

## Tentative Schedule and Suggested Reading

| <b>I Newtonian Dynamics</b>   |   |   |
|---|---|---|
| <b>A One-dimensional motion</b>   | • K&K Ch:2.1-2.5, 2.7-2.9   | <i>Sep 9, 14</i>  |
| <b>B Three-dimensional motion</b><br>1. Vectors, inner products, $\vec{F} = m\vec{a}$<br>2. Coordinates and examples<br>3. Circular motion<br>4. Changing basis vectors<br>5. Moving coordinate systems<br>6. Universal gravitation | • K&K Ch:1.1-1.4<br>• K&K Ch:1.5-1.11, 3.1-3.2<br>• K&K Ch:2.10<br>• K&K Ch:3.4<br>• K&K Ch:2.6<br>• K&K Ch:3.3 | <i>Sep 14</i><br><i>Sep 16, 21</i><br><i>Sep 21</i><br><i>Sep 21, 23</i><br><i>Sep 28</i><br><i>Sep 28</i>  |
| <b>C Momentum</b><br>1. Definition, examples<br>2. Center of mass, impulse  | • K&K Ch:4  | <i>Sep 28</i><br><i>Sep 28</i>  |
| <b>D Energy</b><br>1. 1-dim., kinetic, potential, work<br>2. 3-dim., line integral, gradient<br>3. Gravitational potential<br>3. Stokes' theorem, 2-dim.<br>4. Stokes' theorem, 3-dim.<br>cross product, curl<br>5. Collisions      | • K&K Ch:5.1-5.2<br>• K&K Ch:5.3-5.8, Note 5.2<br><br>• K&K Ch:6.5  | <i>Sep 28</i><br><i>Sep 30</i><br><i>Sep 30</i><br><i>Oct 5</i><br><i>Oct 5, 7</i><br><br><i>Oct 12, 14</i> |
| <b>E Simple harmonic motion</b><br>1. Introduction<br>2. Complex numbers<br>3. Damped SHM<br>4. Forced SHM  | • K&K Ch:3.7, 6.2, 6.3, 11.1, 11.2<br>• K&K Note 11.1<br>• K&K Ch:11.3<br>• K&K Ch:11.4-11.6                    | <i>Oct 14</i><br><i>Oct 14</i><br><i>Oct 19</i><br><i>Oct 19, 26</i>  |
| <b>Midterm</b>  |   | <b>Oct 21</b>   |
| <b>II Special Relativity</b>  |   |   |
| <b>A Introduction</b>   | • K&K Ch:12.1-12.3  | <i>Oct 28</i>   |
| <b>B Lorentz transformations</b><br>1. Derivation<br>2. Four-vectors<br>3. Doppler effect<br>4. Invariant length and causality<br>5. Dynamics   | • K&K Ch:12.4-12.9<br>• K&K Ch:14.1-14.4<br><br>• K&K Ch:13, 14.5, 14.6   | <i>Oct 28, Nov 4</i><br><i>Nov 4</i><br><i>Nov 9</i><br><i>Nov 9</i><br><i>Nov 11, 16</i>                   |
| <b>III Rigid body motion</b>  |   |   |
| <b>A Fixed axis rotation</b>  | • K&K Ch:7.1-7.4  | <i>Nov 16</i>   |
| <b>B Angular momentum</b>   | • K&K Ch:7.5-7.10   | <i>Nov 16, 18</i>   |

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|                                       |                       |                      |
|---------------------------------------|-----------------------|----------------------|
| <b>C Motion in 3 dimensions</b>       | • K&K Ch:8            | <i>Nov 23</i>        |
| <b>Below is from Fall 2020:</b>       |                       |                      |
| <b>IV Electrostatics</b>              |                       |                      |
| <b>A Coulomb's law</b>                | • Purcell Ch:1.1-1.8  | <i>Nov 24, Dec 1</i> |
| <b>B Gauss' law</b>                   | • Purcell Ch:1.9-1.15 | <i>Dec 3</i>         |
| <b>C Gauss' theorem</b>               | • Purcell Ch:2        | <i>Dec 3, 8</i>      |
| <b>D Scalar potential</b>             | • Purcell Ch:2        | <i>Dec 8</i>         |
| <b>E Conductors</b>                   | • Purcell Ch:3.1-3.4  | <i>Dec 10</i>        |
| <b>Final</b>                          |                       | <b>Dec 17</b>        |
| <b>F Capacitance</b>                  | • Purcell Ch:3.5-3.8  |                      |
| <b>G Ohm's law and circuit theory</b> | • Purcell Ch:4        |                      |
| <b>V Electrodynamics</b>              |                       |                      |