

Tentative Schedule and Suggested Reading

I Newtonian Dynamics		
A One-dimensional motion	• K&K Ch:2.-2.5, 2.7-2.9	<i>Sep 8, 10</i>
B Three-dimensional motion 1. Vectors, inner products, $\vec{F} = m\vec{a}$ 2. Coordinates and examples 3. Circular motion 4. Changing basis vectors 5. Moving coordinate systems 6. Universal gravitation	• K&K Ch:1.1-1.4 • K&K Ch:1.5-1.11, 3.1-3.2 • K&K Ch:2.10 • K&K Ch:3.4 • K&K Ch:2.6 • K&K Ch:3.3	<i>Sep 10</i> <i>Sep 15, 17</i> <i>Sep 17</i> <i>Sep 17, 22</i> <i>Sep 22</i> <i>Sep 22</i>
C Momentum 1. Definition, examples 2. Center of mass, impulse	• K&K Ch:4	<i>Sep 24</i> <i>Sep 24</i>
D Energy 1. 1-dim., kinetic, potential, work 2. 3-dim., line integral, gradient 3. Gravitational potential 3. Stokes' theorem, 2-dim. 4. Stokes' theorem, 3-dim. cross product, curl 5. Collisions	• K&K Ch:3.4.3, 3.4.4, 5.1-5.3.1 • K&K Ch:5.3.2-5.8, Note 5.2 • K&K Ch. 4.3, Note 4.1 • K&K Ch:6.5	<i>Sep 24</i> <i>Sep 29</i> <i>Sep 29</i> <i>Oct 1</i> <i>Oct 1, 6</i> <i>Oct 8</i>
E Simple harmonic motion 1. Introduction 2. Complex numbers 3. Damped SHM 4. Forced SHM	• K&K Ch:3.7, 6.2, 6.3, 11.1, 11.2 • K&K Note 11.1 • K&K Ch:11.3 • K&K Ch:11.4-11.6	<i>Oct 13</i> <i>Oct 13</i> <i>Oct 15</i> <i>Oct 20</i>
Midterm		Oct 29
II Special Relativity		
A Introduction	• K&K Ch:12.1-12.3	<i>Oct 20</i>
B Lorentz transformations 1. Derivation 2. Four-vectors 3. Invariant length and causality 4. Doppler effect 5. Dynamics	• K&K Ch:12.4-12.8 • K&K Ch:14.1-14.4 • K&K Ch:13, 14.5, 14.6	<i>Oct 20, 22, 27</i> <i>Oct 29</i> <i>Oct 29</i> <i>Oct 29</i> <i>Nov 5, 10, 12</i>
III Rigid body motion		
A Fixed axis rotation	• K&K Ch:7.1-7.4	<i>Nov 12, 17</i>
B Angular momentum	• K&K Ch:7.5-7.10	<i>Nov 17, 19</i>

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C Motion in 3 dimensions	• K&K Ch:8	<i>Nov 19, 24</i>
IV Electrostatics		
A Coulomb's law	• Purcell Ch:1.1-1.8	<i>Nov 24, Dec 1</i>
B Gauss' law	• Purcell Ch:1.9-1.15	<i>Dec 3</i>
C Gauss' theorem	• Purcell Ch:2	<i>Dec 3, 8</i>
D Scalar potential	• Purcell Ch:2	<i>Dec 8</i>
E Conductors	• Purcell Ch:3.1-3.4	<i>Dec 10</i>
Final		Dec 17
F Capacitance	• Purcell Ch:3.5-3.8, 4.1-4.5	<i>Jan 14</i>
G Ohm's law and circuit theory	• Purcell Ch:4.7-4.11	<i>Jan 14, 19, 21</i>
V Electrodynamics		
A Maxwell's equations, Lorentz force	• Purcell Ch:5, 6.1, 6.7	<i>Jan 21, 26, 28</i>
B Magnetostatics 1. Ampere's law 2. Biot-Savart law 3. dipole expansion 4. Larmor precession 5. Cyclotron motion	• Purcell Ch:6.2	<i>Jan 28, Feb 2, 4 Feb 4 Feb 4, 9 Feb 9 Feb 9</i>
C Changing fields 1. Maxwell's displacement current 2. Faraday's Law	• Purcell Ch:9.1, 9.2 • Purcell Ch:7.1-7.4	<i>Feb 9 Feb 11</i>
D Inductance	• Purcell Ch:7.5-7.10	<i>Feb 16, 18</i>
E AC circuits	• Purcell Ch:8	<i>Feb 18, 23</i>
F Light waves	• Purcell Ch:9	<i>Feb 25</i>
Midterm		Feb 25
VI Quantum Mechanics		
A Overview		<i>Feb 25</i>
B Angular Momentum 1. States and complex vector space 2. J_z and Stern Gerlach 3. Linear operators 4. J_x, J_y and rotation 5. Spin-1/2	• F&T 1-1 thru 1-5, 10-1 thru 10-3 • F&T 1-6 thru 1-12	<i>Feb 25, Mar 9 Mar 9 Mar 9, Mar 11 Mar 11 Mar 16</i>

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6. Time translation, Schrödinger equation		<i>Mar 18</i>
7. Measurement, composite states and tensor product		<i>Mar 23</i>
C Position		<i>Mar 25</i>
1. Definition, uncertainty principle		<i>Mar 30</i>
2. Uncertainty, gedanken experiments		
D One-dim QM		<i>Apr 1</i>
1. Ehrenfest relations		<i>Apr 6</i>
2 .Simple harmonic oscillator		<i>Apr 6</i>
3. Quantum tunneling		
E Quantum Computing		<i>Apr 8, 13</i>
E Quantum Field Theory		<i>Apr 15</i>