To: AME faculty and graduate students
From: H. Flashner
Date: December 5, 2016
Subject: AME Screening Exam, January 2017
        Friday, January 27, 2017, 9 a.m. – 3 p.m., Room: TBA

The screening exam is one component of the overall screening procedure that involves each student's complete academic/research record. The faculty of the Aerospace and Mechanical Engineering Department have approved the following format of the AME PhD Screening Exam:

1. **Structure of the examination:** The examination will be organized as follows:

   a. All students will take the written part of the examination.

   b. After examining the results of the written part of the examination, the faculty will determine whether an oral examination needs to be administered to each student.

2. **Frequency of the examination:** The examination will be offered once a year in January. If an oral examination is required, it will be administered no later than two weeks after the results of the written part were discussed by the faculty.

3. **Written part of the examination**

   a. *Format*
   The examination will consist of the following categories

       i. Applied Mathematics - Two (2) problems

       ii. Major area - Three (3) problems

       iii. Minor area - Two (2) problems

       iv. The examination will be closed book.

       v. Calculators are allowed, but other
          electronic devices are not permitted

   b. *Structure*:

       i. *Applied Mathematics:* There will be two (2) problems and both of them must be solved. The student must be prepared to answer problems in each of these three topics: Linear Algebra, Complex Analysis and Partial Differential Equations.

       ii. *Major and Minor Areas:* In each of these parts there will be three problems covering the various topics of the area.

   c. *Length of the examination:* The examination will be divided into two parts given in the morning and afternoon of the same day. One part will consist of Applied Mathematics and will last one and a half (1.5) hours. The second part will include the Major and Minor areas and will last three and a half (3.5) hours.

   d. *Grading and evaluation of results:* Evaluation of the results will be performed in three stages.

       i. The problems will be graded by the corresponding faculty.

       ii. Faculty will meet and decide whether the student passed or failed an area.

       iii. The faculty will then determine whether the student needs to take an oral examination.

4. **Oral part of the examination**

   a. *Composition of the committee:* A committee will be formed for each student and will include three faculty in the student's major area of research.

b. *Evaluation of results:* The oral examination committee will write its recommendations and a decision will be made at a faculty meeting whether the student passed the screening examination. A Pass/Fail decision will be made for each student at the AME faculty meeting. The general policy is that the screening exam can be taken only once. Individual exceptions to this policy may be approved by the faculty on the basis of other significant indicators, such as, for example, research potential.

A Sample copy of a past exam will be posted on the AME web page. At the time of registration, a student must:

1. Be admitted to the AME PhD Program, with all conditions cleared in case of a conditional admission;

2. Have completed at least 9 units of graduate work (taken for a letter grade) in AME;

3. Have completed no more than 24 units of graduate work in AME including research courses, as per AME graduate student handbook;

4. Have a cumulative GPA of 3.25 or greater in the AME Graduate Program;

5. Declare his/her major and minor in which he/she wishes to be examined;

6. Provide evidence that an AME faculty member has agreed to serve as his/her Ph.D. advisor.

To facilitate preparation, the material covered in the screening exam, for some research areas, is identified below by a relevant AME course number and a typical textbook and/or names of the AME faculty members, who may be contacted for further information.

1. <u>Applied Mathematics</u> (Profs. Campbell, Kanso, Newton, Sadhal, Udwadia)
    1.1 Complex Variables
          AME 525, Text: "Complex Variables and Applications" by Churchill and Brown.
    1.2 Linear Algebra
          AME 525, Text: "Linear Algebra" by Shilov.
    1.3 Differential Equations
          AME 526

2. <u>Combustion</u> (Profs. Egolfopoulos, Ronney)

          AME 513, Texts: "Combustion" by I. Glassman; "An Introduction to Combustion" by S. Turns.

3. <u>Control Theory</u> (Profs. Flashner, Udwadia, Yang, Perez-Arancibia)
          AME 451, Text: "Modern Control Engineering" by K. Ogata.
          AME 541, Text: "Linear Systems and Theory" by C.-T. Chen.
          AME 552, Text: "Nonlinear Systems" bu H. Khalil.

4. <u>Design</u> (Prof. Jin)

> AME 410
> AME 503
> AME 505

5. <u>Dynamics and Vibrations</u> (Profs. Udwadia, Yang)

> AME 420
> AME 521
> AME 524

6. <u>Elasticity and Solid Mechanics</u> (Prof. Safadi)

> AME 403
>
> AME 509, Text: "Deformation of Elastic Solids" by A.K. Mal and S.J. Singh.

7. <u>Fluid Dynamics</u> (Profs. Eliasson, Domaradzki, Luhar)

> AME 530a, Text: "Incompressible Flow" by Panton.
>
> AME 511, Text: "Modern Compressible Flow" by Anderson.
>
> AME 535a, Text: "Computational Techniques for Fluid Dynamics, Vol. I" by Fletcher.

8. <u>Materials</u> (Profs. Hodge, Kassner)

> MASC 551
> AME 560