instructors 'guidelines. If no instructions are provided the student should assume that the use of such software is disallowed. In any case, students are fully responsible for the content of any assignment they submit, regardless of whether they used an AI, in any way. This specifically includes cases in which the AI plagiarized another text or misrepresented sources. 13.99.99.R0.03 Undergrad Academic Dishonesty, 13.99.99.R0.10 Grad Student Academic Dishonesty
A&M-Commerce Supports Students' Mental Health, The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel
Students with Disabilities: The Americans with Disabilities Act (ADA) is a federal anti-discrimination statute that provides comprehensive civil rights protection for persons with disabilities. Among other things, this legislation requires that all students with disabilities be guaranteed a learning environment that provides for reasonable accommodation of their disabilities. If you have a disability requiring an accommodation, please contact: Office of Student Disability Resources and Services; Texas A&M University-Commerce; Halladay Student Services Building; Room 132 A/D; Phone (903) 886-5150 or (903) 886-5835; Fax (903) 468-8148 StudentDisabilityServices@tamu-commerce.edu
All students enrolled at the U shall follow the tents of common decency and acceptable behavior conducive to a positive learning environment (See Student's Guide Handbook, Polices and Procedures, Conduct).
Texas Senate Bill - 11 *(Government Code 411.2031, et al.) authorizes the carrying of a concealed handgun in TAMUC buildings only by persons who have been issued and are in possession of a Texas License to Carry a Handgun. Qualified law enforcement officers or those who are otherwise authorized to carry a concealed handgun in the State of Texas are also permitted to do so. Pursuant to Penal Code (PC) 46.035 and A&M-Commerce Rule 34.06.02.R1, license holders may not carry a concealed handgun in restricted locations. For a list of locations, please refer to http://www.tamuc.edu/aboutUs/policiesProceduresStandardsStatements/rulesProcedures/34SafetyOfEmployeesAndStudents/34.06.02.R1.pdf and/or consult your event organizer). Pursuant to PC 46.035, the open carrying of handguns is prohibited on all TAMUC campuses. Report violations to the University Police Department at 903-886-5868 or 9-1-1.*
Nondiscrimination Notice **Texas A&M University-Commerce** will comply in the classroom, and in online courses, with all federal and state laws prohibiting discrimination and related retaliation on the basis of race, color, religion, sex, national origin, disability, age, genetic information or veteran status. An environment free from discrimination on the basis of sexual orientation, gender identity, or gender expression will be maintained.
The Counseling Center at A&M-Commerce, located in the Halladay Building, Room 203, offers counseling services, educational programming, and connection to community resources for students. Students have 24/7 access to the Counseling Center's crisis assessment services by calling 903-886-5145. For more information regarding Counseling Center events and confidential services, please visit www.tamuc.edu/counsel .

The road that will lead you to find a good job is the road of learning, and developing yourself.

Commerce, Texas
July 23, 2024 **Dr. Nikolay Metodiev Sirakov**