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# **Teaching statement**

## 1. Merits in teaching

I am a passionate and versatile teacher, I work hard to achieve my goals, and I have excellent presentation skills, and years of experience in producing online teaching materials and in teaching development.

I have a broad teaching experience in mathematics. I have the skill to teach university level mathematics courses and to use educational technology in a meaningful way to support the teaching.

On June 4<sup>th</sup>, 2021, I gave a 20-minute-long teaching demonstration during the job application process to a position of university lecturer in University of Eastern Finland, Finland. The teaching demonstration was online through MS Teams. I discussed the concepts of inverse of a complex number and complex conjugate by using a video camera and blackboard, and self-made computer visualizations of the complex plane. I got the feedback that I performed excellently.

I have also experience in guidance. Based on my 2019 postdoctoral period, I am currently a second supervisor to one doctoral student. I have tutored Finnish students thrice and helped the international students of the department in practical matters.

I have taken part in developing the teaching in the Department of Physics and Mathematics in University of Eastern Finland and taken part in improving engineering degree programmes. I have very good readiness to guide students and I have excellent IT skills in e.g. updating websites and solving issues on computers.

# 2. Pedagogical and other training

I completed subject teacher's pedagogical studies in my MSc degree and graduated as a qualified teacher in mathematics and physics on September 20<sup>th</sup>, 2013.

I continue to develop my skills. Currently, I have studied mathematics (325 ECTS), physics (98), pedagogical (60), computer science (31), chemistry (17), law (7) and Japanese (2).

# 3. Experience

#### 3.1 Teaching experience

I have a vast teaching experience in University of Eastern Finland and Aalto University. The lists of courses are in Appendices, in Table 1. But the experience is explained here.

During 2008-2009, I coached first year students in their homework. Unfortunately, there are no documents from this work available.

In 2011-2014, I was a teaching assistant in various courses. Most of the courses were about analysis. Analysis III contained things about integrals and series. In Numerical analysis, we calculated things via Matlab. The course I have taught the most, is Introduction to Fourier-analysis. I have taught the exercises 3 times and the whole course once – I began this journey in 2012 and taught the exercises again in 2022. However, the first lectures I ever taught were in Introduction to topology 4 ECTS. My doctoral advisor planned the thing very well. In 2014, I taught the exercises of the course. Then in 2015, I was well prepared to teach the lectures. I re-taught the lectures in 2016.

Later, I have taught various courses from first year courses to doctoral level courses.

During the academic year 2022-2023, I am holding two simultaneous full-time university teacher positions, one in University of Eastern Finland (6/2022-6/2023) and one in Aalto University (10/2022-8/2023).

## 3.2 Experience in developing online courses

I have worked as a university teacher in the Department of Physics and Mathematics, University of Eastern Finland, Finland, in the following projects developing online course materials:

- Multidisciplinary university level thematic entity of linear analysis state subsidy (Ministry of Education and Culture of Finland), 2021-2022. The university teacher position started June 1st 2021 and ended May 31st 2022. In this multidisciplinary project I prepared the reorganization of the mathematics courses Linear algebra a and b and the physics course Basics in numerical calculations to online format.
- University of Eastern Finland Continous learning separate funding, 2019-2020. The university teacher position started 1.8.2019 and ended 31.7.2020. In this collaborative project of Department of Physics and Mathematics (Joensuu, Finland) and Department of Applied Physics (Kuopio, Finland), I prepared online materials for the courses Integral calculus and Basics in mathematics.

My responsibilities contained writing mathematical text to Digicampus Moodle platform by using HTML language and MathJax library which allows the usage of LaTeX code. I prepared static and dynamic images via TikZ package and JSXGraph Javascript library. In addition, I made versatile teaching videos by using an iPad and a computer. In these videos, I used my self-made slide presentations and Matlab visualizations. For the Moodle courses, I prepared automatic evaluation Moodle quizzes, randomized STACK quizzes and CodeRunner programming quizzes.

# 4. Societal impact

I participate in scientific publishing by being an editor in journals. Currently, I am the editor-in-chief of Metodologia, a peer-reviewed journal in methodology. Previously, I was the editor-in-chief of UEFDSA newspaper during 2019-2021.

To increase the societal impact of my work, I make it public and release it with a free license. My JSXGraph visualizations are available online at <a href="http://integraali.com/jsxgraph/jsxgraphindex.php">http://integraali.com/jsxgraph/jsxgraphindex.php</a> and obtain requests such as

"Can I utilize these JSXGraph-made dynamic pictures and other visualizations from integraali.com/umd2021 when I create assignments which are related to my master's thesis research?"

- M.L. December 31, 2021

"We were really impressed the 3D solution you presented during the JSXGraph conference 2021 and would like to know if we could use it in..." - E. November 26, 2021

To coach graduate students and doctors in job searching, I make my job searching documents public at <u>http://integraali.com/tyonhaku/tyonhaku.php</u> and obtain feedback such as

"Wow this is a great resource Juha... Thank you for sharing... It is most useful for me at the moment!"

– Dr. R.R. April 14, 2023

## 5. Plan how to develop

I will continue to teach various mathematics courses in the university. I desire to teach new topics such as functional analysis, differential geometry, theory of probability, and data-analysis.

Developing engineering programmes during the academic year 2022-2023, has increased my interest to teach physics at university level.

I will continue to produce JSXGraph visualizations. I will also slowly learn Three.js, which allows to use the GPU to make dynamical visualizations in the browser.

I will deepen my networking in teaching related networks such as MAOL, and NUME.

I plan to establish a new journal which is an easy publication format for early-stage researchers.

#### Appendices

#### Table 1. Teaching experience

a. Bachelor's level courses

Year	Name of the course	University	No of enrolled	My role in the course	Status of the course
			students		
2023	Linear algebra b	UEF	20	teaching	compulsory, 4 ECTS
				assistant	
2023	Differential and	Aalto University	60?	responsible	compulsory, 5 ECTS
	integral calculus			teacher	
2023	Differential and	Aalto University	15	responsible	compulsory, 5 ECTS
	integral calculus			teacher	
2022	Differential and	Aalto University	259	responsible	compulsory, 5 ECTS
	integral calculus			teacher	
2021	Differential calculus in	UEF	54	responsible	compulsory, 9 ECTS
	several variables			teacher	
2020	Introduction to	UEF	60	teaching	compulsory, 4 ECTS
	analysis			assistant	
2020	Introduction to	UEF	60	teaching	compulsory, 4 ECTS
	mathematics			assistant	
2019	Euclidean geometry	UEF	40	responsible	optional, 4 ECTS
				teacher	
2019	Algebra a	UEF	50	responsible	compulsory, 4 ECTS
				teacher	
2015?	Complex analysis a	UEF	50	teaching	compulsory, 4 ECTS
				assistant	
2013?	Analysis III	UEF	40	teaching	compulsory, 8 ECTS
				assistant	

#### b. Master's level courses

Year	Name of the course	University	No of enrolled students	My role in the course	Status of the course
2022	Introduction to	UEF, Oulu	26	teaching	optional, 9 ECTS
	Fourier analysis			assistant	
2020	Introduction to	UEF	19	responsible	optional, 9 ECTS
	Fourier analysis			teacher	
2014,	Introduction to	UEF	15, 15	teaching	optional, 9 ECTS
2012	Fourier analysis			assistant	
2015,	Introduction to	UEF	15, 15	responsible	optional, 4 ECTS
2014	topology			teacher	
2013	Introduction to	UEF	15	teaching	optional, 4 ECTS
	topology			assistant	
2012	Numerical analysis	UEF	10	teaching	optional, 8 ECTS
				assistant	

## c. Doctoral level courses

Year	Name of the course	University	No of enrolled students	My role in the course	Status of the course
2023	Measure and integration theory b	UEF	4	teaching assistant	optional, 4 ECTS
2019	Seminar on K. Yamanoi's paper: Zeros of higher derivatives of meromorphic functions in the complex plane	UEF	8	co-teacher	optional
2019	Measure and integration theory a	UEF	15	responsible teacher	optional, 4 ECTS
2020	Topology	UEF		teaching assistant	8 ECTS

# Table 2. Supervision experience

Name of the	University	Title of the thesis	My role	Status of the thesis		
student						
Bachelor theses						
Master's theses						
Doctoral theses						
Lasse Asikainen	UEF	Nevanlinna theory	co-supervisor	20% done		
		for difference				
		operators?				