

KO 5001

Organic Chemistry – Reactivity and Structure

Autumn term 2017

Types of sessions and general schedule:

Lectures	A501	Morning: 09:30 – 12:30
Seminars	A501/K206/K233	Morning: 09:30 – 12:30
Tutoring (<i>appointment only</i>)	A515/K206/K233	Morning: 09:30 – 12:30 // Afternoon: 13:30 – 18:30
Laboratory exercises (compulsory)	Lab K422	Full day: 09:30 – 18:30 <i>or</i> Afternoon: 13:30 – 18:30

Lecturers:

Dr Abraham Mendoza (AM) – coordinator & part I	16 24 81	abraham.mendoza@su.se
Prof Pino Pilotti (PP) – part II	16 24 84	ake.pilotti@su.se

Teaching Assistants:

Cristiana Margarita (CM)	16 24 67	cristiana.margarita@su.se
Marvin Lubke (ML)	16 23 59	marvin.luebcke@su.se
Matteo Costantini (MC)	16 24 66	matteo.costantini@su.se

Course literature:

- **[CGW]** Clayden, Greeves & Warren: Organic Chemistry; 2nd Edition, Oxford University Press 2012 (ISBN 978-0-19-927029-3) *or* Clayden, Greeves, Warren & Wothers: Organic Chemistry, Oxford University Press 2001 (ISBN 978-0-19-850346-0)
- **[FSK]** L.D. Field, S. Sternhell, J.R. Kalman: Organic Structures from Spectra, John Wiley & Sons, 4th edition (ISBN 978-0-470-31927-7)
- Handouts from lecturers and assistants

Demands to pass the theory course:

- Passed exam in nomenclature > 50% of the points required
- Passed exam part I (reactions & mechanisms) > 50% of the points required
- Passed exam part II (spectroscopy theory & analysis) > 50% of the points required

Demands to pass the laboratory course:

- Passed exam in nomenclature (30% of the points required)
- Passed exam in safety (100% of the points required)
- Passed all lab reports
- Taken part in lab report writing sessions
- Taken part in lab presentation
- Taken part in lab cleaning

Schedule for KO 5001

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Week 1 [35]

Mon	Aug 28	09.30 – 10.00	Course introduction	AM, PP, ML, CM, MC	A501
		10.00 – 12.30	Lecture 1 – Chemical bonding and resonance	AM	A501
Tue	29	09.30 – 12.30	Lecture 2 – Thermodynamics and kinetics	AM	A501
		13.30 – 16.30	<i>Tutoring (optional, per appointment)</i>	ML, CM, MC	K206
Wed	30	09.30 – 12.30	Exam: Nomenclature and safety	ML, CM, MC	K206
Thu	31	09.30 – 12.30	Lecture 3 – Acidity and basicity	AM	A501
Fri	Sep 1	09.30 – 12.30	Lecture 4 – Mechanisms and intermediates	AM	A501

Week 2 [36]

Mon	Sep 4	09.30 – 12.30	Lab Introduction & <i>resit Exam: Nomenclature and safety</i>	ML, MC	K422/K206
Tue	5	09.30 – 18.30	Lab 1 – Ketones	ML, MC	K422
Wed	6	09.30 – 12.30	Lecture 5 – Organometallics and carbonyls	AM	A501
Thu	7	09.30 – 12.30	Lecture 6 – Carbonyl chemistry I	AM	A501
Fri	8	09.30 – 18.30	Lab 2 – Distillation	ML, CM	K422

Week 3 [37]

Mon	Sep 11	09.30 – 18.30	Lab 3 – Substitution, elimination and addition	CM, MC	K422
Tue	12	09.30 – 18.30	Lab 4 – Grignard addition	ML, MC	K422
Wed	13	09.30 – 12.30	Lecture 7 – Carbonyl chemistry II	AM	A501
Thu	14	09.30 – 12.30	Lecture 8 – Carbonyl chemistry III	AM	A501
Fri	15	09.30 – 12.30	Lecture 9 – Carbonyl chemistry IV	AM	A501

Week 4 [38]

Mon	Sep 18	09.30 – 12.30	Lecture 10 – Nucleophilic substitution & elimination	AM	A501
		13.30 – 18.30	<i>Scientific report workshop</i>	ML, CM, MC	K206
Tue	19	09.30 – 12.30	Lecture 11 – Additions to C-C multiple bonds	AM	A501
Wed	20	09.30 – 18.30	Lab 5 - Condensation	ML, CM	K422
Thu	21	09.30 – 18.30	Lab 6 - Rearrangements	ML, MC	K422
Fri	22	09.30 – 12.30	Lecture 12 – Cycloadditions, radicals and rearrangements	AM	A501

Week 5 [39]

Mon	Sep 25	09.30 – 12.30	Lecture 13 – Determining reaction mechanisms	AM	A501
		13.30 – 18.30	Lab 7 – Redox	CM, MC	K422
Tue	26	09.30 – 12.30	Lecture 14 – Stereoselective reactions and strategy	AM	A501
Thu	28	09.30 – 12.30	Lecture 15 – Review	AM	A501

Week 6 [40]

Mon	Oct 2	09.30 – 12.30	<i>Tutoring (optional, per appointment)</i>	CM	K233
		13.30 – 18.30	<i>Tutoring (optional, per appointment)</i>	MC	K233
Tue	3	09.30 – 12.30	<i>Tutoring (optional, per appointment)</i>	AM	A529
Wed	4	09.30 – 12.30	<i>Tutoring (optional, per appointment)</i>	ML	K233
Thu	5	09.00 – 14.00	Exam: part I	ML, CM, MC	A501
Fri	6	09.30 – 12.30	Lab 8 – Reactive intermediates	ML, CM	K422
		13.30 – 18.30	Lab introduction to separation techniques	ML, MC	K422/K233

Week 7 [41]

Mon	Oct 9	09.30 – 12.30	Lecture 16 – Spectroscopic methods	PP	A501
		13.30 – 18.30	Lab 9 - Separation	CM, MC	K422
Tue	10	09.30 – 18.30	Lab 9 – Separation	ML, MC	K422
Wed	11	09.30 – 18.30	Lab 9 – Separation	ML, CM	K422
Thu	12	09.30 – 12.30	Lecture 17 – Ultraviolet, infrared and mass spectroscopy	PP	A501
		13.30 – 18.30	Lab 9 - Separation	ML, MC	K422
Fri	13	09.30 – 12.30	Lecture 18 – NMR I	PP	A501
		13.30 – 18.30	Lab cleaning (and extra-time)	CM, MC	K422

Week 8 [42]

Mon	Oct 16	09.30 – 12.30	Lecture 19 – NMR II	PP	A501
		13.30 – 18.30	Problem seminar and lab report workshop	ML, CM	K233
Tue	17	09.30 – 12.30	Lecture 20 – NMR III	PP	A501
Wed	18	09.30 – 12.30	Problem seminar	PP	A501
Thu	19	09.30 – 12.30	Lecture 21 – NMR IV	PP	A501
Fri	20	09.30 – 18.30	Lab presentations and reports	ML, CM, MC	K233

Week 9 [43]

Mon	Oct 23	09.30 – 12.30	Lecture 22 – Structure solution	PP	A501
Tue	24	09.30 – 12.30	Problem seminar	PP	A501
Wed	25	09.30 – 12.30	Exercise: Techniques to solve spectral problems	CM, MC	K233
Thu	26	09.30 – 12.30	<i>Tutoring (optional, per appointment)</i>	CM	K233
		13.30 – 18.30	<i>Tutoring (optional, per appointment)</i>	ML	K233
Fri	27	13.30 – 18.30	<i>Tutoring (optional, per appointment)</i>	MC	K233

Week 10 [44]

Mon	Oct 30	09.00 – 14.00	Exam: part II	ML, CM, MC	A501
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IMPORTANT: The deadline for the laboratory reports is **Friday, October 20th, 2017** (see above).

After November 1st, 2016 the reports will be corrected whenever the assistants have the time. A fast response is therefore not warranted. To avoid disappointment and curricular issues, **keep the set deadline for the reports.**

The **resit exam** for part I and part II is penciled for **Tuesday, November 21st 2017 (09.00 – 14.00)**. Nevertheless, the time of the exam might be adjusted (within week 47) to match the students' schedule, if appropriately documented.

Appointment is required to participate in the **tutoring sessions** scheduled before exams. Please kindly let the person in charge of the tutoring session know of your intention of attending using the contact information provided. **A 24 hour advance notice is strongly recommended.**

Note that all the laboratory activities are compulsory.

Recommended reading:

L1	Chemical bonding and resonance	CGW	Ch. 4, 7
L2	Thermodynamics and kinetics	CGW	Ch. 13, 12
L3	Acidity and basicity	CGW	Ch. 8
L4	Mechanisms and intermediates	CGW	Ch. 5, 39
L5	Organometallics and carbonyls	CGW	Ch. 9
L6	Carbonyl chemistry I: Generalities	CGW	Ch. 6, 9, 10, 23
L7	Carbonyl chemistry II: Enolates and Michael	CGW	Ch. 20, 22, 25
L8	Carbonyl chemistry III: Reversible additions and carboxylic acids	CGW	Ch. 6,10,11,20
L9	Carbonyl chemistry IV: Condensation and olefination	CGW	Ch. 25, 26
L10	Nucleophilic substitution and elimination reactions	CGW	Ch.15, 17, 27
L11	Additions to carbon-carbon multiple bonds	CGW	Ch. 19, 23, 37, 38
L12	Cycloadditions, radicals and rearrangement reactions	CGW	Ch. 34, 35, 36, 37
L13	Determining organic reaction mechanisms	CGW	Ch. 39
L14	Stereoselective reactions and synthesis strategy	CGW	Ch. 14,23,28,32,33,41
L15	Review	CGW	All above
L16	Introduction to spectroscopic methods	CGW	Ch. 3, 13, 18
L17	UV/IR/MS	FSK	Ch. 1, 2, 3, 4
L18	NMR I	FSK	Ch. 5
L19	NMR II	FSK	Ch. 5, 6
L20	NMR III	FSK	Ch. 5, 6, 7
L21	NMR IV	FSK	Ch. 5, 6, 7, 8
L22	Structure solution	FSK	Ch. 8, 9