Dynamics Syllabus
UNC Charlotte Department of Mechanical Engineering
Comprehensive Qualifying Exam
Last revised: 3/22/2016

Exam Contents
1. Dynamics of Particles
      Newton's Laws
      Energy Methods
      Impulse/Momentum Methods
2. Systems of Particles
3. Mechanism Kinematics and Dynamics
4. Rigid Body Dynamics (2D and simple 3D)
      Newton's Laws
      Energy Methods
      Impulse/Momentum Methods
5. System Dynamics
      Modeling Dynamic Systems
      Developing Equations of Motion for Dynamic Systems (ODEs)
      Solving Equations of Motion for Dynamic Systems (Laplace Transforms, Time-Domain Methods etc.)
      Analogies between different types of dynamic systems
      a. Mechanical
      b. Electrical
      c. Electro-mechanical
      d. Thermal

Representative Study Materials

1. *Engineering Mechanics, Dynamics* by J. L. Meriam, L. Glenn Kraige, Wiley; 7 edition (March 27, 2012), ISBN-10: 0470614811.

2. *System Dynamics* 4th Ed., by Katsuhiko Ogata, 2004, Person Prentice Hall, Upper Saddle River NJ, 07458, ©2003, ISBN-10: 0131424629.

3. *System Dynamics for Mechanical Engineers*. Matthew A. Davies, Tony L. Schmitz, 2014, Springer, New York, ©2014, ISBN: 978-1-4614-9292-4.