

**Modules:**

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

**Course:****Effective Field Theory (T)**

Course No.: physics757

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 and construction of Effective Field Theories, ability to perform calculations in Effective Field Theories

**Contents of the Course:**

Scales in physical systems, naturalness

Effective Quantum Field Theories

Renormalization Group, Universality

Construction of Effective Field Theories

Applications: effective field theories for physics beyond the Standard Model, heavy quarks, chiral dynamics, low-energy nuclear physics, ultracold atoms

**Recommended Literature:**

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

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

A.V. Manohar, M.B. Wise; Heavy Quark Physics (Cambridge University Press 2007)

P. Ramond, Journeys Beyond The Standard Model (Westview Press 2003)

D.B. Kaplan, Effective Field Theories (arXiv:nucl-th/9506035)

E. Braaten, H.-W. Hammer; Universality in Few-Body Systems with Large Scattering Length (Phys. Rep. 428 (2006) 259)