UNIVERSITÀ degli STUDI di CATANIA

**DIPARTIMENTO DI FISICA E ASTRONOMIA**
**Ettore MAJORANA**

**DOTTORATO DI RICERCA IN FISICA**

**ANNO ACCADEMICO 2019 - 2020**

# Basics of Neutrino Physics

3 CFU

**Teaching staff**
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## Program of the course:

*1) Phenomenology of the beta decay. Leptons and neutrinos. No parity conservation in the beta decay. Experiment of Wu and collaborators. The experimental discovery of neutrino: Cowan-Reines experiment. Neutrinos and antineutrinos.*
*2) The bosons W and Z. Electroweak unification. Weak isospin. Weinberg angle.*
*3) The lepton families. PMNS matrix and leptonic flavor mixing.*
*4) Neutrino mass. Neutrino as Dirac or Majorana particle? Normal or inverted hierarchy mass?*
*5) Ongoing experiments with solar, atmospheric, reactor and accelerator neutrinos. Neutrino oscillations. Tritium beta decay. Neutrinoless double beta decay ?*

## Bibliography:

[1] C. Giunti and C.W. Kim: Fundamentals of Neutrino Physics and Astrophysics at Oxford University Press.
[2] Course notes.