CHEM 344-002 Organic Chemistry II
Text Reading and Problem Assignments
Solomons 10th edition (2011)

Text problems will be assigned from each chapter that are chosen to drill fundamental concepts. These problems will NOT be collected, but your worked out answers should be written in a separate problem notebook. There should be a heading for each set of chapter problems. You are strongly encouraged to work these problems, individually or in a study group, as they will appear on worksheets and exams.

Chapter 11: Alcohols and Ethers.
Key Concepts: Alcohol nomenclature, acid-base reactions of alcohols, acid catalyzed alcohol dehydration (E1/E2 elimination), acid catalyzed substitution reactions of alcohols with HX, Williamson ether synthesis, reactions of epoxides.
Text Reading Assignment: Review the nomenclature of alcohols in Chapter 2 (section 2.6), and Chapter 4 (section 4.3F). In Chapter 11 read sections (11.x): 1, 1A, 4(hydration), 5, 6, 7, 8, 8A, 10, 11B, 14.
Recommended Problems (11.x): 2, 4, 5, 6, 9, 13, 20, 21, 25(a,e,f), 26(b,d), 30(a,b,c), 40(d,e,f,i), 44, 45, 46, 47.

Chapter 12: Alcohols from Carbonyl Compounds.
Key Concepts: reduction of carbonyl compounds to alcohols; oxidation of alcohols to aldehydes and ketones; Grignard reaction with aldehydes, ketones, epoxides, esters, acidic compounds.
Text Reading Assignment (12.x): Sections 1, 1A, 3, 3B, 4A-C, 5, 6B, 7A-C, 8, 8A, 8B.
Recommended Problems (12.x): 4(a,b,c), 8(c,d), 9(a,c), 10(a-f), 12(f,g,h,i), 15(a,c), 16(a,b,c,d,e), 17(a,b,c,e), 18(a,b,d), 19(c,d), 27(a,b,c), 30(a,b,d,g).

Chapter 9: Nuclear Magnetic Resonance and Mass Spectrometry (Review Infrared Spectroscopy).
Key Concepts: Interpretation of IR spectra (functional group identification), ^{1}H and ^{13}C NMR spectra (equivalent protons, chemical shift, splitting patterns, characteristic chemical shifts, H-D exchange, equivalent carbons, proton coupling and decoupling, DEPT); Mass Spectroscopy (fragmentation patterns, m/z, molecular ion).
Text Reading Assignment: Review IR in Chapter 2, sections 15, 16, 16A, 16B; Review Index of Hydrogen Deficiency in Chapter 4, section 17 and 17A. In Chapter 9 read Sections (9.x): 1, 2, 2A-C, 3, 5, 7, 7A, 8, 9, 9A, 9B, 10, 11A-E, 13, 14, 15, 16, 16A-C, 17A.
Recommended Problems (9.x): 2, 4(a,b,c,d), 9, 15, 18, 23(a,b,c,d,f), 24(a,b,c,d,f), 25, 26, 31, 32, 39(c,d,f,l), 43, 44, 45.

Chapter 14: Aromatic Compounds.
Key Concepts: Nomenclature of substituted benzenes; criteria for aromaticity (conjugation, delocalization, resonance, Huckel's Rule); aromatic ions; NMR of benzene; Mass spectra of benzene (molecular ion, fragmentation patterns, structure and stability of fragment ions).
Text Reading Assignment: Sections (14.x) 1, 2, 3, 4, 7, 7B, 7D, 8A, 8B, 9, 10, 11A, 11B, 11E.
Recommended Problems (14.x): 1(a,c), 14, 16(a,b,c,d,e,f,j,k,m,n,p,q), 18, 21(A), 22, 38.

Chapter 15: Reactions of Aromatic Compounds.
Key Concepts: Benzylic carbocations and reactions at the benzylic position; electrophilic aromatic substitution reactions (halogenation, nitration, Friedel-Crafts alkylation and acylation); synthesis of substituted benzene rings.
Text Reading Assignment: Sections (15.x) 1, 2, 3, 4, 6, 7, 8, 9, 10, 10A-G, 11A-E, 12, 12A, 13A, 13C, 14, 14B.
Recommended Problems (15.x): 7(b,c,d), 8, 11, 12, 18, 22, 24(a,b), 26, 30(a,b,c,d,e), 31(a,b,c,d), 33(a,b,c), 34(a,e,f,i), 35(a,b,d,e,f), 36(a,b,c,d,f,i).

Chapter 16: Aldehydes and Ketones – Nucleophilic Additions to the Carbonyl Group.
Key Concepts: Nomenclature and spectroscopy of aldehydes and ketones; synthesis of aldehydes and ketones; carbonyl addition reactions (Grignard, $NaBH_4$, water, alcohols, cyanide, amines).
Text Reading Assignment: Sections (16.x) 1, 2, 4A, 5A, 6, 7, 7A, 7B, 8, 8A, 8B, 9, 11, 13A-C, 14.
Recommended Problems (16.x): 1, 4(a,c,d), 10, 11, 16, 19(a,b,c,d,e,f,g,j,k), 20(a,b,g,j,k,l), 22(a,b,d,e), 23(a,c,e,f), 24(a,b,c), 27(a,b,c,d), 47, 49.

Chapter 17: Carboxylic Acids and their derivatives.
Key Concepts: Nomenclature (carboxylic acids & esters), acid strength, synthesis and reactions of carboxylic acids, esters and amides, nucleophilic addition/elimination reactions, IR & NMR.
Text Reading Assignment: Sections (17.x) 1, 2A-C, 2E, 2H, 2I, 2J, 3, 4, 4A, 4B, 5B, 6B, 7A, 7B, 8A, 8B, 8D, 8F, 8H, 10, 11, 13.
Recommended Problems (17.x): 1, 3, 5, 6, 9, 10, 11(a3, a4, b), 13(b,c), 17, 18(a,d,i,j), 19(a,e,f,g), 22(a,c,d,e,g,h,k,l), 25(a,b,c,d,f), 26(a), 32, 33(a,c), 46(b,c).

Chapter 18: Reactions at the α-Carbon of Carbonyl Compounds.
Key Concepts: acidity of the α-hydrogen of aldehydes and ketones; keto and enol tautomers, reactions at the alpha carbon of aldehydes and ketones (carbanions, acid/base solvent exchange, racemization), acetoacetic ester synthesis, malonic ester synthesis
Text Reading Assignment: Sections (18.x) 1, 2, 3A, 5, 6, 7, 10.
Recommended Problems (18.x): 2, 7, 9, 10, 12, 15, 16, 20(b), 21(b,d), 22(a), 27(a,d).

Chapter 19: Condensation and Conjugate Addition Reactions of Carbonyl Compounds.
Key Concepts: Focus on mechanisms for the Claisen condensation, aldol condensation reaction; conjugate addition reactions (Michael reaction).
Text Reading Assignment: Sections (19.x) 1, 2, 2A, 2B, 4, 4A-C, 5, 5A, 6, 7, 9.
Recommended Problems: 1, 2, 3(a), 4, 5, 11, 12, 16, 17, 23(a,b,c,e), 33(a,c,e), 34, 35(a,b,d), 36(a,b,c,d,e), 38(a,b), 41(a,b), 57.

Chapter 20: Amines.
Key Concepts: No mechanisms, just focus on nomenclature, basicity of amines, and reactions.
Text Reading Assignment: Sections (20.x) 1, 1A, 3, 3A-E, 4A, 5, 6, 6B, 7, 7A-E, 11B, 13.
Recommended Problems (20.x): 3, 4, 19(a,c,m,q,s,t), 20(a,b,d,e,i,l), 21, 22(c,d), 25(a,c,e,f,g,h,i,l), 47, 48.