



LUDWIG-  
MAXIMILIANS-  
UNIVERSITÄT  
MÜNCHEN

MUNICH INTERNATIONAL  
SUMMER UNIVERSITY



MUNICH **MISU** LMU  
INTERNATIONAL SUMMER  
UNIVERSITY

# Machine Learning and Data Analytics in Finance and Accounting

MDA

August 3 - 21, 2020

[www.mda-misu.de](http://www.mda-misu.de)



# Objectives

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 that are too complex for humans.

## 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. Finally, the course gives you relevant data analytics skills such as the description, visualization and statistical analysis of such predictions. 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:**

### **Introduction**

#### **Introduction to Python**

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

#### **Machine Learning**

- Unsupervised machine learning (i.e. clustering)
- Supervised machine learning (i.e. classification and regression)
- Evaluation of the prediction model

#### **Data Analytics**

- Data Visualization
- Data description
- Statistical analysis

**Please see our website for a detailed course schedule:**

[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**

Professor at the Institute for Accounting, Auditing and Analysis  
Munich School of Management

## Lecturer



### **Dr. Andreas Woltschläger, M.Sc., MBR**

Former Research and Teaching Assistant and Doctoral Candidate

- Andreas spent a research stay at Lancaster University. He studied economics at the University Paderborn and business administration with majors in Accounting and Finance at the University of Bayreuth. He was further at the University of Lancaster as visiting scholar.
- He got practical experience at Commerzbank AG, EY, KPMG 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, corporate learning and valuation.



### **Dr. Gereon Hillert, M.Sc., MBR**

Former Research Assistant and Doctoral Candidate

- 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 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 around M&A transactions and topic modelling using machine learning methods.

# Course Requirements

## 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.

## Technical prerequisites for program:

- Hardware: Please bring your own laptop.
- Software: We will provide you detailed installation guidelines for Python before the course starts.

## 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

# Credits

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

**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 LMU. 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:

# Grading

## Grading Scale

Grades are defined by the Academic Board according to the general grading system of the LMU. Please note that extra credit is not available for this course.

- 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.

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 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.

# 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 has been running since November 1, 2019.**

[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:** February 1, 2020, 11:59 am CEST (noon)

**Regular application deadline:** July 15, 2020, 11:59 am CEST (noon)

# Fees & Payment

<b>Early bird registration fee:</b>	€ 100.00
<b>Regular registration fee:</b>	€ 300.00
<b>Tuition:</b>	€ 900.00

## **The complete payment includes the following:**

- academic program (60 contact hours online, 6 ECTS credits)
- course reading materials

## **Deadlines for payment**

- **Early bird payment deadline:** immediately after receiving the e-mail with the admission letter (PDF), February 7, 2020 at the very latest.
- **Regular registration fee and tuition payment deadline:** immediately after receiving the e-mail with the admission letter (PDF), April 10, 2020 at the very latest.
- **Please note:** Your place in the program is only secured if you transfer the registration fee or the full amount to our account via money-wire transfer on time. Make sure that your bank will not deduct additional costs for the transfer. All bank fees have to be paid by you. Please ask the bank in your home country for assistance.
- Please include your full name and the abbreviation of the program (MDA) on the money-wire transfer payment. Your name has to be clearly identifiable.

# Fees & Payment

## **Cancellation\*:**

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

The registration fee will not be refunded.

All other deposits will be fully refunded.

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

The registration fee will not be refunded.

50% of the tuition will not be refunded.

### **Cancellation 7 days before commencement of the course:**

The registration fee will not be refunded.

80% of the tuition will not be refunded.

\* All bank charges are excluded from repayment.

# Contact

## Academic Contact

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## Administration / Application Contact

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