Ma 15 - EPR

Prerequisites:

- Quantum mechanics: (spin-)Hamiltonian and operators
- Structure of matter: electronic configuration of transition metals

Physics:

- Zeeman effect: electron in a magnetic field, Larmor precession
- Hyperfine coupling: interaction between electronic and nuclear magnetic moment
- Spin-orbit interaction/coupling, g-value
- Interaction of electrons with microwaves: resonance phenomenon

Technical:

- Microwave resonators, Q-factor
- Oscilloscope handling: trigger settings, scaling, cursor measurements
- Phase-sensitive/lock-in detection
- Sensitivity considerations
- Calibration measurements
- Data acquisition with Labview

Data analysis:

- Basic data manipulation: finding extrema, zero crossings
- Least-square fitting of data to target function
- Error analysis / propagation