

Course FIELD INTERNSHIP I

Basic Information

Duration	144 hours (4 ECTS)
Starting date	September, 1st
Study credits	4 ECTS credits
Language of instruction	English level B1 (European Framework of Reference of Communicative Skills)
Academic requirements	BSc degree in Mathematics, Computer Science or equivalent

Course Description

“Field Internship I” is a scientific and research internship and is a part of your training as a researcher in data science and mathematical modeling: you study scientific literature in these fields and participate in a research project in one of our scientific groups working in data science or mathematical modeling in the [School of Space and Information Technologies](#) or in other schools in Siberian Federal University (SFU), or in the [Institute of Computational Modeling SB RAS \(ICM SB RAS\)](#) (with SFU’s supervisor). This helps you to carry out in the Master Thesis your own research project.

The students who take this course should have basic knowledge of statistics and programming.

Special Features of the Course

Students do “Field Internship I” in the School of Space and Information Technologies as well as in other schools in Siberian Federal University, or in the Institute of Computational Modeling SB RAS (if your supervisor is a staff member simultaneously in SFU and in ICM SB RAS).

Students will be offered internship topics of the internship with assigned supervisors. All topics are related with data science or mathematical modeling. However, students can also suggest their own topic, but a theme of a research project requires approval by the coordinator of master’s specialization. Irrespective of the type of the project, you will always need a supervisor who is an SFU staff member (i.e. an assistant, associate, or full professor).

The internship may consist of (but not limited to):

- implementation of a research project on the subject of a future master's thesis;
- preparation of a scientific publication on a topic related to a master's thesis;
- work on other research tasks in coordination with the supervisor or academic director of the programme.

Course Aim

A goal of the internship is to gain experience in data science or mathematical modeling, in academia or in industry. It also gives you the opportunity to find out about a prospective work environment, and some experience in carrying out a larger individual project as preparation for the Master Thesis.

Course Objectives

The objectives of the course are:

- to give experience in data science or mathematical modeling, in academia or in industry;
- to give students the opportunity to find out about a prospective work environment;
- to give students experience in carrying out a larger individual project as preparation for the Master Thesis.

Learning Outcomes of the Course

At the end of the course, the student will be able:

- to take part in scientific research in data science or mathematical modeling: get acquainted with the subject and state of the art, apply appropriate methods, discuss, contribute to research results, relate the activities to current developments in data science or mathematical modeling;
- to present their activities and research outcomes of the internship;
- to reflect on the development of their research skills and the role of re-search in their future career in data science or mathematical modeling.

Course (module) Structure

Learning Activities	Hours
Self-study Assignments	144
Total study hours	144

Course Outline

Week		Assignments	Hours
1-6	In the first few sessions, SFU scientists tell students about their research so that students can decide on their future research supervisor and research topic.	Students will be offered internship topics of the internship with assigned supervisors by October 5, 2020. Students can also approve their own topic the coordinator of master's specialization.	12
7-9		According to the requirements in SFU students should choose a place, topic and the	12

		supervisor of the internship by November 3, 2020	
10-18		In this period, you should work with your supervisor on the chosen topic. Then you should prepare the report by December 24, 2020.	120

Assessment

Note: Below there is a tentative version of assessments. The final version will appear prior to start of the course.

Assessment Type	Number per semester	Weight
acquired research skills		45%
quality of the research contribution		30%
an internship report	1	25%

Attendance Policy

Students are expected to work with their supervisor regularly. Meanwhile, excuses of various origin are permissible, in such case students take a consultation and do the necessary work at home (or at their own).

Lecturer(s) and Tutors, Contact Information

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Core Reading

1. **Peter Bruce, Andrew Bruce, Peter Gedeck**, Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python // 2e, Paperback ISBN: 149207294X, O'Reilly Media, 26 May 2020, 368 pp. (<https://www.worldcat.org/title/practical-statistics-for-data-scientists-2nd-edition/oclc/1138943866?loc=>)
2. **Marc Peter Deisenroth, A. Aldo Faisal, Cheng Soon Ong**, Mathematics for machine learning // Paperback ISBN: 9781108455145, e-Book ISBN: 9781108569323, Published by Cambridge University Press, April 2020. (<https://mml-book.github.io/>)
3. **Mark Lutz**, Learning Python // 5e, ISBN: 9781449355739, O'Reilly Media, 2003. (<https://www.worldcat.org/title/learning-python-2nd-edition/oclc/1100828380?loc=>)

Additional Reading

4. **EMC Education Services**, Data Science and Big Data Analytics: Discovering, Analyzing, Visualizing and Presenting Data // ISBN-10: 111887613X, ISBN-13: 978-1118876138, John Wiley & Sons, 17 Mar. 2015, 432 pp.
5. **Sarah Guido, Andreas C. Mueller**, Introduction to Machine Learning with Python: A Guide for Data Scientists // 1e, ISBN-10: 1449369413, ISBN-13: 978-1449369415, O'Reilly Media; 25 May 2016, 400 pp.
6. **Wes Mckinney**, Python for Data Analysis // 2e, ISBN-10: 1491957662, ISBN-13: 978-1491957660, O'Reilly Media; 3 Nov. 2017, 522 pp.
7. **Garrett Grolemund, Hadley Wickham**, R for Data Science // 1e, ISBN-10: 1491910399, ISBN-13: 978-1491910399, O'Reilly Media; 25 July 2016, 250 pp.
8. **Seth Stephens-Davidowitz, Steven Pinker**, Everybody Lies: Big Data, New Data, and What the Internet Can Tell Us About Who We Really Are // ISBN 0062390856, ISBN13: 9780062390851, Dey Street Books, 9 May 2017, 338 pp.
9. **Charles Wheelan**, Naked Statistics: Stripping the Dread from Data // 1e, ISBN-10: 9780393347777, ISBN-13: 978-0393347777, W.W. Norton & Company, 13 Jan. 2014, 304 pp.
10. **Viktor Mayer-Schönberger, Kenneth Cukier**, Big Data – A Revolution that Will Transform How We Live, Work, and Think // ISBN-10: 0544227751, ISBN-13: 978-0544227750, Eamon Dolan/Mariner Books, 4 March 2014, 272 pp.