# SYLLABUS

**PRAIRIE VIEW A&M UNIVERSITY**  
Department of Mathematics  
Fall 2018

<table>
<thead>
<tr>
<th>MATH 4173 – P02</th>
<th>Advanced Math for Engineers CRN: 11287</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Department of</strong></td>
<td>Mathematics</td>
</tr>
<tr>
<td>Instructor Name:</td>
<td>Dimitar P. Michev, Ph. D.</td>
</tr>
<tr>
<td>Office Location:</td>
<td>W. R. Banks Room 301 F</td>
</tr>
<tr>
<td>Office Phone:</td>
<td>936-261-1982</td>
</tr>
<tr>
<td>Fax:</td>
<td>936-261-2088</td>
</tr>
<tr>
<td>Email Address:</td>
<td><a href="mailto:dimichev@pvamu.edu">dimichev@pvamu.edu</a></td>
</tr>
<tr>
<td>Snail Mail (U.S. Postal Service) Address:</td>
<td>Prairie View A&amp;M University</td>
</tr>
<tr>
<td></td>
<td>P.O. Box 519</td>
</tr>
<tr>
<td></td>
<td>Mail Stop 2225</td>
</tr>
<tr>
<td></td>
<td>Prairie View, TX 77446</td>
</tr>
<tr>
<td>Office Hours:</td>
<td>T,R 11:00 am – 12:30 pm, W 9:00 am – 11:00 am, F 9:00 am – 1:00 pm, or by appointment.</td>
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<tr>
<td>Virtual Office Hours:</td>
<td></td>
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<tr>
<td>Course Location:</td>
<td>GILC, Rm. 109</td>
</tr>
<tr>
<td>Class Meeting Days &amp; Times:</td>
<td>MWF 01:00 pm – 01:50 pm</td>
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<tr>
<td>Course Abbreviation and Number:</td>
<td>Math 4173</td>
</tr>
<tr>
<td>Catalog Description:</td>
<td>(3-0) Credit 3 semester hours. Matrices and determinants, vector spaces, systems of linear equations, Eigenvalues and Eigenvectors; power series, Laplace transforms, Fourier series and orthogonal functions, numerical solutions to ordinary differential equations.</td>
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<tr>
<td>Prerequisites:</td>
<td>Math 2043 – Differential Equations I</td>
</tr>
<tr>
<td>Co-requisites:</td>
<td>NA</td>
</tr>
</tbody>
</table>
| Required Text: | Advanced Mathematics for Engineers with Applications in Stochastic Processes by Haghghi, Lian, Mishev, Nova Science Publishers, November 2012, **ISBN:** 978-1-62257-610-4 (Softcover)  
| Recommended Text: | NA |
| Access to Learning Resources: | PVAMU Library:  
phone: (936) 261-1500;  
web: [http://www.tamu.edu/pvamu/library/](http://www.tamu.edu/pvamu/library/)  
University Bookstore:  
phone: (936) 261-1990;  
web: [https://www.bkstr.com/Home/10001-10734-1?demoKey=d](https://www.bkstr.com/Home/10001-10734-1?demoKey=d) |
| Course Goals or Overview: | The goal of this course is to provide a solid foundation of functions of complex variable and power series, Fourier and Laplace transforms and to show how the basic concepts of engineering math can be applied to solving a variety of scientific and applied problems. |
At the end of this course, the student will be able to

<table>
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<tr>
<th></th>
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<th>Alignment with Academic Program</th>
<th>Alignment with Core Curriculum</th>
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<tbody>
<tr>
<td>1</td>
<td>show mastery in the differential and integral techniques to deal with functions of a complex variable.</td>
<td>#1, #3, #4</td>
<td>#1</td>
</tr>
<tr>
<td>2</td>
<td>understand the concept and applications of Cauchy-Riemann equations.</td>
<td>#4</td>
<td>#1</td>
</tr>
<tr>
<td>3</td>
<td>analyze sequences and series; find the interval of convergence of a power series; find Taylor or Maclaurin series for a functions of a complex variable and solve related applied problems;</td>
<td>#1, #3, #4</td>
<td>#1, #3</td>
</tr>
<tr>
<td>4</td>
<td>apply Fourier transform to solving a Partial Differential Equations (PDE).</td>
<td>#4</td>
<td>#3</td>
</tr>
<tr>
<td>5</td>
<td>solving initial value problems (IVP) by Laplace transform.</td>
<td>#4</td>
<td>#3</td>
</tr>
<tr>
<td>6</td>
<td>solving IVP with discontinuous inputs and apply Laplace transform to solve selected problems that arise in mathematics, science, engineering, and computer science.</td>
<td>#3, #4</td>
<td>#1, #3</td>
</tr>
<tr>
<td>7</td>
<td>apply generating functions method to solve difference and differential-difference Equations.</td>
<td>#4</td>
<td>#1, #3</td>
</tr>
</tbody>
</table>

Program Learning Outcomes:

1. Demonstrate mathematical computational skills in differential equations and apply mathematics.
2. Demonstrate the ability to write mathematically rigorous proofs.
3. Demonstrate the ability to perform advanced mathematical computations and distinguish uses of concepts in Applied Mathematics.
4. Demonstrate a breadth and depth of knowledge in applied mathematics.

Course Evaluation Methods

This course will utilize the following instruments to determine student grades and proficiency of the learning outcomes for the course.

- **Exams** – written tests designed to measure knowledge of presented course material
- **Exercises** – written assignments designed to supplement and reinforce course material
- **Projects** – web development assignments designed to measure ability to apply presented course material
- **Class Participation** – daily attendance and participation in class discussions
Grading Matrix

Weights for the percentage course mark

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework and Projects</td>
<td>20%</td>
</tr>
<tr>
<td>Exam 1</td>
<td>15%</td>
</tr>
<tr>
<td>Mid Term Exam</td>
<td>15%</td>
</tr>
<tr>
<td>Exam 2</td>
<td>15%</td>
</tr>
<tr>
<td>Class Participation</td>
<td>5%</td>
</tr>
<tr>
<td>Taskstream and course evaluation</td>
<td>5%</td>
</tr>
<tr>
<td>Final Exam (comprehensive)</td>
<td>25%</td>
</tr>
</tbody>
</table>

The grade and the final percentage course mark are related:

- 90% - 100% A
- 80% - 89% B
- 70% - 79% C
- 60% - 69% D
- 0% - 59% F

Notes:

i. Use of various technologies is NOT allowed on any test and/or exam. However, it is encouraged for HW assignments. At tests, only calculators without camera and no access to the Internet, at the maximum level of TI 14.

ii. All tests must be taken in class and at their scheduled times.

iii. Any sickness’ supporting document must be verified by the department of mathematics.

iv. A Makeup test should be taken in the faculty or in the mathematics’ department office.

v. For tests, including midterm and final exam, you will be given a one-sheet consisting of complex formulae that can be used for your test, in case it would help you. You should return this sheet along with your test sheet.

vi. Taking your tests, you are allowed to use a calculator up to the TI 84 level (Graphing calculator).

vii. Any cellular phone and/or any other device that has access to the Internet and/or is capable of taking picture is not allowed on tests.

MATH 4173 – Advanced Math for Engineers, Spring 2018

COURSE OUTLINE:

<table>
<thead>
<tr>
<th>Week</th>
<th>Topic</th>
<th>Note</th>
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<tbody>
<tr>
<td>1-2</td>
<td>Multivariable functions and the concept of the partial derivative; solution of simple partial differential equations; the wave, heat, diffusion and Laplace equations. Functions of Complex Variable.</td>
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</tr>
<tr>
<td>3-4</td>
<td>The general power series; Radius and interval of convergence; Taylor Series and Maclaurin Series; Analytic Functions; Line Integral and Cauchy’s Integral Theorem.</td>
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</tbody>
</table>
Orthogonal functions and Sturm Louisville Problems: inner product of two functions; orthogonality of a set of real-valued functions; norm and square norm of a function;

Fourier coefficients and expansions; periodic extension of functions; half-range expansions; Fourier sine and Fourier cosine series. Fourier Series and Partial Differential Equations (PDE).

Review Mid Term Exam

Definition of Laplace Transform; Transform of the derivative of a function; Inverse Laplace transform; Solution of initial value problems by Laplace transformation; Definition and properties of convolution; The Convolution Theorem;

Solving Initial-Value Problems with Discontinuous Inputs. Short Impulse and Dirac’s Delta Functions. Applications to Electric Circuits.


Review Final Exam

Course Procedures or Additional Instructor Policies

Taskstream

Taskstream is a tool that Prairie View A&M University uses for assessment purposes. At least one of your assignments is REQUIRED to be submitted as an "artifact," an item of coursework that serves as evidence that course objectives are met. More information will be provided during the semester, but for general information, you can visit Taskstream via the link in eCourses.

Submission of Assignments:

Current homework assignments and computer lab projects will be collected. No late homework or project will be accepted.

Study Hints:
1. Attend class regularly.
2. You should read the material from the textbook before coming to class. The accompanying assignment sheet shows the class schedule and the corresponding text material for each class meeting. If you miss a class, you are expected to find out which material was covered and to
familiarize yourself with it. Please ask questions if you have any.

3. Form study groups with classmates.
4. Make use of office hours.
5. Make use of the Math Tutorial Lab in WR Banks, Room 303.

Student Support and Success

John B. Coleman Library
The library and its partners have as their mission to provide resources and instructional material in support of the evolving curriculum, as a partner in Prairie View A&M University's mission of teaching, research, and service and to support the University's core values of access and quality, diversity, leadership, relevance, and social responsibility through emphasis on ten key areas of service. It maintains library collections and access both on campus, online, and through local agreements to further the educational goals of students and faculty. [https://www.pvamu.edu/library/] Phone: 936-261-1500

The Learning Curve (Center for Academic Support)
The Learning Curve offers Tutoring via peer tutoring. The services include workshops (i.e., Save My Semester, Recalculate Your Route), seminars (i.e., Tools You Can Use: TI-84), group review sessions (i.e., College Algebra Topic Reviews, GRE Preparation), group study opportunities (i.e., TSIA, HESI, Study Break, Exam Cram), and test-taking strategies (How to take Notes, Study Buddy, 5 Day Study Guide). The Learning Curve is a nationally certified tutoring program through the National Tutoring Association. The peer tutors are trained and certified by the coordinator each semester. Location: J.B. Coleman Library Rm. 207F. Phone: 936-261-1561

The Center for the Oversight and Management of Personalized Academic Student Success (COMPASS)
The Center for the Oversight and Management of Personalized Academic Student Success (COMPASS) is designed to help Prairie View students in their second year and beyond navigate towards graduation by providing the following services: Academic Advisement, Targeted Tutorials for Personalized Learning, Campus-Wide Referrals, and Academic & Social Workshops. Location: J.B. Coleman Library Rm. 306. Phone: 936-261-1040

Writing Center
The Writing Center provides student consultants on all aspects of the writing process and a variety of writing assignments. Writing Center consultations assist students in such areas as prewriting, brainstorming, audience awareness, organization, research, and citation. Students taking on-line courses or courses at the Northwest Houston Center or College of Nursing may consult remotely or by email. Location: Hilliard Hall Rm. 121. Phone: 936-261-3724.

Student Counseling Services
The Student Counseling Services unit offers a range of services and programs to assist students in maximizing their potential for success: short-term individual, couples, and group counseling, as well as crisis intervention, outreach, consultation, and referral services. The staff is licensed by the State of Texas and provides assistance to students who are dealing with academic skills concerns, situational crises, adjustment problems, and emotional difficulties. Information shared with the staff is treated confidentially and in accordance with Texas State Law. Location: Owens-Franklin Health Center Rm. 226. Phone: 936-261-3564

Testing
The Department of Testing administers College Board CLEP examinations, the HESI A2 for pre-nursing majors, LSAT for law school applicants and MPRE for second-year law students, the Experiential Learning Portfolio option, the Texas Success Initiative (TSI) Assessment, which determines college readiness in the state, and exam proctoring, among other service such as SAT and ACT for high school students. Location: Delco Rm. 141. Phone: 936-261-4286

Office of Diagnostic Testing and Disability Services
As a federally-mandated educational support unit, the Office of Disability Services serves as the repository for confidential disability files for faculty, staff, and students. For persons with a disability, the Office develops
individualized ADA letters of request for accommodations. Other services include: learning style inventories, awareness workshops, accessibility pathways, webinars, computer laboratory with adapted hard and software, adapted furniture, proctoring of non-standardized test administrations, ASL interpreters, ALDs, digital recorders, livescribe, Kurtzweil, and a comprehensive referral network across campus and the broader community. Location: Evans Hall Rm. 317. Phone: 936-261-3585

Veteran Affairs
Veterans Services works with student veterans, current military and military dependents to support their transition to the college environment and continued persistence to graduation. The Office coordinates and certifies benefits for both the G.I. Bill and the Texas Hazlewood Act. Location: Evans Hall Rm. 323. Phone: 936-261-3563

Office for Student Engagement
The Office for Student Engagement delivers comprehensive programs and services designed to meet the co-curricular needs of students. The Office implements inclusive and accessible programs and services that enhance student development through exposure to and participation in diverse and relevant social, cultural, intellectual, recreational, community service, leadership development and campus governance. Location: Memorial Student Center Rm. 221. Phone: 936-261-1340

Career Services
Career Services supports students through professional development, career readiness, and placement and employment assistance. The Office provides one-on-one career coaching, interview preparation, resume and letter writing, and career exploration workshops and seminars. Services are provided for students at the Northwest Houston Center and College of Nursing in the Medical Center twice a month or on a requested basis. Distance Learning students are encouraged to visit the Career Services website for information regarding services provided. Location: Evans Hall Rm. 217. Phone: 936-261-3570

University Rules and Procedures

Disability Statement (Also See Student Handbook):
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 believe you have a disability requiring an accommodation, please contact Disability Services, in Evans Hall, Room 317, or call 936-261-3585/3.

Academic Misconduct (See Student Handbook):
You are expected to practice academic honesty in every aspect of this course and all other courses. Make sure you are familiar with your Student Handbook, especially the section on academic misconduct. Students who engage in academic misconduct are subject to university disciplinary procedures.

Forms of Academic Dishonesty:
1. Cheating: deception in which a student misrepresents that he/she has mastered information on an academic exercise that he/she has not mastered; giving or receiving aid unauthorized by the instructor on assignments or examinations.
2. Academic misconduct: tampering with grades or taking part in obtaining or distributing any part of a scheduled test.
3. Fabrication: use of invented information or falsified research.
4. Plagiarism: unacknowledged quotation and/or paraphrase of someone else’s words, ideas, or data as one’s own in work submitted for credit. Failure to identify information or essays from the Internet and submitting them as one’s own work also constitutes plagiarism.

Nonacademic Misconduct (See Student Handbook)
The university respects the rights of instructors to teach and students to learn. Maintenance of these rights requires campus conditions that do not impede their exercise. Campus behavior that interferes with either (1) the instructor’s ability to conduct the class, (2) the inability of other students to profit from the instructional program, or
(3) campus behavior that interferes with the rights of others will not be tolerated. An individual engaging in such disruptive behavior may be subject to disciplinary action. Such incidents will be adjudicated by the Dean of Students under nonacademic procedures.

**Sexual Misconduct (See Student Handbook):**
Sexual harassment of students and employers at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating this policy will be subject to disciplinary action.

**Title IX Statement**
Prairie View A&M University (PVAMU) is committed to supporting students and complying with the Texas A&M University System non-discrimination policy. It seeks to establish an environment that is free of bias, discrimination, and harassment. If you experience an incident of sex- or gender-based discrimination, including sexual harassment, sexual assault or attempted sexual assault, we encourage you to report it. While you may talk to a faculty member about an incident of misconduct, the faculty member must report the basic facts of your experience to Ms. Alexia Taylor, PVAMU’s Title IX Coordinator. If you would like to speak with someone who may be able to afford you privacy or confidentiality, there are individuals who can meet with you. The Title IX Coordinator is designated to handle inquiries regarding non-discrimination policies and can assist you with understanding your options and connect you with on- and off-campus resources. The Title IX Coordinator can be reached by phone at 936-261-2123 or in Suite 013 in the A.I. Thomas Administration Building.

**Class Attendance Policy (See Catalog for Full Attendance Policy)**
Prairie View A&M University requires regular class attendance. Attending all classes supports full academic development of each learner whether classes are taught with the instructor physically present or via distance learning technologies such as interactive video and/or internet.

Excessive absenteeism, whether excused or unexcused, may result in a student’s course grade being reduced or in assignment of a grade of “F”. Absences are accumulated beginning with the first day of class during regular semesters and summer terms. Each faculty member will include the University’s attendance policy in each course syllabus.

**Student Academic Appeals Process**
Authority and responsibility for assigning grades to students rests with the faculty. However, in those instances where students believe that miscommunication, errors, or unfairness of any kind may have adversely affected the instructor’s assessment of their academic performance, the student has a right to appeal by the procedure listed in the Undergraduate Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint.

**TECHNICAL CONSIDERATIONS**

**Minimum Recommended Hardware and Software:**
- Intel PC or Laptop with Windows 7; Mac with OS X; Smartphone or iPad/Tablet with Wi-Fi
- High speed Internet access
- 8 GB Memory
- Hard drive with 320 GB storage space
- 15” monitor, 800x600, color or 16 bit
- Sound card w/speakers
- Microphone and recording software
- Keyboard & mouse
- Most current version of Google Chrome, Safari, Internet Explorer or Firefox

**Note:** Be sure to enable Java & pop-ups in the Web browser preferences

**Participants should have a basic proficiency of the following computer skills:**
- Sending and receiving email
- A working knowledge of the Internet
- Proficiency in Microsoft Word (or a program convertible to Word)
- Proficiency in the Acrobat PDF Reader
- Basic knowledge of Windows or Mac O.S.
Netiquette (online etiquette):
Students are expected to participate in all discussions and virtual classroom chats as directed. Students are to be respectful and courteous to others on discussions boards. Foul or abusive language will not be tolerated.

Technical Support:
Students should go to https://mypassword.pvamu.edu/ if they have password issues. The page will provide instructions for resetting passwords and contact information if login issues persist. For other technical questions regarding eCourses, call the Office of Distance Learning at 936-261-3283

Communication Expectations and Standards:
Emails or discussion postings will receive a response from the instructor, usually in less than 48 hours. Urgent emails should be marked as such. Check regularly for responses.

Discussion Requirement:
Online courses often require minimal to no face-to-face meetings. However, conversations about the readings, lectures, materials, and other aspects of the course can take place in a seminar fashion. This will be accomplished by the use of the discussion board. The exact use of discussion will be determined by the instructor.

It is strongly suggested that students type their discussion postings in a word processing application and save it to their PC or a removable drive before posting to the discussion board. This is important for two reasons: 1) If for some reason your discussion responses are lost in your online course, you will have another copy; 2) Grammatical errors can be greatly minimized by the use of the spell-and-grammar check functions in word processing applications. Once the post(s) have been typed and corrected in the word processing application, it/they should be copied and pasted to the discussion board.

College of Arts and Sciences Student & Staff Aspiration Statement
The faculty and staff of the College of Arts and Sciences at PVAMU are committed to providing the best possible quality education to its students. To that end, we will work hard to prepare the students for success by setting the proper academic environment and background necessary to facilitate learning. In order for us to be successful, there are some basic expectations our students must demonstrate. These expectations are a simple ingredient to foster camaraderie and ‘esprit de corps’ in every class and classroom on campus. Additionally, these are lifelong fundamental learning skills to better prepare students for success in America’s job market.

CAS student expectations:

- You are expected to come to class prepared and on time.
- Higher education is an investment in your future, to that end; you must endeavor to be properly equipped for class. (i.e. School supplies, text, and other supporting materials).
- Resolution of any classroom issues (i.e. Grades, course materials, etc) should begin with the instructor.
- If you must leave early, notify the instructor before the class begins, sit by the door, and exit quietly
- Be considerate of your fellow classmates; please turn off all phones, pagers and other electronic devices.
- Do not talk to other students during lecture. If you have a question or a comment on the subject being discussed, address it to the instructor directly.
- Walk quietly through the hallways, classes in other rooms may still be in session.
- Please refrain from eating, drinking, sleeping in class, using profanity, and engaging in any form of horseplay in the classroom it is disruptive to your fellow classmates.
➢ Be respectful, civil, polite and considerate when dealing with your professors as well as your fellow classmates.

➢ Student attire is based on personal preference and taste. The rule of thumb is simple, if it projects a statement which is offensive to others, then maturity should dictate that it is probably not a good idea to wear to class.

➢ Enthusiasm is infectious, a smile and positive attitude will go far to motivate and charge your professors and fellow classmates.