

**Modules:** physics700 **Elective Advanced Lectures**  
physics730 **Theoretical Physics**

**Course:**  **Quantum Chromodynamics (T)**

**Course No.:** physics758

Category	Type	Language	Teaching hours	CP	Semester
Elective	Lecture with exercises	English	3+2	7	WT/ST

**Requirements:**

**Preparation:**

Advanced quantum theory (physics606)

Quantum Field Theory (physics755)

**Form of Testing and Examination:**

Requirements for the examination (written): successful work with the exercises

**Length of Course:**

1 semester

**Aims of the Course:**

Understanding basic properties of Quantum Chromodynamics, ability to compute strong interaction processes

**Contents of the Course:**

Quantum Chromodynamics as a Quantum Field Theory

Perturbative Quantum Chromodynamics

Topological objects: instantons etc.

Large N expansion

Lattice Quantum Chromodynamics

Effective Field Theories of Quantum Chromodynamics

Flavor physics (light and heavy quarks)

**Recommended Literature:**

S. Weinberg; The Quantum Theory of Fields (Cambridge University Press 1995)

M.E. Peskin, D.V. Schroeder; An Introduction to Quantum Field Theory (Westview Press 1995)

F.J. Yndurain; The Theory of Quark and Gluon Interactions (Springer 2006)

J.F. Donoghue et al.; Dynamics of the Standard Model (Cambridge University Press 1994)

E. Leader and E. Predazzi; An Introduction to Gauge Theories and Modern Particle Physics (Cambridge University Press 1996)