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Mathematical Methods for Business and Economics (5205-460) Winter 2021/2022

1. Curriculum

The module “**Mathematical Methods for Business and Economics**” (5205-460) replaces the former module “**Mathematics for Business Economics**” (5205-440) and is relevant for students of the following master’s programs:

- Masters in International Business and Economics (compulsory).

2. Course organization

In order to facilitate that the course can be followed remotely, we follow an **Inverted Mastery Classroom Model**. We deliver the course content online via our learning platform (ILIAS). Learning units will be made available at a weekly basis. You are expected (i) to study the online course, (ii) to do the exercises, (iii) to complete the e-Mastery test, and (iv) to post open questions in Forums related to the learning units on ILIAS. The agenda below lists what to do and when.

In additional weekly in-class **Meet-up Sessions** (2 hours per week, can also be followed synchronously via Zoom, hold by Professor Dr. Benjamin Jung), the previous learning unit will be wrapped up (by discussing open questions posted on ILIAS), and the next learning unit will be introduced.

In online **Tutorial Sessions** (2 hours per week, Zoom, hold by Katrin Buchali), the remaining questions posted on ILIAS will be cleared. The first session on Oct. 29, 2021 will be devoted to questions to the **Math Refresher**. The Math Refresher consists of videos and exercises for your self assessment. Please join the Math Refresher on ILIAS as soon as possible (password: MathWS2122#)

https://ilias.uni-hohenheim.de/goto.php?target=crs_1271538&client_id=UHOH

Zoom sessions will **not** be recorded.

There will be a **final exam** (6 EP). The exam is an academic assessment that can be failed. By completing the e-Mastery tests **at a weekly basis**, you can earn up to 10% of the final assessment (**Bonus Points**) in advance. The e-Mastery tests can also be done later, but then no Bonus Points can be earned.

You have to **register for the final exams via the examination office** (“Prüfungsamt”). There will be one exam right after the semester and a second exam later before the summer semester starts.

Regarding possible changes, please **check ILIAS frequently**.

For this semester, you do not need a password to join the ILIAS course:

https://ilias.uni-hohenheim.de/goto.php?target=crs_1266459&client_id=UHOH

3. Agenda (What to do and when)

Date	Time/Room	Type of session	Learning units	Content and Tasks
As soon as possible				Work through the Math Refresher on your own
Monday, Oct. 18, 2021	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	0	Class preliminaries
			1	Introduction to Derivatives and Differentials After the session, (i) study the online course content, (ii) do the exercises, and (iii) complete the e-Mastery test
Monday, Oct. 25, 2021	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	1	Wrapping up Derivatives and Differentials
			2	Introduction to Higher-order and Cross Derivatives After the session, (i) study the online course content, (ii) do the exercises, and (iii) complete the e-Mastery test
Friday, Oct. 29, 2021	4.00 p.m. Zoom	Tutorial		Questions on Math Refresher
Monday, Nov. 1, 2021	Bank Holiday			
Friday, Nov. 5, 2021	4.00 p.m. Zoom	Tutorial		Questions on Learning unit 1
Monday, Nov. 8, 2021	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	2	Wrapping up Higher-order and Cross Derivatives
			3	Introduction to Unconstrained Optimization After the session, (i) study the online course content, (ii) do the exercises, and (iii) complete the e-Mastery test
Friday, Nov. 12, 2021	No session			
Monday, Nov. 15, 2021	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	3	Wrapping up Unconstrained Optimization
			4	Introduction to Unconstrained Optimization – Two Choice Variables After the session, (i) study the online course content, (ii) do the exercises, and (iii) complete the e-Mastery test
Friday, Nov. 19, 2021	4.00 p.m. Zoom	Tutorial		Questions on Learning unit 2
Monday, Nov. 22, 2021	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	4	Wrapping up Unconstrained Optimization – Two Choice Variables
			5	Introduction to Unconstrained Optimization – Three Choice Variables After the session, (i) study the online course content, (ii) do the exercises, and (iii) complete the e-Mastery test
Friday, Nov. 26, 2021	4.00 p.m. Zoom	Tutorial		Questions on Learning unit 3
Monday, Nov. 29, 2021	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	5	Wrapping up Unconstrained Optimization – Three Choice Variables

Date	Time/Room	Type of session	Learning units	Content and Tasks
			6	Introduction to Optimization with Equality Constraints - 2 Variables and 1 Constraint, Part 1 After the session, (i) study the online course content, (ii) do the exercises, and (iii) complete the e-Mastery test
Friday, Dec. 3, 2021	4.00 p.m. Zoom	Tutorial		Questions on Learning unit 4
Monday, Dec. 6, 2021	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	6	Wrapping up Optimization with Equality Constraints - 2 Variables and 1 Constraint, Part 1
			7	Introduction to Optimization with Equality Constraints - 2 Variables and 1 Constraint, Part 2 After the session, (i) study the online course content, (ii) do the exercises, and (iii) complete the e-Mastery test
Friday, Dec. 10, 2021	4.00 p.m. Zoom	Tutorial		Questions on Learning unit 5
Monday, Dec. 13, 2021	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	7	Wrapping up Optimization with Equality Constraints - 2 Variables and 1 Constraint, Part 2
			8	Introduction to Optimization with Non-negativity Restrictions and Inequality Constraints After the session, (i) study the online course content, (ii) do the exercises, and (iii) complete the e-Mastery test
Friday, Dec. 17, 2021	4.00 p.m. Zoom	Tutorial		Questions on Learning unit 6
Monday, Dec. 20, 2021	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	8	Wrapping up Optimization with Non-negativity Restrictions and Inequality Constraints
				MOCK EXAM will be released Work on the MOCK EXAM during the Christmas break
Christmas Break				
Monday, Jan. 10, 2022	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	9	Introduction to Maximum-value Functions and the Envelope Theorem After the session, (i) study the online course content, (ii) do the exercises, and (iii) complete the e-Mastery test
Friday, Jan. 14, 2022	4.00 p.m. Zoom	Tutorial		Questions on Learning unit 7 and 8
Monday, Jan. 17, 2022	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	9	Wrapping up Maximum-value Functions and the Envelope Theorem
			10	Introduction to Duality After the session, (i) study the online course content, (ii) do the exercises, and (iii) complete the e-Mastery test
Friday, Jan. 21, 2022	4.00 p.m. Zoom	Tutorial		Questions on Learning unit 9
Monday, Jan. 24, 2022	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	10	Wrapping up Duality

Date	Time/Room	Type of session	Learning units	Content and Tasks
			11	Introduction to Further Applications of the Envelope Theorem and Duality After the session, (i) study the online course content, (ii) do the exercises, and (iii) complete the e-Mastery test
Friday, Jan. 28, 2022	4.00 p.m. Zoom	Tutorial		Questions on Learning unit 10
Monday, Jan. 31, 2022	10.15– 11.45 a.m. HS 7 + Zoom	Meet up	11	Wrapping up Further Applications of the Envelope Theorem and Duality Discussion of the MOCK EXAM
Friday, Jan. 28, 2022	4.00 p.m. Zoom	Tutorial		Questions on Learning unit 11

4. Office hours

Prof. Dr. Benjamin Jung: Only with appointment (via e-mail)

Timo Walter (M. Sc.): Only with appointment (via-email)

Please take advantage of the possibility to contact us in person directly before or after the sessions.

Please use the “Forum on Organizational Issues” on ILIAS for all general questions about the course organization and the Forums on learning units for all questions related to content.

5. Literature

- Chiang, A.C. and K. Wainwright. (2005). *Fundamental Methods of Mathematical Economics*.
- Simon, Carl P. and L. Blume (2010). *Mathematics for Economists*.