<u>COURSE SYLLABUS</u>

**Course Number** <u> ENGMA 101 </u>   **Title** <u> Engineering Mathematics I            </u>

**Department/Program** <u> ECCE                          </u> **School** <u> SOSE           </u>

**Semester** <u> 2nd </u> **School Year** <u> 2006 - 2007 </u>  **Instructor** <u> Luisito L. Agustin          </u>

**A.  Course Description**

This course aims to equip students with the necessary knowledge in differential equations as applied to engineering problems. The topics include ordinary differential equations of the first order; linear differential equation with constant coefficients; simultaneous linear differential equations; eigenvalues and eigenvectors.

                                                                          Prerequisite: MA 22

**B.  Course Objectives**

In this course, students must learn how to:
          * interpret 1st order differential equations geometrically
          * solve separable 1st order differential equations
          * solve homogeneous linear differential equations of second order
           * use the method of undetermined coefficients to solve nonhomogeneous ordinary
                    differential equations
          * solve systems of differential equations
          * obtain series solutions for differential equations
          * use Laplace Transforms to solve differential equations
          * identify applications of differential equations in their field of concentration

**C.  Course Outline and Timeframe**

          Geometric Interpretation of First Order Differential Equations ( 3 to 6 hrs)
          First Order Differential Equations (3 to 6 hrs)
          Homogeneous Second Order ODEs (6 to 9 hrs)
          Nonhomogeneous Second Order ODEs (6 to 9 hrs)
          Systems of Differential Equations (3 to 6 hrs)
          Series Solutions (6 to 9 hrs)
          Laplace Transforms (3 to 6 hrs)
          Applications of Laplace Transforms to ODEs (3 to 6 hrs)
          Applications of Laplace Transforms to Systems of ODEs (3 to 6 hrs)

**D.  Required Readings**

[Kreyszig]      Erwin Kreyszig: *Advanced Engineering Mathematics*, 8th ed, 1999.

## E. Suggested Readings

[Abell & Braselton] Martha L. Abell and James P. Braselton: Modern Differential Equations, 2nd ed, 2001.

[Banks] Bernard W. Banks: Differential Equations with Graphical and Numerical Methods, 2001

[Davis] Paul Davis: Differential Equations - Modelling with Matlab, 1999.

[Edwards & Penney] C. Henry Edwards and David E. Penney: Differential Equations - Computing and Modelling, 2nd ed, 2000.

[Zill] Dennis G. Zill: Differential Equations with Computer Lab Experiments, 1995

[Zill & Wright] Dennis G. Zill and Warren S. Wright: Manual for Differential Equations with Computer Lab Experiments, 1995

## F. Course Requirements

Exams will be given regularly. Students are expected to submit homework whenever there is pending homework. Students are also expected to participate actively in class discussion and all class activities.

## G. Grading System

The class standing is determined as
$$CS = 0.7\,E + 0.3\,P$$
where

E is the exam grade in the range [0,100], and

P is the participation and homework grade in the range [0,100].

The exam grade is the average of all exam scores each normalized to 100 points. The final exam has the same weight as any other exam.

A student's participation and homework grade shall be computed as

$$P = max\left( P_{min}, min\left( P_{max}, P_{min} + \left( P_{max} - P_{min} \right)\left( \frac{P_{cred} - P_{dem}}{M_P} \right)^{\frac{1}{C_P}} \right) \right)$$

where

$P_{cred}$ is the sum of all participation and homework credits earned by the student,

$P_{dem}$ is the sum of all participation demerits earned by the student,

$M_P$ is the maximum value of $P_{cred}$ over all students in the class,

$P_{min}$ is initially set to 0, but may be set to a higher value according to the instructor's evaluation of the class as a whole,

$P_{max}$ is initially set to 100, but may be set to a lower value according to the instructor's evaluation of the class as a whole,

$C_P$ is a curving parameter initially set to 1, but may be raised based on the instructor's evaluation of the class as a whole.

Homework submitted on a given class day earns participation and homework credits according to the following scheme:

$$points\ earned = \sum_{i=0}^{N-1} \left(\frac{1}{2}\right)^i S_i$$

where N is the number of homework submitted by a student, and the $S_i$ are the homework scores sorted from largest to smallest, with each homework submitted being graded over 10 points.

The final grade (FG) will be determined from the class standing (CS) as follows: FG = F if CS < 50, D if $50 \leq CS < 60$, C if $60 \leq CS < 69$, C+ if $69 \leq CS < 77$, B if $77 \leq CS < 86$, B+ if $86 \leq CS < 92$, A if $92 \leq CS$.


## H.  Classroom Policies

### H.1. Attendance

Prompt and regular attendance is expected.  Students who arrive late may be barred from class, denied participation points, prevented from submitting homework, and/or given participation demerits.  Students who have exceeded the allowed number of cuts shall be given a grade of W, and shall be barred from class for the rest of the semester.

### H.2. Attire

Students are expected to dress decently and appropriately. Shorts and skirts that are too short are not appropriate attire. These shall be considered too short if the person would be touching skin rather than cloth when standing up with hands hanging down. Slippers and similar footwear are not appropriate attire. For the purpose of this policy, slippers shall be defined to be footwear that are unheeled, and unsupported at the back of the heel. Students wearing inappropriate attire may be barred from class, denied participation points and/or given participation demerits.

### H.3. Homework

All homework should be typeset and printed on short bond paper. No handwritten homework will be accepted. Only those physically present in class may submit homework. Homework must be submitted when called for at the start of class. Specific homework may have additional requirements in addition to the printed component. Students should be ready to present their homework in class when called upon to do so. Students who refuse to or cannot present their homework in class will not be given full credit for the homework in question.

**H.4. Exams**

Students should come to class on time for exams.

All exams shall be accomplished on white short bond paper using blue or black ink.

Students may not pass notes, books and/or calculators among themselves during exams. Students who do so shall be asked to submit their papers immediately.

Students shall be penalized 10 points for each of the following offenses during exams:
    * arriving late for an exam
    * using the wrong kind of paper
    * using pencil or ink other than black or blue
    * disturbing others taking the exam
    * attempting to ask for pens or paper from others taking the exam
    * passing notes, books and other materials during the exam
    * attempting to communicate with someone taking the exam

A student who misses an exam gets a grade of 0 for the exam. Special cases where the reasons for missing exams are deemed valid by the instructor (e.g. hospitalization) shall be handled on a case to case basis, subject to the discretion of the instructor.

**H.5. Language**

This is an English language course. All oral presentations shall be in English. All documents submitted shall be in English.


**I.  Consultation Hours**

    9 - 11, TTh, F-312