Course Code: MScTI_AQC		**Course Title:** Applied Quantum Computing		
Course Coordinator: JProf. Dr. Marko Rančić		**Type:** Lecture with exercises		
Credit Points: 6	**Workload:** 180 h	**Teaching Hours:** 4 / week	**Term:** ST	**Module usage:** WPEC

Module Parts and Teaching Methods:
- Lecture (2-3 h / week)
- Practical exercise with homework (1-2 h / week)

Objectives: Students...
- Understand the benefits which quantum computing brings to classical computing
- Understand the main bottlenecks of modern quantum computing
- Name most common approaches to quantum computing
- Get extensive hands on experience and theoretical understanding of main quantum computing algorithms

Content:
- Introduction to quantum mechanics
- Introduction to quantum computing
- Quantum noise
- Quantum computing approaches: Universal Quantum computing, NISQ Quantum computing and Quantum Annealing,
- Main architectures: Superconducting, Photonic, Trapped Ions, Spin qubits
- Universal quantum computing algorithms: (Shor's / Grover's /HHL algorithms, quantum phase estimation)
- Noisy-intermediate scale algorithms (Variational Quantum Eigensolver, Imaginary time evolution, Quantum Approximate Optimization algorithm)
- Quantum annealing

Prerequisites: none	**Recommended Knowledge:** Basic Computer Architecture

Literature:
- Lecture Notes and Handouts
- A list of other sources will be provided in the course

Testing: Defined by lecturer before beginning of course