2026학년도 1학기 종합 및 자격시험 과목 안내
(Qualifying Exam – written test subject)

과목명	출제위원	출제 수준 및 범위
고분자화학 I/II (Polymer)	김경곤	* 교재: alcolm P. Stevens, Polymer Chemistry, An Introduction, International 3rd Edition, Oxford University Press, 2009. * 범위: Chap 1,2,3,4,6,10 - Molecular weight and polymer solutions - Free-radical polymerization - Step-reaction and ring-opening polymerization - Structure, configuration and morphology - Physical, mechanical & thermal properties
물리화학 I/II (Physical)	현가담	* 교재 : Akins 10th edition 기준 [물리화학1] - Understand the result of isothermal expansion on thermodynamic functions (Problem 3A.8 or 3A.9) - Understand reversible engines and efficiency (Section 3A.3) - Understand impact of mixing on Gibbs free energy, entropy and enthalpy (Try exercise 5B4 or 5B5) - Understand Le Chatlier's principle (Try exercise 6B2 or 6B4) [물리화학2] - Understand how to derive and work with wavefunctions for particle in a box (Section 8A.2) - Understand hydrogenic wavefunctions (Section 9A.1) - Understand Raman vibrations and selection rules (Section 12D.5) Justification 12D.2 Ex) 9A.2
유기화학 I/II (Organic)	김원석	* 교재: Leroy G. Wade. Jr. and Jan William Simek, "Organic Chemistry", 10th ed * 범위: - Chap 6: Alkyl Halides: Nucleophilic Substitution and Elimination (37, 42, 46, 50, 57, 58) - Chap 8: Reactions of Alkenes (46, 54, 55, 56, 61, 64, 67, 70, 71, 76) - Chap 9: Alkynes (32, 38, 39, 40, 42) - Chap 11: Reactions of Alcohols (47, 52, 53, 55, 56) - Chap 17: Reactions of Aromatic Compounds (50, 57, 66, 78) - Chap 18: Ketones and Aldehydes (39, 47, 48, 50, 59) - Chap 22: Condensations and Alpha Substitutions of Carbonyl Compounds (62, 63, 70, 76, 77, 85) - One question will be out of the test range.
무기화학 I/II (Inorganic)	김진흥	* 교재 : Inorganic Chemistry (Fifth Edition / Gary L. Miessler, Paul J.Fischer, Donald A.Tarr) * 범위 : - Chapter 9. Coordination Chemistry I: Structures and Isomers - Chapter 10. Coordination Chemistry II: Bonding - Chapter 11. Coordination Chemistry III: Electronic Spectra
분석화학 I/II (Analytical)	이영미	* 교재: D. C. Harris, "Quantitive Chemical Analysis", 10th Ed. 혹은 9th Ed. * 범위: Chapter 7. Let's the Titrations Begin - Chapter 8. Activity and the Systematic Treatment of Equilibrium - Chapter 9. Monoprotic Acid-Base Equilibria - Chapter 10. Polyprotic Acid-Base Equilibria - Chapter 11. Acid-Base Titrations - Chapter 12. EDTA Titrations

생화학 I/II (Bio)	차선신	* 교재: Lehninger Principles of Biochemistry (7th and 8th edition) * 범위: - Chapter 3 Amino acids, peptides, and proteins - Chapter 4 The three-dimensional structure of proteins - Chapter 5 Protein Function - Chapter 6 Enzymes - Chapter 21 Lipid Biosynthesis - Chapter 23 Hormonal Regulation and Integration of Mammalian Metabolism
나노소재 I/II (Nano)	김동하	* 학부 "나노소재화학" / 대학원 "나노재료특강" 및 "나노소재과학" 강의 내용 (Content of the Course Studies of "Nanomaterials Chemistry" at Undergraduate Course, and "Advanced Nanomaterials", or "Introduction to Nano Materials" at Graduate Course) * 주요 출제 내용 (Specific Subjects): - 양자점과 귀금속 나노소재의 발광 원리 및 색상 제어 기법 (Principle of Light Emission and Strategy for Controlling the Color of Quantum Dots and Noble Metal Nanomaterials) - 상향식 및 하향식 나노제작의 개념, 유형 및 응용 사례 (Bottom-up & Top-down Nanofabrication: Concept, Types and Applications) - 탄소나노소재의 유형, 합성법 및 응용 (Carbon Nanomaterials: Type, Synthesis, and Applications) - 친환경 나노소재 (Eco-friendly Nanomaterials): 광촉매를 이용한 물분해 수소생성 원리 및 가시광 활성 TiO2 설계 방법 (Principle of Hydrogen Production via Water Splitting and Development Routes to Visible Light-Active TiO2) - 나노소자 구조 및 작동 원리: 태양전지 (Solar Cell), 연료전지 (Fuel Cell), 2차전지 (Secondary Battery), 광검출기 (Photodetector), 트랜지스터 (Transistor), 디스플레이 (Light Emitting Diode) - 표면 플라즈몬 공명 현상의 원리 및 응용 (Surface Plasmon Resonance: Concept and Application) - 나노소재 기반 생의학적 진단·치료의 원리 및 응용 사례 (Principles and Applications of Nanomaterials-based Biomedical Diagnosis and Therapy)