ENGR 201: Dynamics (3 units)

1. **Course Description:** Vector treatment of kinematics and kinetics of particles, systems of particles and rigid bodies. Methods of work, energy, impulse, and momentum. Vibrations and time response. Applications to one- and two-dimensional engineering problems. 3 units.

2. **Instructor & Contact Information:**
   
   Dr. Kwok-Siong Teh  
   Office: SCI 124  
   Office Hours: **Tu 12-2pm, 4.30-5pm** and by email appointment.  
   Tel: 415-405-4168, Fax: 415-338-0525  
   Email: ksteh@sfsu.edu

3. **Course Information:**
   
   **Course Website:** [http://online.sfsu.edu/~ksteh/engr201.html](http://online.sfsu.edu/~ksteh/engr201.html) (username and password on iLearn)  
   **Schedule & Location:** MW 3.35-4.50, HH 543  
   **Prerequisites:** Engr 102 (Statics) *Students without a passing grade in Engr 102 will be dropped from the class*  
   
   In addition, useful prerequisites include: Vector algebra, Forces as vectors, Graphing of functions, Static equilibrium, Representation of points in space, Moment of a force as a cross-product, Differentiation, Integration, Natural laws, Moments of inertia, Free-body diagrams.

   **Required Texts:**
   
   (2) Mastering Engineering (www.masteringengineering.com)

   Mastering Engineering is an online platform through which online quizzes will be assigned. So, it is mandatory that everyone AT LEAST purchases a copy of standalone Mastering Engineering ($65).

   **Reference Texts:**
   

4. **Course Objectives & Topics Covered:**

   **Objectives:**
   - The description of the motion of points in space using the position vector and its derivatives.  
   - The use of Newton’s second law (F=ma) to relate force to motion for particles and rigid bodies.  
   - The use of work-energy to solve motion problems.  
   - The use of impulse and momentum methods.  
   - Rigid body motion and rotating reference frames.  
   - The use of Euler’s laws for the description of two-dimensional rigid body motion.  
   - The analysis of simple harmonic motion and undamped vibration.

   **Major Topics Covered:**
   - Position vector and its derivatives – velocity and acceleration.  
   - Rectilinear motion.  
   - Curvilinear motion in Cartesian, normal-tangential, and cylindrical coordinate systems.  
   - Constrained motion.
- Newton’s laws of motion, especially the second law \( F = ma \).
- Work, energy, and conservation of energy.
- Power.
- Linear impulse and momentum.
- Angular impulse and momentum.
- Conservation of linear and angular momentums.
- Impact and collisions.
- Two-dimensional rigid body kinematics.
- Euler’s laws of motion for rigid bodies.
- Energy methods in rigid body motion.
- *Free vibration (with and without damping)
- *Forced vibration (with and without damping)

*Topics that are delivered if time allows.

5. Important Dates:

<table>
<thead>
<tr>
<th>Date</th>
<th>Event</th>
<th>Date</th>
<th>Event</th>
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</thead>
<tbody>
<tr>
<td>8/27/2012</td>
<td>First day of instruction</td>
<td>9/3 &amp; 11/12</td>
<td>Campus holidays</td>
</tr>
<tr>
<td>9/10/2012</td>
<td>Last day to Drop classes</td>
<td>12/17/2012</td>
<td>Last day of class</td>
</tr>
<tr>
<td>9/24/2012</td>
<td>Last day to Add classes</td>
<td>12/22/2012</td>
<td>Final Exam (1.30 – 3pm)</td>
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6. Success Factors:

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
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<tbody>
<tr>
<td>*Online Quizzes</td>
<td>30%</td>
</tr>
<tr>
<td>Mid-Term Exam 1</td>
<td>15%</td>
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<tr>
<td>Mid-Term Exam 2</td>
<td>25%</td>
</tr>
<tr>
<td>Final Exam (12/22/2012, 1.30-3pm)</td>
<td>30%</td>
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*Administered via Mastering Engineering

7. Evaluation Notes:

(a) **Online Quizzes:** Online quizzes are assigned on a weekly/bi-weekly basis and are to be turned in on
designated dates. Please log onto Mastering Engineering to complete the online quizzes.

(b) **In-Class Exams:** There will be 3x exams during the semester. The exams are close-book and students
are allowed to bring in one-sheet of notes (on both sides of paper). No make-up exams nor incomplete
grades are assigned. Exams are not curved, WYSIWYG.

(c) **Cheating:** Cheating result in a letter grade F with immediate effect.

8. Grades Distribution:

<table>
<thead>
<tr>
<th>Grade</th>
<th>Score Range</th>
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<tbody>
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<td>93-100</td>
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<td>A-</td>
<td>90-92</td>
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<tr>
<td>B</td>
<td>87-89</td>
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<td>B-</td>
<td>83-86</td>
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<td>C</td>
<td>77-79</td>
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<td>C-</td>
<td>73-76</td>
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<td>D</td>
<td>67-69</td>
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<tr>
<td>D-</td>
<td>63-66</td>
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<tr>
<td>F</td>
<td>Below 60</td>
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9. Disability Accommodations:

Students with disabilities who need reasonable accommodations are encouraged to contact the instructor.
The Disability Programs and Resource Center (http://www.sfsu.edu/~dprc/welcome.html) is available to
facilitate the reasonable accommodations process. The DPRC, located in SSB 110, can be reached by
telephone at 338-2724 (voice/TTY) or by e-mail at dprc@sfsu.edu.