강 의 계 획 서(Syllabus)

[1] 기본 정보(Basic Information)

■ 강의 정보(Course Information)

교과목명 (Course Title)	고급양자역학(ADVANCED QUANTUM MECHANICS)	강의유형 (Course Type)	이론 (Theoretical course)

[2] 학습 목표/성과(Learning Objectives/Outcomes)

■ 과목 설명(Course Description)

This course covers the advanced topics of quantum mechanics. Topics include the basic concepts of quantum mechanics including symmetry in quantum mechanics, time-independent, time-dependent perturbation methods, scattering theory, quantum theory of radiation in a non-relativistic limit, and Dirac equation.

■ 학습 목표(Learning Objectives)

It is aimed that the graduate students after this course are acquainted with the concepts of quantum physics as scientific background. The students are expected to understand a theoretical framework of quantum physics enough to be qualified for their research areas, where modern quantum physics is essential.

■ 학습 성과(Learning Outcomes)

After completed course, the student should master the formalism and methods of quantum mechanics in order to
(1) perform theoretical studies and calculations with applications on atomic and subatomic phenomena.
(2) evaluate experimental results in terms of quantum mechanics
(3) apply approximation methods to calculations of various physics problems

[3] 강의 진행 정보(Course Methods)

■ 강의 진행 방식(Teaching and Learning Methods)

강의 진행 방식	추가 설명
오프라인 강의	ppt와 white board를 이용한 설명과 유도 위주의 강의. 강의노트는 pdf 파일로 제공

■ 수업 자료(Textbooks, Reading, and other Materials)

수업 자료	제목	저자	출판일/게재일	출판사/학회지
Textbooks	Modern Quantum Physics	J. J. Sakurai and Jim Napolitano	2017.09	Cambridge University Press

[4] 수업 일정(Course Schedule)

차시	강사명	수업주제 및 내용	제출 과제	추가 설명
1	최광용	Symmetry in Quantum Mechanics	Reading Sakurai Chapter 4.1, 4.2	
2	최광용	Symmetry in Quantum Mechanics (Continued)	Reading Sakurai Chapter 4.3, 4.4	
3	최광용	Time-Independent Perturbation Theory	Reading Sakurai Chapter 5.1 and 5.2	
4	최광용	Variational Methods	Reading Sakurai Chapter 5.3 and 5.4	
5	최광용	Time-dependent Perturbation Theory	Reading Sakurai Chapter 5.5 and 5.6	
6	최광용	Interaction with Radiation Field	Reading Sakurai Chapter 5.7, 5.8	
7	최광용	Identical Particles	Reading Sakurai Chapter 6	
8	최광용	Scattering Theory (Lippmann-Schwinger Equation and Born Approximation)	Reading Sakurai Chapter 7.1 and 7.2	
9	최광용	Scattering Theory (Optical Theorem and Eikonal Approximation)	Reading Sakurai Chapter 7.3, 7.4 and 7.5	
10	최광용	Scattering Theory (Methods of Partial Waves)	Reading Sakurai Chapter 7.6 and 7.7	
11	최광용	Relativistic quantum mechanics	Lecture note	
12	최광용	Berry phase	Lecture note	

[5] 수강생 학습 안내 사항

강의노트는 Sakurai 책을 충실히 따르고 모든 공식을 자세히 유도하고 있다. 일부 연습문제 풀이도 포함하고 있다.