**Title: 1.1**

**Topic: Introduction**

- Learning Goals/Objectives: Course-Level learning goals, Summer 2009

- Lecture Notes:

May 4, 2009

1st day of class

**Title: 1.2**

**Topic: Photons - Light as a Particle**

- Learning Goals/Objectives: Photons - Light as a Particle

- Lecture Notes:

May 6, 2009

Electromagnetic Waves

**Title: 2.1**

**Topic: Photons - Light as a Particle**

- Learning Goals/Objectives: Photons - Light as a Particle

- Lecture Notes:

May 11, 2009

EM Waves (finish)

Photoelectric Effect (start)

**Title: 2.2**

**Topic: Photons - Light as a Particle**

- Learning Goals/Objectives: Photons - Light as a Particle

- Lecture Notes:

May 13, 2009

Photoelectric Effect

**Title: 3**

**Topic: General**

May 18, 2009 -- Holiday

**Title: 3.1**

**Topic: Photons - Light as a Particle**

- Demos & Simulations: Quantum Wave Interference

- Lecture Notes:

May 20, 2009

Probability and Randomness

**Title: 4.1**

**Topic: Emission & Absorption of Light**

- Demos & Simulations: Lasers

- In-Class Activities:

May 25, 2009

Lasers

**Title: 4.2**

**Topic: Emission & Absorption of Light**

- Demos & Simulations: Models of the Hydrogen Atom

- Lecture Notes:

May 27, 2009

Models of the atom

**Title: 5.1**

**Topic: Electrons as Waves; Probability Waves**

- Demos & Simulations: Quantum Wave Interference

- Demos & Simulations:

June 1, 2009

Wave properties of electrons

**Title: 5.2**

**Topic: Electrons as Waves; Probability Waves**

- Demos & Simulations: Quantum Wave Interference

- Demos & Simulations:

June 3, 2009

Matter Waves

**Title: 6.1**

**Topic: Electrons as Waves; Probability Waves**

- Demos & Simulations: Fourier: Making Waves

- Lecture Notes:

June 8, 2009

Wave Packets

**Title: 6.2**

**Topic: Electrons as Waves; Probability Waves**

- Lecture Notes: Wave Functions - June 10, 2009

June 10, 2009

Wave function shape

**Title: 7.1**

**Topic: Schrodinger Eq & Potential Energy Wells**

- Demos & Simulations: Quantum Bound States

- Lecture Notes:

June 15, 2009

Schrodinger Equation and Potential Energy Wells

**Title: 7.2**

**Topic: Schrodinger Eq & Potential Energy Wells**

- Demos & Simulations: Quantum Tunneling & Wave Packets

- In-Class Activities:

June 17, 2009

Tunnelling

**Title: 7.3**

**Topic: Schrodinger Eq & Potential Energy Wells**

- Demos & Simulations: Quantum Tunneling & Wave Packets

- Lecture Notes:

June 19, 2009

Superposition & Measurement

**Title: 8.1**

**Topic: Schrodinger Eq & Potential Energy Wells**

- Lecture Notes: Application of Tunnelling - June 22, 2009

June 22, 2009

Applications of Tunnelling

**Title: 8.2**

**Topic: Atomic Structure**

- Demos & Simulations: Models of the Hydrogen Atom

- Lecture Notes:

June 24, 2009

Hydrogen Atom

**Title: 9.1**

**Topic: Solids and Conductivity**

- Demos & Simulations: Band Structure

- Demos & Simulations:

June 29, 2009

Solids and Conductivity

**Title: 9.2**

**Topic: Solids and Conductivity**

- Demos & Simulations: Semiconductors

- Lecture Notes:

July 3, 2009

Solids and conductivity - part 2

**Title: 10.1**

**Topic: Special Relativity**

- Lecture Notes: Frames of Reference and Principle of Relativity - July 6, 2009

July 6, 2009

Frames of Reference and Principle of Relativity

**Title: 10.2**

**Topic: Special Relativity**

- Lecture Notes: Time Dilation and Length Contraction - July 8, 2009

July 8, 2009

Time Dilation and Length Contraction

**Title: 10.3**

**Topic: Special Relativity**

- In-Class Activities: Relativistic Velocity, Momentum, and Energy Tutorial - July 10, 2009

- Lecture Notes:

July 10, 2009

Relativistic Energy and Momentum

**Title: 11.1**

**Topic: Bose-Einstein Condensation**

- Demos & Simulations: BEC applets

- Lecture Notes:

July 13, 2009

Bose-Einstein Condensation

**Title: 11.2**

**Topic: General**

- Lecture Notes: QMCS and Review - July 15, 2009

July 15, 2009

Quantum Mechanics Concept Survey and Review

**Title: 2.3**

**Topic: Photons - Light as a Particle**

- In-Class Activities: Potential Energy Tutorial - May 15, 2009

May 15, 2009

Tutorial Activity: Potential Energy

**Title: 3.2**

**Topic: Emission & Absorption of Light**

- Demos & Simulations: Neon Lights & Other Discharge Lamps

- Lecture Notes:

May 22, 2009

Atomic Spectra

**Title: 4.3**

**Topic: General**

May 29, 2009

Midterm 1 - Individual followed by group exam

**Title: 5.3**

**Topic: Electrons as Waves; Probability Waves**

- Demos & Simulations: Fourier: Making Waves

- In-Class Activities:

June 5, 2009

Tutorial activity: Wavepacket representation of particles

**Title: 6.3**

**Topic: Schrodinger Eq & Potential Energy Wells**

- In-Class Activities: Wave Equations & Differential Equations Tutorial - June 12, 2009

June 12, 2009

Tutorial Activity: Wave equations & differential equations

**Title: 8.3**

**Topic: General**

June 26, 2009

Midterm 2: Individual followed by group exam

**Title: 9**

**Topic: General**

July 1, 2009 - Holiday