Topics for Exam 2, MATH308-Summer 2014

1. Linear homogeneous equations of second order with constant coefficient in all possible cases (two distinct real roots, complex roots, repeated root) (sections 3.1, 3.3, and 3.4);

2. Method of reduction of order (section 3.4);

3. Linear non-homogeneous equations of second order: general solution via a particular solution and the general solutions of the corresponding homogeneous equation (section 3.5);

4. Method of undetermined coefficients (section 3.5)

5. Method of variation of parameters for linear non-homogeneous equations of 2nd order (sect. 3.6).

6. Spring-mass systems: undamped free vibration (including finding of the amplitude, the natural frequency, the period and the phase)(sect. 3.7).

7. Spring-mass systems: damped free vibration (including finding of quasi-period and understanding the meaning of damping amplitude.)

8. Forced vibration (including finding of steady state solution) (section 3.8).

9. Laplace Transform (sections 6.1,6.2). The table of Laplace transform as in the page 317 of the textbook will be given. It is recommended to practice to use this table. Even more important is that you have to be aware that before using the table you will have to make an appropriate work based on the principles and techniques you learned. Please make sure to review them. Do not rely on the presence of the table. The table will be useless if you do not know appropriate principles and techniques.

   - how to find Laplace transform of the given function using Laplace transform definition. (section 6.1)
   - how to transform a given differential equation to an algebraic one using the Laplace transform (section 6.2).
   - how to find the inverse Laplace transform of a rational function using the partial fraction decomposition (section 6.2).

   It is recommended to review all topics discussed in class. Review problems in homework assignments 4-7; the examples given during the class on the topics listed above, the problems in homework assignments 4-6 of Spring 2012 term (skip problem 5(b,c) in the hmwk 5 and the last problem in hmwk 6) posted on http://www.math.tamu.edu/ shatalov/308Hmwk.html.
   Also attempt the additional suggested problems listed in the Class Announcements.