COURSE                Dynamic Systems and Controls
COURSE NO             MCEG 4063
CREDIT                3 Semester Hours
SECTION               Z03
PRE-REQUISITES:       Differential Equations (MATH 2043)
Engineering Mechanics II (CVEG/MCEG 2053)
CLASS HOURS           MWF 10:00-11:50am
CLASS ROOM            Internet (Synchronous)
INSTRUCTOR            Dr. April Lovelady
OFFICE                Room 102, C. L. Wilson Engr. Bldg.
OFFICE HOURS          Virtual Office Hours TBD
TELEPHONE             (936) 261-9962
E-MAIL                aplovelady@pvamu.edu
Catalog Data:         MCEG 4063 Dynamic Systems and Controls.  
                       Dynamic modeling and simulation of mechanical and 
                       electromechanical coupling systems; linear system stability, 
                       transient, steady-state behavior; introduction to feedback control.

Textbook              “System Dynamics for Engineering Students, Concepts and 
                       Applications” by Nicolae Lobontiu, 2nd Edition, Academic Press, 
                       Elsevier. 
                       ISBN 978-0-12-804559-6
Reference             W. Thomson, Theory of Vibration with Applications, 5th Edition, 
                       Prentice Hall. 
                       G. F. Franklin, Feedback Control of Dynamic Systems, Prentice 
                       Hall.

Goals                 The Goals of this course is to develop ability to apply knowledge of 
                       mathematics, science and engineering in solving dynamic problems, 
                       especially in mechanical and electromechanical coupling systems,
and introduction to control systems.

**Outcome**

On completion of this course, the students will be able to solve dynamic system problems and have an overview of feedback control systems. The students will learn to:

- Derive equations from simple components, proceed to the objects’ assembly, and arrive at the system interaction level;
- Use modeling, procedures, and techniques to solve dynamic system problems;
- Use computer tools to solve dynamic and feedback control systems.

**Course objective**

To introduce students to the dynamics of mechanical and electromechanical systems, and feedback control systems.

**Topics**

1. Mechanical elements and systems (11 hours)
2. Modeling and solution techniques of dynamics systems (12 hours)
3. Electromechanical coupling systems (9 hours)
4. Feedback control systems (12 hours)

**Grading**

The final grade will be computed according to the following weight distribution:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Solving &amp; Computer Assignments</td>
<td>15%</td>
</tr>
<tr>
<td>Graded Forum Discussion</td>
<td>15%</td>
</tr>
<tr>
<td>Midterm Exam</td>
<td>35%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>35%</td>
</tr>
</tbody>
</table>

The distribution of grades will be as follows:

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

Use of ecourses (http://ecourse.pvamu.edu)
Ecourses will be used extensively in this class. Lecture slides, assignments, and project statement will be provided on ecourses. All grades including homework, tests, and project will be posted on ecourses.

Academic Integrity
Academic dishonesty of any sort (plagiarism, cheating, fabrication or facilitation) is prohibited under any circumstance. Any detected actions of dishonesty will cause the failure of the class directly.

Assignments & Due Dates
Homework will be submitted according to the requirement of the instructor. Late homework will be charged a 20% penalty for each day late – weekend days do count. Circumstances beyond your control (i.e., illness, computer failure, weather, etc.) will be considered as required.

Attendance
Joining the synchronous sessions is required. If you miss class, you must watch the recorded sessions within two days of them being posted. You should notify the instructor if you can neither attend the synchronous sessions nor review the recorded sessions within two days of posting.

Tests
No makeup test will be given. You will be expected to complete the exam in the allotted time period. Portions of each exam may be either closed or open book. You will be notified of the exam format at least one week in advance.

Question/concern about grades
All discussion about grades excluding final exam grade should happen before final exam. Questions about grade of quizzes, homework, exams should be brought up within one week after they are graded and given back to you.

IMPORTANT DATES
Please visit https://www.pvamu.edu/registrar/academic-calendars/summer-2021-full-term/
## MCEG 4063 - Dynamic Systems and Controls

### Course Schedule

**Summer 2021 Semester**

<table>
<thead>
<tr>
<th>WEEK</th>
<th>Topics</th>
<th>Chapters</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&lt;sup&gt;st&lt;/sup&gt; week</td>
<td>Overview and Mechanical Elements</td>
<td>1, 2</td>
</tr>
<tr>
<td>2&lt;sup&gt;nd&lt;/sup&gt; week</td>
<td>Mechanical Elements</td>
<td>2, 3</td>
</tr>
<tr>
<td>3&lt;sup&gt;rd&lt;/sup&gt; week</td>
<td>Mechanical Systems</td>
<td>3</td>
</tr>
<tr>
<td>4&lt;sup&gt;th&lt;/sup&gt; week</td>
<td>Mechanical Systems</td>
<td>3</td>
</tr>
<tr>
<td>5&lt;sup&gt;th&lt;/sup&gt; week</td>
<td>Mechanical Systems and Midterm Exam</td>
<td>3</td>
</tr>
<tr>
<td>6&lt;sup&gt;th&lt;/sup&gt; week</td>
<td>Mechanical Systems</td>
<td>3, 6</td>
</tr>
<tr>
<td>7&lt;sup&gt;th&lt;/sup&gt; week</td>
<td>Transfer Function Approach and State-Space Modeling</td>
<td>7, 8</td>
</tr>
<tr>
<td>8&lt;sup&gt;th&lt;/sup&gt; week</td>
<td>Frequency-Domain Approach</td>
<td>9, 10</td>
</tr>
<tr>
<td>9&lt;sup&gt;th&lt;/sup&gt; week</td>
<td>Coupled-Field Systems, Electromechanical Coupling Systems, Stability of Feedback Control System</td>
<td>10, 12</td>
</tr>
<tr>
<td>10&lt;sup&gt;th&lt;/sup&gt; week</td>
<td>Coupled-Field Systems, Electromechanical Coupling Systems, Stability of Feedback Control System</td>
<td>10,12</td>
</tr>
<tr>
<td></td>
<td>Final Exam</td>
<td></td>
</tr>
</tbody>
</table>

Note: The instructor reserves the right to alter the schedule during the semester.
How Mechanical Engineering Courses meet Department Objectives (MCEG Objectives) at Prairie View A&M are to produce graduates who have:

1. the techniques and skills necessary for modern mechanical engineering practices, and an ability to function effectively in multi-disciplinary teams.
2. an ability in life-long learning skills, a knowledge of contemporary issues, and an ability to communicate effectively.
3. an understanding of global and societal context in the aspects of professional and ethical responsibility and the impact of engineering solutions on society.
4. the qualifications to be employed by major industries and government agencies in the State of Texas and the nation.
5. the qualifications to pursue graduate degrees.

ABET Criterion 3: Program Outcomes and Assessment
Engineering Programs must demonstrate that their graduates have:

(1) the ability to identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics;
(2) the ability to apply engineering design to produce solutions that meet specified needs with consideration of public health, safety, and welfare, as well as global, cultural, social, environmental, and economic factors;
(3) the ability to communicate effectively with a range of audiences;
(4) the ability to recognize ethical and professional responsibilities in engineering situations and make informed judgments, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts;
(5) the ability to function effectively on a team whose members together provide leadership, create a collaborative and inclusive environment, establish goals, plan tasks, and meet objectives;
(6) ability to develop and conduct appropriate experimentation, analyze and interpret data, and use engineering judgment to draw conclusions;
(7) the ability to acquire and apply new knowledge as needed, using appropriate learning strategies.

Program Outcomes Covered by Course
Program Outcome (1) as defined above

Program Outcomes Measured by Course
Program Outcome (1) as defined above
University Rules and Procedures

Academic Misconduct (See Student Planner)
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 Planner, especially the section on academic misconduct (see University Administrative Guidelines on Academic Integrity). Students who engage in academic misconduct are subject to university disciplinary procedures. As listed in the PVAMU Undergraduate Catalog, Graduate Catalog, and the Student Planner, the following are examples of prohibited conduct. This list is not designed to be all-inclusive or exhaustive. In addition to academic sanctions, any student found to have committed or to have attempted to commit the following academic misconduct may also be subject to disciplinary review and action as outlined in the PVAMU Student Planner.

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 learned, giving or receiving aid unauthorized by the instructor on assignments or examinations. Examples: unauthorized use of notes for a test; using a "cheat sheet" on a quiz or exam; any alteration made on a graded test or exam which is then resubmitted to the teacher.

2. **Plagiarism**: Careless or deliberate use of the work or the ideas of another; representation of another's work, words, ideas, or data as your own without permission or appropriate acknowledgment. Examples: copying another's paper or answers, failure to identify information or essays from the Internet and submitting or representing it as your own; submitting an assignment which has been partially or wholly done by another and claiming it as yours; not properly acknowledging a source which has been summarized or paraphrased in your work; failure to acknowledge the use of another's words with quotation marks.

3. **Multiple Submission**: Submission of work from one course to satisfy a requirement in another course without explicit permission. Example: using a paper prepared and graded for credit in one course to fulfill a requirement and receive credit in a different course.

4. **Conspiracy**: Agreeing with one or more persons to commit an act of academic/scholastic dishonesty.

5. **Fabrication of Information/Forgery**: Use or submission of contrived, invented, forged, or altered information in any assignment, laboratory exercise, or test; tampering with or production of a counterfeit document, particularly documents which make up the student's academic record. Examples: making up a source or citing nonexistent publication or article; representing made up data as real for an experiment in a science laboratory class; forging a change of grade or student withdrawal record; falsifying any document related to a student academic exercise.

Nonacademic Misconduct (See Student Planner)
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, or (2) the ability of students to benefit from the instructional program, or (3) 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 Office for Student Conduct under nonacademic procedures.

Sexual Misconduct
Sexual harassment of students and employees at Prairie View A&M University is unacceptable and will not be tolerated. Any member of the university community violating the university's sexual harassment policy will be subject to disciplinary action. In accordance with the Texas A&M University System guidelines, your instructor is obligated to report to the Office of Title IX Compliance (titleixteam@pvamu.edu) any instance of sexual misconduct involving a student, which includes sexual
assault, stalking, dating violence, domestic violence, and sexual harassment, about which the instructor becomes aware during this course through writing, discussion, or personal disclosure. The faculty and staff of PVAMU actively strive to provide a learning, working, and living environment that promotes respect that is free from sexual misconduct, discrimination, and all forms of violence. If students, faculty, or staff would like assistance, or have questions, they may contact the Title IX Coordinator at 936-261-2144 or titleixteam@pvamu.edu. More information can be found at the Title IX Webpage including confidential resources available on campus.

Pregnancy, Pregnancy-related, and Parenting Accommodations
Title IX of the Education Amendments of 1972 prohibits sex discrimination, which includes discrimination based on pregnancy, marital status, or parental status. Students seeking accommodations related to pregnancy, pregnancy-related condition, or parenting (reasonably immediate postpartum period) are encouraged to contact Student Disability Services or the Dean of Students’ Office for additional information and to request accommodations. More information can be found at this webpage.

Non-Discrimination Statement
Prairie View A&M University does not discriminate on the basis of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation or gender identity in its programs and activities. The University 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 discrimination or harassment, we encourage you to report it. 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 Director of Equal Opportunity & Diversity has been designated to handle inquiries regarding the non-discrimination policies, and can be reached at Harrington Science Building, Suite 109 or by phone 936-261-1744 or 1792.

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 University Catalog and by doing so within thirty days of receiving the grade or experiencing any other problematic academic event that prompted the complaint. Students can file Academic Complaints and/or Grade Appeals at this webpage.

Technical Considerations

Minimum Recommended Hardware and Software:
- Intel PC or Laptop with Windows 10 or later version; Mac with OS High Sierra*
- 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 or Firefox

*Smartphone, Google Chrome books and Android tablets may not be supported. iPads are the only tablets supported.

**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 emails
• A working knowledge of the Internet
• Microsoft Word (or a program convertible to Word)
• Acrobat PDF Reader
• Windows or Mac OS
• Video conferencing software

**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. Do not use ALL CAPS for communicating to others AS IT CAN BE INTERPRETED AS YELLING. Avoid slang terms such as “wassup?” and texting abbreviations such as “u” instead of “you.” Limit and possibly avoid the use of emoticons. Be cautious when using humor or sarcasm as tone is sometimes lost in an email or discussion post and the message might be taken seriously or sound offensive.

**Video Conferencing Etiquette**
When using Zoom, WebEx or other video conferencing tools, confirm the visible area is tidy, clear of background clutter, inappropriate or offensive posters, and other distractions. Ensure you dress appropriately and avoid using high traffic or noisy areas. Stay muted when you are not speaking and avoid eating/drinking during session. Before class session begins, test audio, video and lighting to alleviate technology issues.

**Technical Support**
Students should go to the Password Reset Tool 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 Center for Instructional Innovation and Technology Services (CIITS) at 936-261-3283 or email ciits@pvamu.edu.

**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 such as Word 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, copy and paste to the discussion board.
COVID-19 Campus Safety Measures

To promote public safety and protect students, faculty, and staff during the COVID-19 pandemic, Prairie View A&M University has adopted policies and practices for the Fall 2020 academic term to limit virus transmission. Students must observe the following practices while participating in face-to-face courses and course-related activities (office hours, help sessions, transitioning to and between classes, study spaces, academic services, etc.):

- **Self-monitoring** - Students should follow CDC recommendations for self-monitoring. Students who have a fever or exhibit symptoms of COVID-19 should participate in class remotely and should not participate in face-to-face instruction.

- **Face Coverings** - Face coverings (cloth face covering, surgical mask, etc.) must be properly worn in all non-private spaces including classrooms, teaching laboratories, common spaces such as lobbies and hallways, public study spaces, libraries, academic resource and support offices, and outdoor spaces where 6 feet of physical distancing is difficult to reliably maintain.

- **Physical Distancing** - Physical distancing must be maintained between students, instructors, and others in course and course-related activities.

- **Classroom Ingress/Egress** - Students must follow marked pathways for entering and exiting classrooms and other teaching spaces. Students should leave classrooms promptly after course activities have concluded, should not congregate in hallways and should maintain 6-foot physical distancing when waiting to enter classrooms and other instructional spaces.

- **Face-to-face Class** - To attend a face-to-face class, students must wear a face covering (or a face shield if they have an exemption letter). If a student refuses to wear a face covering, the instructor should ask the student to leave and join the class remotely. If the student does not leave the class, the faculty member should report that student to the Office for Student Conduct for adjudication. Additionally, the faculty member may choose to teach that day’s class remotely for all students.

- **COVID-19 Guidelines for Student Conduct Adjudication** - The mandatory COVID-19 Training/Certification taken by all students serves as the 1st Warning for violation of COVID-19 Guidelines.
  - 1st incident: upon review of Incident Report and finding of responsibility — Conduct Probation
  - 2nd incident: upon review of Incident Report and finding of responsibility — Suspension
  - Consult the Code of Student Conduct in the Student Planner or Student Conduct website for additional information on Conduct Probation and Suspension.

- **Personal Illness and Quarantine** - Students required to quarantine must participate in courses and course-related activities remotely and must not attend face-to-face course activities. Students should notify their instructors of the quarantine requirement. Students under quarantine are expected to participate in courses and complete graded work unless they have symptoms that are too severe to participate in course activities. Students experiencing personal injury or illness that is too severe for the student to attend class qualify for an excused absence. To receive an excused absence, students must provide appropriate documentation to the Office for Student Conduct, studentconduct@pvamu.edu.