SCHOOL PLAN

University Unit:
Engineering school

Graduate program:
Geospatial Sciences and Applications

Curse:
☒ Academic Master ☐ Professional Master's ☒ Doctorate degree

Discipline :
Quantum Mechanics

Teacher (s):
Sérgio Szpigel

Note:

The Geospatial Science and Applications course is a multidisciplinary course encompassing research in Solar Physics, Terrestrial Solar Relations, Astronomy, Particle Physics and others. The course subjects reflect this multidisciplinarity and often require more than one teacher, who specializes in topics of the same discipline.

Workload:	**Credits**	
48 h	4	☐ Required ☒ Optional ☐ Eleffective

Description:

Limits of Classical Physics and experimental foundations of Quantum Physics. Fundamental concepts: vector space and operators; Dirac notation. General structure of quantum mechanics: Schrödinger and Heisenberg formulations; postulates of Quantum Mechanics. Simple quantum systems. Angular momentum and central potential: orbital angular momentum and spin, addition of angular momentum; hydrogenic atoms, fine and hyperfine structure. Symmetries and conservation laws: discrete symmetries, parity and time reversal. Systems of identical particles: fermions and bosons. Approximation methods: theory of time independent perturbations, time-dependent pertubation theories, variational and semi classical methods. Scattering theory: Lippmann-Schwinger equation, Born approximation, methods of partial waves; time dependent formulation. Relativistic Quantum Mechanics: Klein-Gordon and Dirac equations.

Program content:

Evaluation criteria

According to the General Regulation of Stricto Sensu Post-Graduation, Art. 98:
A - excellent: corresponds to grades in the interval between grades 9 and 10;
B - good: corresponds to grades in the interval between grades 8 and 8.9;
C - regular: corresponds to grades in the interval between grades 7 and 7.9;
R - disapproved: corresponds to grades in the interval between degrees 0 and 6.9 "

Bibliography:

Gasiorowicz, S. Quantum Physics (3rd edition), Wiley, 2003.

Sakurai, J. J., Modern Quantum Mechanics, Addison-Wesley, 1994.

Cohen-Tannoudji, C.; Diu, B.; Laloe, F., Quantum Mechanics I e II, Wiley-Interscience, 1996.

Merbacher, E. Quantum Mechanics, Wiley, 1997.

Messiah, A. Quantum Mechanics, Dover, 1999.

Eisberg, R. M e Resnick R., Física Quântica – Átomos, Moléculas, Sólidos, Núcleos e Partículas, MacGraw-Hill, São Paulo, 1990.

Schedule

Date	Theme