Carbonyl Chemistry
11 Lectures

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Aim of Course
To build upon elements of Dr E. Smith's and DR C. Braddocks's course. To introduce the chemistry of the carbonyl functional groups.

Course Objectives At the end of this course you should be able to:

- Identify the various functional groups that involve carbonyls
- Predict products of carbonyl functional groups with various reagents
- Select reagents and pathways for synthesis of various carbonyl containing functional groups
- Explain the mechanism associated with each type of functional groups

Recommended Texts
Vollhardt, K.P.C. & Schore N.E. "Organic Chemistry" (2nd ed.) £29.95
Sykes, P. "Mechanism in Organic Chemistry" (6th ed.) £17.99
Warren, S. "Chemistry of the Carbonyl Group" £15.99
J. Jones "Core Carbonyl Chemistry" £5.99

A. Introduction. Carbonyl structure.

B. Aldehydes, Ketones
physical properties, spectroscopic properties, O- nucleophiles, acetal/hydrate formation, protection, S-nucleophiles, thioacetal protection, Baeyer-Villager oxidation, C, H nucleophiles, metal alkyls, reducing agents, Wittig, cyanohydrin formation, benzion, N nucleophiles, secondary amines/enamine formation, Wolff-Kishner, Electron nucleophiles, Clemmensen reduction, ketyl formation, pinacol formation, keto-enolates, pKa, C- vs O-alkylation, acid/base cat., haloform, carbonyl alkylation, aldol condensation, Michaels addition, synthesis

C. Carboxylic Acid and their Derivatives,
physical properties, spectroscopic properties, nomeclature, Bronsted-Lowry/Lewis acidity, substituent effect of acidity, reactions (decarboxylation, alkylation, conversion to ketone) synthesis (oxidation, hydrolysis, haloform, organometallic)
Acid halides, nomenclature, reactions (hydroxide, reduction, partial reduction, Friedel-Craft acylation, Hell-Volhard-Zelinsky, synthesis ($SOCl_2$, PCl_3,)
Esters, reactions with alkyl halides), reactions (hydroylsis acid/base, transesterification, reduction, claisen, dieckmann) polyesters, synthesis, fischer esterifcation,
Amides, reactions (hydrolysis, reduction, dehydration, polymerisation, alkylation of amidate anion), organometallic, synthesis (acid halid and amine, nitrile hydrolysis)