



LUDWIG-  
MAXIMILIANS-  
UNIVERSITÄT  
MÜNCHEN

MUNICH INTERNATIONAL  
SUMMER UNIVERSITY



MUNICH **MISU** <sup>LMU</sup>  
INTERNATIONAL SUMMER  
UNIVERSITY

# Machine Learning and Data Analytics in Finance and Accounting

Summer School  
July 25 - August 12, 2022  
[www.mda-misu.de](http://www.mda-misu.de)



# Objectives

The course “Machine Learning and Data Analytics in Finance and Accounting” takes place one week online and two weeks in-class in Munich.

- **online: July 25 - 29**
- **in-class in Munich: August 3 - 12**

The Munich School of Management at LMU - one of the leading universities for Business Administration in Europe - offers a unique summer program for students from around the world. The course “Machine Learning and Data Analytics in Finance and Accounting” takes place in the heart of Munich.

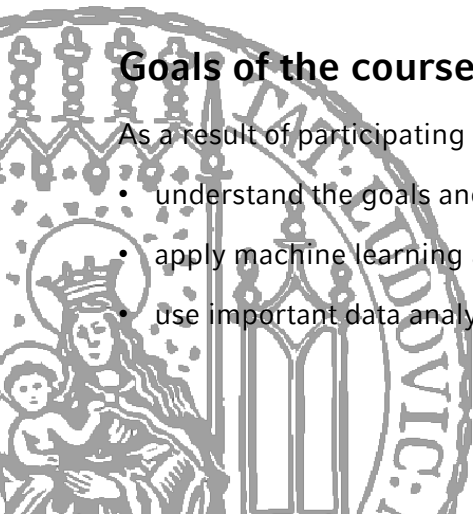


An increasingly complex global business environment requires firms’ to make use of the large amounts of data out there in order to make better decisions. Machine learning allows to “automatically detect patterns in data, and then use the uncovered patterns to predict future data” (K. Murphy, Research Scientist at Google). It is rapidly developing and changing businesses as well as companies’ financial processes. This opens up the possibility of using machine learning approaches to cope with complicated real-world financial problems.

## Goals of the course

As a result of participating in this course, a student is expected to

- understand the goals and capabilities of machine learning,
- apply machine learning approaches to real-world financial problems, and
- use important data analytics methods to evaluate large data sets.



# Content

This course aims at making you familiar with basic machine learning approaches and data analytics techniques by enabling you to use them to your professional benefit. Adopting a user perspective, you will learn to automate simple, but time-consuming tasks such as classification of analysts' conference calls into economically meaningful content.

Additionally, the course enables you to tackle complex prediction tasks using different information sources. For example we will approach loan loss predictions or price and volume forecasts. Finally, the course gives you relevant data analytics skills such as the description, visualization and statistical analysis of such predictions. This is a hands-on class: We will use the programming language Python to apply the above concepts.

All essential programming skills are taught in this course and there are no prior programming skills required.

**The course contains the following building blocks:**

## **1. Introduction**

## **2. Introduction to Python**

- Python Basics for Data Science
- Importing and cleaning data
- Natural language processing

## **3. Machine Learning**

- Unsupervised machine learning (e.g. K-means clustering)
- Supervised machine learning (e.g. SVM, Regression)
- Evaluation of the prediction model

## **4. Data Analytics**

- Data Visualization
- Data description
- Statistical analysis

Please see the schedule in detail on our website  
[http://www.mda-misu.de/en/content/MDA\\_program](http://www.mda-misu.de/en/content/MDA_program)

# Academic Host

Institute for Accounting, Auditing and Analysis at the Munich School of Management at Ludwig-Maximilians-Universität München



## Patronage

Prof. Dr. Thorsten Sellhorn

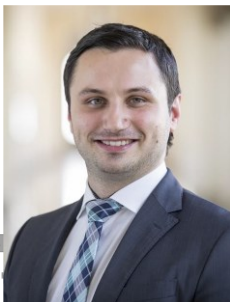
## Lecturer



### Dr. Gereon Hillert

Gereon is a Manager in EY's Valuation, Modelling and Economics practice based in Munich, Germany. Further he is lecturer in the summer schools financial statement analysis and valuation and machine learning and data analytics.

- He studied business administration with majors in Accounting and Finance at Saint Mary's University Halifax, Canada, Goethe University Frankfurt, Universidad Viña del Mar, Chile and University of Bayreuth.
- Gereon is a Manager in EY's Valuation, Modelling and Economics (VME) practice based in Munich, Germany.
- Further, he got practical experience at PwC AG, KPMG and Deutsche Bank AG in the areas of capital markets, M&A, financial due diligence and financial accounting.
- His current research interests include corporate learning and operating leverage decisions as well as disclosure policy choice and topic modelling using machine learning methods.



### Dr. Andreas Woltschläger

Andreas is an Manager in PwC's valuation team based in Hamburg, Germany. Further he is lecturer in the summer schools financial statement analysis and valuation and machine learning and data analytics.

- He studied economics and business administration with majors in Accounting and Finance at the University Paderborn, University of Bayreuth, Ludwig-Maximilians-Universität and University of Lancaster.
- Andreas is an Assistant Manager in KPMG Deal Advisory, Valuation team based in Hamburg, Germany.
- He got practical experience at Commerzbank AG, EY and Wincor Nixdorf AG in the areas of equity research, M&A, financial due diligence, valuation and group accounting.
- His current research interests include financial statement analysis, forecasting using machine learning techniques, business intelligence, corporate learning and valuation.

# Course Requirements

## General course requirements

The Academic Board of the LMU Munich defines the requirements and contact hours\* for successful completion of the courses as follows:

- regular attendance (6 lessons max. absence)
- preparation for and active participation in seminars
- attendance and contribution to lectures
- participation in and contribution to class excursions
- self-study and homework assignments
- written assignments
- presentations

## Literature

Andreas C. Müller, Sarah Guido: Introduction to Machine Learning with Python: A Guide for Data Scientists, 1st Edition

Bird, Steven; Klein, Ewan; Loper, Edward: Natural Language Processing with Python, First edition, 2009

Géron, Aurélien: Hands-On Machine Learning with Scikit-Learn and TensorFlow: Concepts, Tools, and Techniques to Build Intelligent Systems 1st Edition



# Student Profile

## Target group

We offer this program for Bachelor students, Masters students and young scientists as well as to support their successful placement in attractive fields of activity.

There are no prior programming skills required. However, an interest in numbers and logical relationships as well as a basic statistical knowledge are advantageous.

Prerequisites for participation are a good command of written and spoken English. Lectures, presentations and examinations will be held in English. Even though we do not require students to submit language test results, we urge students with poor language skills to abstain from applying. Knowledge of German is not a prerequisite.

## Achievements

Former participants of the MISU Finance, Accounting and Economics programs have evaluated this program very positively and recounted their experience as follows:

- “The course itself was very nice organized and executed. Gereon and Andreas were extremely knowledgeable on the subject matter. They very approachable for expert consultation”
- “Many thanks to our amazing teachers Dr. Gereon Hillert and Dr. Andreas Woltschläger!”
- “The course was an engaging way to understand technical concepts used in the industry I’m interested in and I’m thankful for my wonderful lecturers. It was a pleasure meeting my fellow course mates who hailed from all parts of the world and I enjoyed studying with them and learning from them throughout the program. Spending nearly a month in Munich was a fantastic experience as a whole and I’m glad I received the opportunity to experience German culture. I look forward to my next trip!”



# Credits

Contact Hours\*: 60 contact/class hours\* worth up to 6 ECTS credits

- One contact/class hour comprises 45 minutes.

## Credit Transfer

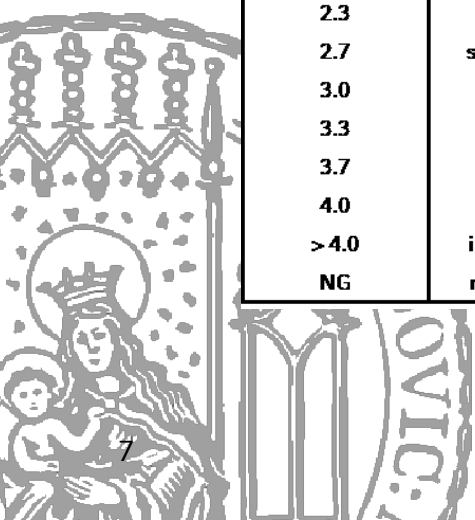
Most international colleges and universities accept credits from the MISU<sup>LMU</sup>. However, each institution has its own policy regarding credit acceptance from other institutions. We strongly recommend that students consult their academic adviser and/or professor to receive credit transfer approval before applying to the MISU Summer Academy. Students who would like to transfer credits to their home universities should print out all documents contact the professor or study abroad adviser and ask for credit and grade approval.

## European Credit Transfer system (ECTS) and ECTS Credits

The ECTS was developed in order to provide common procedures that may guarantee academic recognition for studies abroad. ECTS credits are based on the workload students need in order to achieve expected learning outcomes. The ECTS (European Credit Transfer and Accumulation System) is a standard for comparing the academic level and performance of students in Higher Education across the European Union.

Students will be awarded 1 ECTS credit for 30 hours of work, including attending classes, self-study, examinations and essays. The following chart provides grading information:

LMU Grade	Description	Grade ECTS	US	US	Percentage
1.0	excellent	A	A+	4,0	100 – 97
1.0	very good	A	A	3,9	96 – 93
1,3	very good	A	A-	3,7	92 – 90
1.7	good	B	B+	3,5	89 – 87
2.0		B	B	3,3	86 – 83
2.3		B	B-	3,0	82 – 80
2.7	satisfactory	C	C+	2,7	79 – 77
3.0		C	C	2,3	76 – 73
3.3		D	C-	2,0	72 – 70
3.7	sufficient	E	D+	1,3	69 – 67
4.0		E	D	1,0	66 – 60
>4.0	insufficient	F	E	0,0	59 – 0
NG	not graded	F		0,0	0





# Grading

## Grading Scale

- Grades are defined from the Academic Board of the LMU in Munich according to its general grading system. The LMU differentiates 6 levels (from 1 to 6), which cover everything from introductory course work to original research. This course is offered for students having successfully completed levels 2 and 3.
- 1,00 – 1,50 = very good (sehr gut)
- 1,51 – 2,50 = good (gut)
- 2,51 – 3,50 = satisfactory (befriedigend)
- 3,51 – 4,00 = sufficient (ausreichend)
- 4,00 deficient (mangelhaft)
- Passing grades are 1,00 to 4,00.

Level	Description
1	Introductory course with intensive supervision; no course prerequisites; generally first year courses
2	Introductory course, independent study techniques included; no specific course prerequisites; generally second year courses
3	For advanced students, course prerequisites: successful completion of level 1 or 2; examinations test the students' ability to apply knowledge and insights to new problems; generally third year courses
4	Specialized course, course prerequisites: successful completion of level 2 or 3; extensive use of scientific articles; examination may include a small research project, an oral report or written work. This is a third year Bachelor's or first year Master's level course
5	Scientifically oriented course; course prerequisites: successful completion of level 3 or 4; use of scientific advanced literature. This is a Master's level course
6	Very advanced scientific course; latest scientific developments included; examinations consist of a contribution to an unsolved problem with an oral presentation; Master's or PhD level course

## Grading Procedure

There are three grading sections in this course:

60% = Written Exam

30% = Oral presentation, homework assignments

10% = Active participation in class and soft skills

## Transcripts

Every student will receive an official transcript after the successful completion of all program requirements. The transcript will show the course name and contact hours, the number of acquired credits as well as the achieved grades.



# Fees & Payment

The course takes place one week online and two weeks in-class in Munich.

- online: July 25 - 29
- in-class in Munich: August 3 - 12

**Early bird registration fee:** € 150.00 (until March 1, 2022)

**Regular registration fee:** € 300.00

**Tuition:** € 950.00

**Housing fee:** € 450.00 (single room, August 2 - 13)

## The complete payment includes the following:

- academic program (60 contact hours in class, 6 ECTS credits)
- course reading materials
- excursions: City Tour Munich, City of Nürnberg (participation at your own risk)
- student residence (single apartment with own bathroom and kitchen)
- mensa and cafeteria access
- internet access at the dorm (LAN)
- internet access at the university (WiFi)
- library access
- tutors and emergency contact

## Deadlines for payment

- **Early bird registration fee and tuition payment deadline:** immediately after receiving the e-mail with the admission letter (PDF), March 10, 2022 at the very latest.
- **Regular registration fee and tuition payment deadline:** immediately after receiving the e-mail with the admission letter (PDF), May 10, 2022 at the very latest.



# Cancellation\*

## **Cancellation before the registration deadline:**

- The registration fee will not be refunded.  
All other deposits will be fully refunded.
- Cancellation after the registration deadline:
- The registration fee will not be refunded.  
If accommodation was booked, the rent will not be refunded or have to be paid.

## **Cancellation 4 weeks before commencement of the course:**

- The registration fee will not be refunded.  
If accommodation was booked, the deposit for the rent will not be refunded and 50% of the tuition will not be refunded.

## **Cancellation 3 days before commencement of the course:**

- The registration fee will not be refunded.  
If accommodation was booked, the deposit for the rent will not be refunded and 80% of the tuition will not be refunded.
- Once the course has started, no refund will be granted.

## **Cancellation by MISU**

- All tuition and fees will be refunded.

\* All bank charges are excluded from repayment.



# Accommodation

## Arrival

- August 2, 2022 (Check-in 02:00 p.m. - 7:00 p.m.)

## Departure

- August 13, 2022 (Check-out 10:00 am at the latest)
- can be extended until August 27 without extra payment

## Student Residence

The participants will reside in one of the LMU student residences. The student housing facility is located approximately six subway stations away from the classroom and city center.

### About the rooms:

- Each student will have their own private apartment with their own small kitchen and bathroom (WC + shower).
- The rooms are equipped with bedding (sheets and blankets) which can be washed at one of the laundry rooms in the building.
- Kitchen utensils (cutlery, cups, plate and pots) will **not** be provided.
- Towels will also **not** be provided. We ask you to acquire this items according to your own personal needs.
- Internet access is available via Ethernet (LAN) cable. The cable is not provided. Please bring our own.
- Please note that student residences are geared towards student needs and financial means. As such do not expect facilities to meet claims on luxury comfort and on pools.
- Students with health impairment are kindly asked to inform us in the application process.

## Board

During your stay, you will be responsible to provide your own meals. You should count on spending approximately 15,00 € per day on food. During the week lunch can be purchased at one of the university's canteens for 3,00 - 7,00 €.



# Registration

The selection of participants will be done continuously. The registration takes place on the 'first come, first serve'- principle, given that the application meets the requirements of the program.

In the interest of maintaining the program's high standards, the number of participants will be limited to 30. The application is based on a first come first served basis. The number of students from one university is limited to 4 to ensure an international character of the program.

**The online registration starts on the November 1, 2021.**

[http://www.mda-misu.de/en/content/MDA\\_registration](http://www.mda-misu.de/en/content/MDA_registration)

## **Application materials for the MDA program:**

- Curriculum vitae (CV): you may use the Euro Pass format if you do not have your own form: <http://europass.cedefop.europa.eu>
- Statement of motivation: Applicants should write a short statement of no more than one typed page in English as to why they wish to take part in the summer program.

## **Deadlines for the registration:**

- **Early bird application deadline:** March 1, 2022
- **Regular application deadline:** May 1, 2022



# Contact

## Academic Contact

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## Administration / Application Contact

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