

Quantum Engineering 2021

Plan of lectures

Week 1 [30/8→ 3/9]

Tuesday 10-12 *Introduction to course and to Quantum Mechanics (Physics Area 1)*
Wednesday 8-10 *Introduction to or repetition of basic Quantum Mechanics (Area 1)*
Friday 8-10 *Quantum wells, barriers & periodic barriers, transport (Areas 1-2)*
Friday 10-12 *Exercises (see homepage for list of problems). Handout of **Project 1***

Week 2 [6/9→ 10/9]

Tuesday 10-12 *Dirac functions, operators & Quantum language (Areas 2-6)*
Wednesday 8-10 *Perturbation theory, Part I (Area 3)*
Friday 8-10 *Central potentials, (spin effects,) and the periodic table (Area 5)*
Friday 10-12 *Exercises (see homepage for list of problems).*

Week 3 [13/9→ 17/9]

Tuesday 10-12 *Atoms and Lewis structure*
Wednesday 8-10 *Chemical Bonding and Structure I*
Friday 8-10 *Chemical Bonding and Structure II*
Friday 10-12 *Exercises (see home pages for list of problems)*

Week 4 [20/9 → 24/9]

Tuesday 10-12 *Hückel theory*
Wednesday 8-10 *Introduction to computational chemistry, Handout of **Project 2***
Friday 8-10 *Intramolecular interactions*
Friday 10-12 *Exercises (see homepage for list of problems), **Deadline Project 1***

Week 5 [27/9 → 1/10]

Tuesday 10-12 *Quantum language & Perturbation theory, Part II (Areas 2-6 & 3)*
Wednesday 8-10 *Harmonic oscillator problem in quantum physics (Area 4)*
Friday 8-10 *Step operators for the harmonic oscillator (Area 4 & 6)*
Friday 10-12 *Exercises (see homepage for list of problems)*

Week 6 [4/10 → 8/10]

Tuesday 10-12 *Spin and Materials systems (Areas 5-6)*
Wednesday 8-10 *Sample Nanoscience Theory (Areas 2-6)*

Week 7 [11/10 → 15/10]

Monday 23:59 **Deadline Project 2**
Tuesday 10-12 *Many-particle theory, Spin, & Statistics (Areas 4-6)*
Wednesday 8-10 *Many-particle theory & Density Functional Theory (Area 6)*
Friday 8-10 *Many-particle theory & Applications: Materials theory (Area 6)*
Friday 10-12 *Exercises (see homepage for list of problems).*

Week 8 [18/10 → 22/10]

Monday 23:59 **Second deadline Project 1**
Tuesday 10-12 *Applications: Be the quantum engineer.*
Wednesday 8-10 *Summary A*
Friday 8-10 *Summary B*
Friday 10-12 *Exercises (see homepage for list of problems).*

Week 9 [25/10 - 31/10]

Wednesday? 14-18 **Written exam**
Sunday 23:59 **Second deadline Project 2**