Course Title: Engineering Analysis-II, MECH 3352, CRN: 26966
(Spring-2023): Credit: 3

Instructor: Arifur R. Khan, PhD. Assoc. Prof. AME (arkhan@utep.edu);

Office hours: TR: 9am to 10 am (A-317) or MS Team

Course Prerequisite: Successful completion of Engineering Analysis-I (MECH 2351) or equivalent.

Course Description: Applications of engineering mathematical model and computational techniques to analyze and solve real-life engineering problems; Explaining different physical meaning of roots, linear algebra, solving 3D linear equations, fitting of curves, multivariable Differential equations, and numerical Integration; In this course MATLAB software and programming languages will be used for modeling and solving engineering problems.

Course Objective: The primary goal is to provide engineering majors with a basic knowledge of numerical methods including root-finding, elementary numerical linear algebra, solving systems of linear equations, curve fitting, and numerical solution to ordinary differential equations, and numerical integration. An advanced programming tool (e.g., MATLAB) will be used for the implementation and application of these numerical methods. The numerical techniques learned in this course enable students to work with mathematical models of technology and systems.

By the end of this course, the students should be able to do the following:

- Structured programming: Understand basic structured programming concepts involving decision making, loops, functions, and parameter passing implemented within the MATLAB programming environment.
- Numerical methods: Understand the most common numerical methods used in engineering analysis, when to use each method, and how to implement basic methods in a structured manner using MATLAB’s programming language.
- Numerical accuracy: Estimate the amount of error inherent in different numerical methods.
- Numerical efficiency: Assess the efficiency of a selected numerical method when more than one option is available to solve a certain class of problem.

Course Topics: Basic mathematical knowledge on finding roots and its application, Linear Algebra, Solving linear 3D equation, Data analysis and curve fitting, Derivative and Ordinary Differential Equation (ODE), Higher order Differential Equation, Numerical Integration, Engineering Application and Assignments.

Reference:
3. Additional Reference materials (notes, projects, web links, etc.) may be handed out in class.

Software in class: iClicker (Free software) and MATLAB (Get it from Technology Support Center or MyApps (UTEP).

Student’s assessment:
1. Class performance: 20% [Class quiz and attendance]
2. Midterm Exam-1: 25%
3. Midterm Exam-2: 25%
4. Final Exam: 25%
5. Assignments: 30%

Final exam (optional) will replace the worst midterm.
6. Grace point: 1% if it improves the current grade to the next better level.

Students grading:
A= ≥ 90%; B= < 90% and ≥ 80%; C= < 80% and ≥ 70%; D= < 70% and ≥ 60%; F= < 60% (UTEP Standard)

Tools in Class/Lab: Mathematical software: MATLAB.

**Necessary ITEMS for the Spring 2023 semester**

- Each student is recommended to register in iClicker

Please note, Engineering Analysis-II, MECH 3352, CRN No 12345, Date and Meeting time in the picture left. Link: [https://app.reef-education.com/#/courses/add](https://app.reef-education.com/#/courses/add)
<table>
<thead>
<tr>
<th>Date</th>
<th>Class Topic (subject to change)</th>
<th>NOTES</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/17</td>
<td>Introduction, Syllabus. High Impact Practices, Ground Rule, iClicker</td>
<td>MEET and GREET</td>
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<tr>
<td>1/19</td>
<td>MATLAB Fundamentals, Function, Plots, Roots, Solving equations, Differentiation, Integration, and solving ODE.</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>1/24</td>
<td>MATLAB Fundamentals, Function, Plots, Roots, Solving equations, Differentiation, Integration, and solving ODE.</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>1/26</td>
<td>MATLAB Fundamentals, Function, Plots, Roots, Solving equations, Differentiation, Integration, and solving ODE.</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>1/31</td>
<td>MATLAB Fundamentals, Function, Plots, Roots, Solving equations, Differentiation, Integration, and solving ODE.</td>
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<tr>
<td>2/2</td>
<td>MATLAB Fundamentals, Function, Plots, Roots, Solving equations, Differentiation, Integration, and solving ODE.</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>2/7</td>
<td>Structured programming</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>2/9</td>
<td>Structured programming</td>
<td>Home practice for random class quiz</td>
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<td>2/14</td>
<td>Structured programming</td>
<td>Home practice for random class quiz</td>
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<td>2/16</td>
<td>Structured programming</td>
<td>Home practice for random class quiz</td>
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<td>2/21</td>
<td>Structured programming</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>2/23</td>
<td>Structured programming</td>
<td>Home practice for random class quiz</td>
</tr>
<tr>
<td>2/28</td>
<td><strong>Midterm-1 Exam</strong> In Classroom</td>
<td>No Quiz, No attendance</td>
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<tr>
<td>3/2</td>
<td><strong>Project-1 Assignment</strong> Submission due date: 3/9</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>3/7</td>
<td>Derivative and ODE and Eng. Application</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>3/9</td>
<td>Derivative and ODE and Eng. Application</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>3/21</td>
<td>Derivative and ODE and Eng. Application</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>3/23</td>
<td>Derivative and ODE and Eng. Application</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>3/30</td>
<td>Derivative and ODE and Eng. Application</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>3/28</td>
<td>Derivative and ODE and Eng. Application</td>
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<tr>
<td>4/11</td>
<td>Numerical Integration and Application</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>4/13</td>
<td>Numerical Integration and Application</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>4/18</td>
<td>Numerical Integration and Application</td>
<td>Home practice for random class quiz</td>
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<tr>
<td>4/20</td>
<td><strong>Project-2 Assignment</strong> Submission due date: 11/30 (BB)</td>
<td>Home practice for random class quiz</td>
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</table>
| Week 14  | 4/25 | **Midterm-2 Exam**  
Classroom or Online (Blackboard) | Home practice for random class quiz |
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<tbody>
<tr>
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<td>4/27</td>
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<td><strong>Nov. 25-27: Thanksgiving Holiday-University closed</strong></td>
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| Week 15 | 5/2  | Application of Derivative and Integration  
(PID) | Home practice for random class quiz |
|        | 5/4  | Application of Derivative and Integration  
(PID) | Grade declaration (on BB) |
| Week 16 | 5/8-12 | **Fina Exam, TBD** |
Grade Calculation (Example)

Class performance (20%) : Iclicker Quiz and Attendance
   Points for each quiz: 1.5 (almost each class)
   Points for each attendance: 0.5 (almost each class)
   Student’s score (for example):
   \[
   \frac{72 \text{(Student score)}}{85 \text{(out of total score)}} \times 20\% = 16.94\%
   \]

Midterm-1 (25%)= 21 (student’s score)/25 (out of total score)

Midterm-2 (25%)= 22 (student’s score)/25 (out of total score)

Projects (total 2 projects)= 13 + 13 = 25 out of 30.

Total Score without final exam:
   Class perf.= 16.94 out of 20
   Midterm-1 = 21 out of 25
   Midterm-2= 22 out of 25
   Projects= 26 out of 30
   Total= 85.95 or 86 (Grade B)

If any student likes to improve the grade, it can be done by joining the final exam.

Score in the final exam (for example): 24 out of 25.

Between the two midterms, the worst will be dropped or ignored if Final exam score
is higher than any of the midterm scores. If not, final exam score will be ignored.

New score calculation

Total Score after final exam:
   Class perf.= 16.94 out of 20
   Midterm-1 = 21 out of 25 (dropped/ignored)
   Midterm-2= 22 of 25
   Final exam= 24 out pf 25
   Projects= 26 out of 30
   Total= 89+1 (grace point) (Grade A)
<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
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<tbody>
<tr>
<td>Jan 16th</td>
<td>Dr. Martin Luther King Jr. Holiday – University Closed</td>
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<tr>
<td>Jan 17th</td>
<td>Spring classes begin</td>
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<tr>
<td>Jan 17th-20th</td>
<td>Late Registration (Fees are incurred)</td>
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<tr>
<td>Feb 1st</td>
<td>Spring Census Day</td>
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<tr>
<td>Feb 13th</td>
<td>Note: This is the last day to register for classes. Payments are due by 5:00 pm.</td>
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<tr>
<td>Feb 17th</td>
<td>20th Class Day</td>
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<tr>
<td>Mar 13th-17th</td>
<td>Graduation application deadline for degree conferral</td>
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<tr>
<td>Mar 30th</td>
<td>Spring Drop/Withdrawal Deadline</td>
</tr>
<tr>
<td>Mar 31st</td>
<td>Note: Student-initiated drops are permitted after this date, but the student is not guaranteed a grade of W. The faculty member of record will issue a grade of either W or F.</td>
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<tr>
<td>Apr 7th</td>
<td>Cesar Chavez Holiday - No classes</td>
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<tr>
<td>Apr 14th</td>
<td>Spring Study Day</td>
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<tr>
<td>Apr 14th</td>
<td>Deadline to submit candidates' names for commencement program</td>
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<tr>
<td>May 4th</td>
<td>Spring - Last day of classes</td>
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<tr>
<td>May 5th</td>
<td>Dead day</td>
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<tr>
<td>May 8-12th</td>
<td>Spring Final Exams</td>
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<tr>
<td>May 13-14th</td>
<td>Spring Commencement</td>
</tr>
<tr>
<td>May 17th</td>
<td>Grades are Due</td>
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<tr>
<td>May 18th</td>
<td>Grades are posted to student records; students are notified of grades and academic standing</td>
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<tr>
<td>Payment Deadlines</td>
<td>For more information on payment deadlines, visit the Student Business Services Website</td>
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</tbody>
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Important Information

NETIQUETTE

As we know, sometimes communication online can be challenging. It’s possible to miscommunicate what we mean or to misunderstand what our classmates mean given the lack of body language and immediate feedback. Therefore, please keep these netiquette (network etiquette) guidelines in mind. Failure to observe them may result in disciplinary action.

- Always consider audience. This is a college-level course; therefore, all communication should reflect polite consideration of other’s ideas.
- Respect and courtesy must be provided to classmates and to the instructor at all times. No harassment or inappropriate postings will be tolerated.
- When reacting to someone else’s message, address the ideas, not the person. Post only what anyone would comfortably state in a face-to-face situation.
- Blackboard is not a public internet venue; all postings to it should be considered private and confidential. Whatever is posted on these online spaces is intended for classmates and professor only. Please do not copy documents and paste them to a publicly accessible website, blog, or other space.

Class Attendance

The student is expected to attend all classes and laboratory sessions and attendance is mandatory for all freshman-level courses (1XXX). It is the responsibility of the student to inform each instructor of extended absences. When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor can drop the student from the class with a grade of W before the course drop deadline and with a grade of F after the course drop deadline.

Excused Absences for University-Recognized Activities

Students who will be absent while representing the University in officially recognized University activities (sports, band, professional conferences, etc.) must notify the Dean of Students not less than ten (10) days prior to the absence. The Dean of Students will provide the student with a letter of excuse for the professors. It is the student's responsibility to give the letter to the professors prior to the official recognized activity. Students following these procedures will be permitted to make up both assignments and examinations in consultation with faculty.
EXCUSED ABSENCES AND/OR COURSE DROP POLICY

According to UTEP Curriculum and Classroom Policies, “When, in the judgment of the instructor, a student has been absent to such a degree as to impair his or her status relative to credit for the course, the instructor may drop the student from the class with a grade of “W” before the course drop deadline and with a grade of “F” after the course drop deadline.” See academic regulations in the UTEP Undergraduate Catalog for a list of excuse absences. Therefore, if I find that, due to non-performance in the course, you are at risk of failing, I will drop you from the course. I will provide 24 hours advance notice via email.
OR

I will not drop you from the course. However, if you feel that you are unable to complete the course successfully, please let me know and then contact the Registrar’s Office to initiate the drop process. If you do not, you are at risk of receiving an “F” for the course.

MAKE-UP WORK

Make-up work will be given only in the case of a documented emergency. Note that make-up work may be in a different format than the original work, may require more intensive preparation, and may be graded with penalty points. If you miss an assignment and the reason is not considered excusable, you will receive a zero. It is therefore important to reach out to me—in advance if at all possible—and explain with proper documentation why you missed a given course requirement. Once a deadline has been established for make-up work, no further extensions or exceptions will be granted.

ALTERNATIVE MEANS OF SUBMITTING WORK IN CASE OF TECHNICAL ISSUES

I strongly suggest that you submit your work with plenty of time to spare in the event that you have a technical issue with the course website, network, and/or your computer. I also suggest you save all your work (answers to discussion points, quizzes, exams, and essays) in a separate Word document as a back-up. This way, you will have evidence that you completed the work and will not lose credit. If you are experiencing difficulties submitting your work through the course website, please contact the UTEP Help Desk. You can email me your back-up document as a last resort.

INCOMPLETE GRADE POLICY

Incomplete grades may be requested only in exceptional circumstances after you have completed at least half of the course requirements. Talk to me immediately if you believe an incomplete is warranted. If granted, we will establish a contract of work to be completed with deadlines.

ACCOMMODATIONS POLICY

The University is committed to providing reasonable accommodations and auxiliary services to students, staff, faculty, job applicants, applicants for admissions, and other beneficiaries of University programs, services and activities with documented disabilities in order to provide them with equal opportunities to participate in programs, services, and activities in compliance with sections 503 and 504 of the Rehabilitation Act of 1973, as amended, and the Americans with Disabilities Act (ADA) of 1990 and the Americans with Disabilities Act Amendments Act (ADAAA) of 2008. Reasonable accommodations will be made unless it is determined that doing so would cause undue hardship on the University. Students requesting an accommodation based on a disability must register with the UTEP Center for Accommodations and Support Services (CASS). Contact the Center for Accommodations and Support Services at 915-747-5148, or email them at cass@utep.edu, or apply for accommodations online via the CASS portal.
SCHOLASTIC INTEGRITY

Academic dishonesty is prohibited and is considered a violation of the UTEP Handbook of Operating Procedures. It includes, but is not limited to, cheating, plagiarism, and collusion. Cheating may involve copying from or providing information to another student, possessing unauthorized materials during a test, or falsifying research data on laboratory reports. Plagiarism occurs when someone intentionally or knowingly represents the words or ideas of another as ones' own. Collusion involves collaborating with another person to commit any academically dishonest act. Any act of academic dishonesty attempted by a UTEP student is unacceptable and will not be tolerated. All suspected violations of academic integrity at The University of Texas at El Paso must be reported to the Office of Student Conduct and Conflict Resolution (OSCCR) for possible disciplinary action. To learn more, please visit HOOP: Student Conduct and Discipline.

CLASS RECORDINGS

The use of recordings will enable you to have access to class lectures, group discussions, and so on in the event you miss a synchronous or in-person class meeting due to illness or other extenuating circumstance. Our use of such technology is governed by the Federal Educational Rights and Privacy Act (FERPA) and UTEP’s acceptable-use policy. A recording of class sessions will be kept and stored by UTEP, in accordance with FERPA and UTEP policies. Your instructor will not share the recordings of your class activities outside of course participants, which include your fellow students, teaching assistants, or graduate assistants, and any guest faculty or community-based learning partners with whom we may engage during a class session. You may not share recordings outside of this course. Doing so may result in disciplinary action.

TEST PROCTORING SOFTWARE

Two course assessments (the midterm and final exams) will make use of Respondus Lock Down Browser and Respondus Monitor inside of Blackboard to promote academic integrity. You are encouraged to learn more about how to use these programs prior to the first test.

Please review the following guidelines:

- The assessments will only be available at the times identified on the course calendar.
- You may take the test at any time during the 24-hour window.
- A reliable Internet connection is essential to completing the exam. If you must go to a location to take the exam (such as the library), be sure to follow their health and safety requirements.
- You have 2 attempts to take the test. Once the window closes, your answers will be saved, and no changes can be made. The higher score will be recorded.
- Respondus Lockdown Browser will require that all internet tabs are closed prior to the start of the test.
- Respondus Monitor requires a webcam and microphone.
- You will be required to show the webcam your student ID prior to the start of the test.
- Your face should be completely visible during the test. Blocking the camera will disable the test.
- No notes or textbook materials are permitted during the test. Respondus Monitor requires you to take a video of your surrounding area (desk, chair, walls, etc.).
- You should not have conversations with other people and/or leave and return to the area during the test.
PLAGIARISM DETECTING SOFTWARE

Some of your course work and assessments may be submitted to SafeAssign, a plagiarism detecting software. SafeAssign is used to review assignment submissions for originality and will help you learn how to properly attribute sources rather than paraphrase.

COPYRIGHT STATEMENT FOR COURSE MATERIALS

All materials used in this course are protected by copyright law. The course materials are only for the use of students currently enrolled in this course and only for the purpose of this course. They may not be further disseminated.

COVID-19 PRECAUTIONS

Please stay home if you have been diagnosed with COVID-19 or are experiencing COVID-19 symptoms. If you are feeling unwell, please let me know as soon as possible, so that we can work on appropriate accommodations. If you have tested positive for COVID-19, you are encouraged to report your results to covidaction@utep.edu, so that the Dean of Students Office can provide you with support and help with communication with your professors. The Student Health Center is equipped to provide COVID-19 testing.

The Center for Disease Control and Prevention recommends that people in areas of substantial or high COVID-19 transmission wear face masks when indoors in groups of people. The best way that Miners can take care of Miners is to get the vaccine. If you still need the vaccine, it is widely available in the El Paso area, and will be available at no charge on campus during the first week of classes. For more information about the current rates, testing, and vaccinations, please visit epstrong.org

Course Resources: Where you can go for assistance

UTEP provides a variety of student services and support:

Technology Resources
- **Help Desk:** Students experiencing technological challenges (email, Blackboard, software, etc.) can submit a ticket to the UTEP Helpdesk for assistance. Contact the Helpdesk via phone, email, chat, website, or in person if on campus.

Academic Resources
- **UTEP Library:** Access a wide range of resources including online, full-text access to thousands of journals and eBooks plus reference service and librarian assistance for enrolled students.
- **University Writing Center (UWC):** Submit papers here for assistance with writing style and formatting, ask a tutor for help and explore other writing resources.
- **Math Tutoring Center (MaRCS):** Ask a tutor for help and explore other available math resources.
- **History Tutoring Center (HTC):** Receive assistance with writing history papers, get help from a tutor and explore other history resources.
- **RefWorks:** A bibliographic citation tool; check out the RefWorks tutorial and Fact Sheet and Quick-Start Guide.

Individual Resources
• **Military Student Success Center**: Assists personnel in any branch of service to reach their educational goals.

• **Center for Accommodations and Support Services**: Assists students with ADA-related accommodations for coursework, housing, and internships.

• **Counseling and Psychological Services**: Provides a variety of counseling services including individual, couples, and group sessions as well as career and disability assessments.

**HARASSMENT POLICY**

The University (see Handbook of Operating Procedures 1.2.2.4) has a zero-tolerance policy for harassment. Engagement in any behavior considered harassment will be reported to the proper authorities. In addition to generally understood forms of harassment, the department also treats the following behavior as harassment:

- Repeated emails and/or calls regarding subjects that have already been addressed. Once a decision has been made or a question answered, a student who continues to ask the same question will be given a warning by the recipient of the email/call. If the student continues, the behavior will be reported. Questions that seek understanding of course material are not harassment; but repeated questions about a grade or an administrative decision are.

- **Grades are NOT negotiable**, ever. If you believe a grading mistake has been made, you must follow the process described in the UTEP catalog. Any request for a grade elevation that is NOT based on a mistake is considered harassment and will be reported immediately.

- Remaining in an office after the occupant requests you leave is considered harassment and potentially threatening. You will be reported immediately without warning and depending on the severity, may be reported to law enforcement.

Similar behavior towards department staff, and student advisors will also be treated as harassment, including persistent phone calls, emails, and badgering. Department staff and student advisors are there to help students and should be treated with due respect.