經典物理(一) Classical Physics (I)

教材：the Feynman lectures on physics, Volume I.
（Mainly mechanics, radiation, and heat）

Classical physics and atoms in motion
- Basic Physics
- The relation of physics to other sciences

Conservation of energy
- Time and distance

The theory of gravitation

Motion

Characteristics of force

Work and potential energy

The special theory of relativity
- Relativistic energy and momentum
- Space-time

Rotation

The harmonic oscillator

Electromagnetic radiation

The kinetic theory of gases

The laws of thermodynamics

Symmetry in physical laws

經典物理(二) Classical Physics (II)

教材：the Feynman lectures on physics, Volume II.
（Mainly electromagnetism and matter）

Electromagnetism
- Electrostatics
- Magnetostatics

The Maxwell equations

Electrodynamics in relativistic notation

Refractive index of dense materials

The magnetism of matter

Curved space

物理數學 (一) Mathematical Physics (I)

1. Review on differentiation and integration
2. Complex numbers
3. Series and limits
4. Partial differentiation and multiple integrals
5. Matrices and vector spaces: Eigenvalues, Eigenvectors, System of linear equations
6. Vector calculus
7. Line, surface and volume integrals
8. Fourier series
9. Integral transform
10. Ordinary differential equations—First order and Higher order; Series solution and Eigenfunction method

物理數學(二) Mathematical Physics (II)

1. Special functions
2. Operators in quantum mechanics
3. Partial differential equations
4. Calculus of variations
5. Complex variables
6. Applications of complex variables
7. Tensors
8. Basic group theory
9. Group representation
10. Probability
11. Statistics