

Course Schedule Discrete Mathematics + Intro to Math (2019-1A)

Week	Day	Lecture	Section in Book	Revision Intro to Math exercises	Homework exercises (finish before next colstruction)	Tutorial exercises (to be done during next colstruction)
36	Mon/Tue	Lecture 1	2.1 2.2	4, 10, 13 13	17 18 ¹ , 19 ²	6bcd ³ , 15, 20
	Thu/Fri	Lecture 2	2.3	1,3	7 ⁴ , 9 ⁵ , 10a ⁶ bcd, 11ac	8, 10efgh, 11bd, 12
37	Mon/Tue	Lecture 3	2.4	4, 6, 8, 9, 18, 21, 22, 24, Sup Ex. ⁷ 13	7, 10, 15, 23, 25, Add Ex ⁹	5 ⁸ , 12, 17, 26 Sup. Ex ⁷ 14
	Thu/Fri	Lecture 4	2.5	5, 6	9, 8, 11	10, 7b ¹⁰ Add. Ex ⁹
38	Mon	Lecture 5	3.1 3.2	2, 4, 15, 18 1, 2, 8	6, 7 ¹¹ 6	13, Sup. Ex ¹² 1, Sup Ex ¹² 9
	Thu/Fri	Lecture 6	3.2	14, 18, 19	7, 20	Sup Ex ¹² 3, 11, 12
39	Mon	Lecture 7	4.1	1, 2, 19	4.5: 25, 4.1: 14, 16, 20, Sup. Ex ¹³ 4 ¹⁴	15, 17, Sup. Ex ¹³ 11, 12
	Thu	Lecture 8	4.1	Sup. Ex ¹³ 26 ¹⁶ , 28 ¹⁷	23, 24 ¹⁸ , 26	Sup. Ex ¹³ 7, 13, 27 ¹⁹
40	Mon	Lecture 9	5.1 5.2 5.3	7	1, 11 9 ²¹ , 18, 21 1, 4	7, 9 ²⁰ 3, 14 ²² , 25 ²³ , 19 ²⁴ 2, 15
	Thu	Lecture 10	5.4 5.6		1, 2 8, 20, 18, 19	3, 4, 11, 13 ²⁵ Sup. Ex. ²⁶ 2, 27 ²⁷ 5.6: 11 ²⁸ , 16, 17
41	Mon	Lecture 11	7.1 7.2		1, 5beh, 7, 13 4	4, 6, 8 ²⁹ , 16
	Thu	Lecture 12	7.2 7.3		2, 17 1 ³² , 3 ³³	13, 19, 18, 23 19 ³⁸
42	Mon	Lecture 13	7.4		1, 3 ⁴⁰ , 4, 7 ⁴¹ 8, 10 ⁴²	6, 9, 15 ⁴³

- ¹At each step indicate which Law(s) of Logic is/are used: L1, L2, etc. Cf. Formula sheet and lecture-slides.
- ²In part (b) first add additional brackets: $(p \vee q) \vee ((\neg p \wedge \neg q) \wedge r) \iff (p \vee q) \vee r$. Similarly in part (c).
- ³"Negate" means: put a \neg -symbol in front of the statement (first place brackets around the statement) and simplify the result as far as possible.
- ⁴At each step indicate which Law(s) of Logic (L1, L2, etc.) and/or rules of Inference (R1, R2, etc.) is/are used as well as the number(s) of the previous steps that these Laws or Rules apply to. Cf. Formula sheet and lecture-slides.
- ⁵In parts b and c, "direct proof" means a proof (similar to that of part a) that does not use the extra premisses of the negation of the conclusion (e.g. in part b one cannot use the extra premiss $\neg(\neg q \rightarrow s)$).
- ⁶First write the argument in tabular form. Cf. Example 2.22. Then construct a deduction as in Exercises 7, 8 and 9. Cf. Examples in lecture-slides.
- ⁷Supplementary Exercises, page 121.
- ⁸There are 3 student-levels: junior, senior and graduate. A physics major is a student that follows the physics programme.
- ⁹See Canvas for some Additional Exercises on this subject.
- ¹⁰Cf. hint on slide 20 of Lecture 4.
- ¹¹ $A \subset B$ is defined as $(A \subseteq B) \wedge A \neq B$, so a direct translation into a quantified statement would be:
 $\forall x[x \in A \rightarrow x \in B] \wedge \neg[\forall x(x \in A \rightarrow x \in B) \wedge \forall x(x \in B \rightarrow x \in A)]$.
- Rewrite this statement using the Laws and Rules on the formulasheets into:
 $\forall x(x \in A \rightarrow x \in B) \wedge \exists x(x \notin A \wedge x \in B)$.
- ¹²Supplementary Exercises, page 189-190.
- ¹³Supplementary Exercises, page 245-246.
- ¹⁴Here the notation $d|n$ means: d is a divisor of n . In other words: there exists a $k \in \mathbb{Z}$ such that $n = kd$. A similar exercise is Exercise 13 of Section 4.3.
- ¹⁶Other useful exercises of this kind are Exercises 10, 12, 13, 14 and 15 of Section 4.2
- ¹⁷See Example 4.20 of Section 4.2 for the definition of the Lucas numbers.
- ¹⁸A similar exercise is Exercise 11 of Section 4.2.
- ¹⁹See Example 4.19 of Section 4.2 for the definition of the Fibonacci numbers.
- ²⁰Similar exercises are Sup. Ex. 1, 5 on page 305-307.
- ²¹A similar exercise is 11.
- ²²A bit harder exercise of this kind is 27.
- ²³Exercise 24 is similar (and easier).
- ²⁴Sup. Ex. 22 on page 306 is a bit more advanced.
- ²⁵Exercise 14 is similar.
- ²⁶Supplementary Exercises, page 305-307.
- ²⁷Exercises 4, 7 and 23 of Section 5.6 are similar.
- ²⁸More advanced exercises of this kind are Supplementary Exercises 21, 30, 31 on page 306-307.
- ²⁹Sup. Ex. 1, 2 on page 378 are a bit more advanced.
- ³⁰Exercises 1, 5 and 8 are similar.
- ³¹Sup. Ex. 3 and 5 on page 378-379 are similar.
- ³²Exercise 2 and Sup. Ex. 6 on page 379 are similar.
- ³³Related are Exercises 4 and 11.

³⁴See also Exercise 5.

³⁵Exercise 21 is similar.

³⁶Exercises 8, 23 and 24 are similar.

³⁷Also see Exercise 12.

³⁸Exercise 30 is similar.

³⁹Exercise 10 and Sup. Ex. 7 on page 379 are similar.

⁴⁰Also see Exercise 5.

⁴¹Exercise Sup. Ex. 8 on page 379 is similar.

⁴²For other equivalence relations see Exercise Sup. Ex. 13 and 17 on page 380-381.

⁴³Exercises 16 and 17 are a bit more advanced.

⁴⁴This test consists of two parts; one concerning the material of Lectures 1 – 6 (duration 1 hr), and one concerning the material of Lectures 7 – 13 (duration 1 hr)

⁴⁵At this resit, one can choose to do the partial test concerning the material of Lectures 1 – 6 (duration 1 hr), or the partial test concerning the material of Lectures 7 – 13 (duration 1 hr), or both (duration 2 hrs).