Differential Equations / Linear Algebra
MTH 2201/2202
Spring 2019

Time and Location: (S01) M,W 11:00-11:50am CRF 230; Tu,Th 12:30-1:45pm CRF 210

Instructor: Dr. Vladislav Bukshtynov
Office: CRF 314
Office hours: M 4-5pm; Tu,Th 9:30-10:30am or by appointment
Email: vbukshynov@fit.edu

GSA(s): Ali Hagverdiyev, email: ahaqverdiyev2011@my.fit.edu, office hours Mo 12-2pm, Tu 9:30-11:30am, Wd 12:30-2:30pm, Fr 2-4pm @ MAC

Course web page:
- Canvas: grades, course materials (lecture notes, homework, suggested reading and practice problems, etc.) and general announcements will be posted here
- http://my.fit.edu/~vbukshtynov/mth2201-s19 for general course information

Prerequisite(s): MTH 1002 Calculus 2

Course Topics: first-order differential equations, linear differential equations with constant coefficients, first-order systems of differential equations with constant coefficients, numerical methods, Laplace transforms, series solutions, algebraic systems of equations, matrices, determinants, vector spaces, eigenvalues and eigenvectors

Course Objectives and Learning Outcomes:
1. Gain knowledge and learn mathematical methods and techniques involving Differential Equations.
2. Formulate and solve problems involving Differential Equations and there by develop skills for abstract thinking, mathematical rigor and logic via solving.
3. Understand the relationship and relevance of Differential Equations to other technical fields and develop competence at the application of differential equations in one or more areas.
4. Develop mathematical intuition, demonstrate skills for reading, writing, speaking about differential equations and applications. Communicate and interact effectively to both technical and non-technical audiences.

Textbook(s):
Course Outline:

Linear Algebra for Differential Equations (4 weeks - 1 credit) will cover the following chapters from [1]:


Test 1 (also Final Exam for MTH2202 Linear Algebra): Thursday, February 7, 8pm, TBA

Differential Equations (12 weeks - 3 credits) will cover the following chapters from [2]:

1.1 Definitions and Terminology ◦ 1.2 Initial-Value Problems ◦ 1.3 Differential Equations as Mathematical Models ◦ 2.1 Solution Curves Without a Solution 2.2 Separable Variables ◦ 2.3 Linear Equations ◦ 2.4 Exact Equations ◦ 2.5 Solutions by Substitution ◦ 3.1 Linear Models ◦ 3.2 Nonlinear Models ◦ 4.10. Nonlinear Differential Equations

Test 2: Thursday, March 14, 8pm, TBA

4.1 Preliminary Theory - Linear Equations ◦ 4.2* Reduction of Order ◦ 4.3 Homogeneous Linear Equations with Constant Coefficients ◦ 4.4 Undetermined Coefficients - Superposition Approach ◦ 4.6 Variation of Parameters ◦ 4.7 Cauchy-Euler Equations ◦ 5.1 Linear Models: Initial-Value Problems ◦ 8.1 Preliminary Theory - Systems of Linear Differential Equations ◦ 8.2 Homogeneous Linear Systems ◦ 8.3 Nonhomogeneous Linear Systems

Test 3: Thursday, April 11, 8pm, TBA

7.1 The Laplace Transform ◦ 7.2 Inverse Transforms and Transforms of Derivatives ◦ 7.3 Translation Theorems ◦ 7.4 Derivative of a Transform, Transform of an Integral ◦ 7.5 The Dirac Delta Function

Final Exam: Wednesday, May 1, 10:30am-12:30pm, TBA

Grading: Your course grade will be calculated as follows

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Quizzes</td>
<td>20%</td>
</tr>
<tr>
<td>Project</td>
<td>5%</td>
</tr>
<tr>
<td>Midterm tests</td>
<td>40%</td>
</tr>
<tr>
<td>Final exam</td>
<td>25%</td>
</tr>
</tbody>
</table>

Homework/quizzes/exams polices:

- Required reading associated with the lecture material as well as the problems for homework will be given in class after lectures and posted in Canvas. Since you are required to solve the test and exam problems without using books, notes, or calculators, it is highly recommended that you do as much homework as possible without using any of them. There will be 4 announced graded homeworks. No late submissions will be accepted.
- **Quizzes** with several problems similar to the homework problems will be administered in class. The quiz score will be the sum of the best 5 out of 9 quiz scores. **Hence, there will be no make up for quizzes.**
- Three **midterm exams** will take place on the dates provided in the course outline above and will be common for all sections to be held in the evening. Make up for the midterm exams will be at 7am
on Mondays following the test dates. Note that the makeup exams require valid documentation and prior approval.

- The term project will be assigned to work in small groups and is worth up to 5%. This will be available to those students with excellent lecture attendance 88.4% maintained by 04/23/2019. Detailed instructions will be posted later.

* Grading: applied to students who take only MTH2202 Linear Algebra component:

- homework: 20%
- 2 quizzes: 40%
- Test 1: 40%

The right to alter your final grade is reserved by the instructor, in which case, however, the grade may only be increased. The undergraduate grading system published on the Office of the Registrar’s web site at https://www.fit.edu/Registrar/Academic-standards-and-policies/ is used to convert between percentages and letter grades. The instructor reserves the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice will be given with clear explanations on all changes. It is the responsibility of the student to check their course web site regularly during the term and to note any changes.

Attendance for the entire course is required and will be checked regularly at the beginning of each lecture/lab. Please refer to the Undergraduate Attendance Requirements section at https://www.fit.edu/Registrar/Academic-standards-and-policies/.

Classroom Policy: Use of cell phones or any other unauthorized electronic devices is NOT allowed during the lectures. Any student found using such devices will be asked to leave the class.

Academic dishonesty consists of misrepresentation by deception or by other fraudulent means and can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit for the entire course, and/or suspension or expulsion from the university. It is your responsibility to understand what constitutes academic dishonesty, please refer to the Standards - Academic Honesty section in the Florida Tech Student Handbook posted at http://www.fit.edu/studenthandbook/.

What is Title IX? Title IX of the Educational Amendments Act of 1972 is the federal law prohibiting discrimination based on sex under any education program and/or activity operated by an institution receiving and/or benefiting from federal financial assistance. Behaviors that can be considered “sexual discrimination” include sexual assault, sexual harassment, stalking, relationship abuse (dating violence and domestic violence), sexual misconduct, and gender discrimination. You are encouraged to report these behaviors.

Reporting: Florida Tech can better support students in trouble if we know about what is happening. Reporting also helps us to identify patterns that might arise - for example, if more than one complainant reports having been assaulted or harassed by the same individual.

Florida Tech is committed to providing a safe and positive learning experience. To report a violation of sexual misconduct or gender discrimination, please contact Linda Jancheson, Title IX Coordinator at (321) 674-7277 or ljancheson@fit.edu.

* Please note that as your professor, I am required to report any incidents to the Title IX Coordinator. Confidential support for students is available by contacting the Student Counseling Center at (321) 674-8050.