Topic	Comments
15 Organometallic Compounds	
15.1 Organomagnesium and Organolithium Compounds	Rxns with carbonyls & epoxides (Mechanism)
15.2 Lithium Diorganocopper (Gilman) Reagents	Coupling with halides
15.3 Carbenes and Carbenoids	Insertion reactions: carbene & dihalocarbenes; Simmons-Smith rxn
16 Aldehydes and Ketones	
16.1 Structure and Bonding	Polarity properties; bond characteristics
16.2 Nomenclature	trivial names of compounds on slides; basic nomenclature
16.3 Physical Properties	solubility trends; BP & or MP trends
16.4 Reactions	Reaction theme: addition to give tetrahedral intermediate
16.5 Addition of Carbon Nucleophiles	Grignards; R-Li; acetylide; cyanide-use of cyanohydrins (**mechanisms**)
16.6 The Wittig Reaction	use with carbonyls-**mechanism;**
16.7 Addition of Oxygen Nucleophiles	Hydrates; hemi-acetal; acetal formation; **mechanisms** (acid & base)
16.8 Addition of Nitrogen Nucleophiles	imines and enamines-formation and hydrolysis; **mechanism**
16.9 Keto-Enol Tautomerism	acidity of α hydrogens (significance); **mechanism**-acidic & basic
16.10 Oxidation	RHO & ROH-use of all Cr^{+6} reagents; Silver oxide;O_2
16.11 Reduction	metal hydride reductions; cat H_2; Clemmenson; Wolff-Kishner-**mechanism;**
16.12 Reactions at an α-Carbon	racemization-**mechanism;** halogenation, acidic & basic conditions-**mechanism**
CUT-OFF for XM 1	
17 Carboxylic Acids	
17.1 Structure	Formulas; carbonyl & OH interactions
17.2 Nomenclature	trivial names of compounds on slides; basic nomenclature, otherwise
17.3 Physical Properties	solubility trends; BP & or MP trends; spectral properties
17.4 Acidity	pKa values & use; stability of anions; equilibrium
17.5 Preparation of Carboxylic Acids	Grignard route (from CO_2)- and oxidations of alcohols
17.6 Reduction	LAH; selectivity of reductions
17.7 Esterification	Fisher esterification-mechanism
17.8 Conversion to Acid Chlorides	from $SOCl_2$ mechanism
17.9 Decarboxylation	typical acids vs. β-keto acids; mechanism
18 Functional Derivatives of Carboxylic Acids	
18.1 Structure and Nomenclature	Formulas; carbonyl & OH interactions
18.2 Acidity of Amides, Imides, and Sulfonamides	trivial names of compounds on slides; basic nomenclature, otherwise
18.3 Characteristic Reactions	Nucleophilic acyl substitution-general mechanism
18.4 Reaction with Water: Hydrolysis	of acid Cl; anhydrides, esters, amides, CN; mechanisms of all
18.5 Reaction with Alcohols	to form esters; transesterification-mechanisms

Topic	Comments
18.6 Reactions with Ammonia and Amines	to form amides-mechanism
18.7 Reaction of Acid Chlorides with Salts of Carboxylic Acids	to form anhydrides-mechanism
18.8 Interconversion of Functional Derivatives	know reagents to convert functional groups into each other
18.9 Reactions with Organometallic Compounds	with esters & how that differs from ketones & aldehydes-mechanism
18.10 Reduction	LAH with acids, esters, nitriles and amides
19 Enolate Anions and Enamines	
19.1 Formation and Reactions of Enolate Anions	Enol vs enolates-generation and conditions
19.2 Aldol Reaction	Mechanism-both acidic and Basic conditions
19.3 Claisen and Dieckmann Condensations	Mechanism-why the product formation is irreversible
19.5 Enamines	Formation (chap 16) of and advantages over enolates
	Use in alkylation rxns & hydrolysis of enamines-mechanism
19.6 Acetoacetic Ester Synthesis	mechanism-use for synthetic targets (ketones)
19.7 Malonic Ester Synthesis	mechanism-use for synthetic targets (ketones)
19.8 Conjugate Addition	Mechanism-types of nucleophiles used; **Robinson ring annulation**
to α, β-Unsaturated Carbonyl Compounds	
19.9 Crossed Aldol Rxns with LDA	Kinetic vs Thermodynamic enolates