

BERKE ÜNAL

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Education

2021 – Present B.Sc. at **Koç University**, Istanbul (GPA: 4.00/4.00 | Class Rank: 1 | Full Scholarship)

- Programs:
 - Pure Mathematics (graduated in June 2025)
 - Electrical and Electronics Engineering (expected graduation: June 2026)
 - Minor in Physics (expected graduation: June 2026)
- I graduated as 1st in my faculty and 2nd in the university.

Teaching

2025 Spring Koç University | Teaching assistant

- Math532 Graduate Functional Analysis (w/ Prof. Hasan İnci)
- I was responsible for managing the weekly presentations, grading, and serving as session chair

2023 Fall Koç University | Teaching assistant

- Math320 Advanced Linear Algebra (w/ Prof. Hasan İnci)

2022 – Present Raising a child prodigy: Devrim Türkbay (Age: 11)

- I tutor him in the development of his understanding of advanced mathematical concepts
- I give private lessons on various concepts motivated by analysis and linear algebra

Talks & Presentations

2025 Fall Koç University | **Graduate Math Seminars**

- I am currently giving a lecture series on representation theory of C^* -algebras.

2025 Summer Wuppertal | **ISem28 Final Workshop**

- I gave a talk on adjunctions in the category of $Z[G]$ -modules.

2025 Spring Koç University | **Collage of Sciences Posters**

- Presented a poster titled “Gelfand Transform and Continuous Functional Calculus”

2024 Fall Koç University | **Undergrad Research Day in Math**

- I gave a talk titled “Operator Valued Integrals and Holomorphic Functional Calculus”

2023 Fall Koç University | **Science Day Talks**

- I gave a seminar series on functional analysis, Hilbert spaces, and the mathematical foundations of electrical engineering and quantum mechanics to a general audience

Organizations & Leadership

2024 – Present Koç University | **Mathematics Department Representative**, Student Council

- I prepare biweekly reports on student needs and expectations
- I conduct meetings with relevant university departments to address and resolve issues

2023 – Present Koç University | Founder and president of **Koç University Blood Donation Platform**

- The platform motivated people for blood donation and helped more than 40 people to find donors

2023 – 2025 Koç University | Executive Board Member KU Science Club

Independent Studies & Research Projects

- 2024 – 2025 Isem28 Ergodic Structure Theory (University of Bonn & University of Wuppertal)
- There were 3 phases, lecture phase (2024 Fall), project phase (2025 Spring), final workshop (2025 Summer).
 - I was one of the few undergraduates, among the ~300 graduate students.
 - I prepared the official solutions for week 5.
 - I worked on the project group of Noa Bihlmaier (University of Bonn) which focuses on using category theory and homological algebra tools in dynamical systems and ergodic structure theory.
- 2024 Fall The Theory of Operator Algebras: Banach Algebras, C*-Algebras, and von Neumann algebras
- With Prof. Hasan İnci, we followed “Fundamentals of the Theory of Operator Algebras” by Kadison & Ringrose.
 - I have a particular interest in the structural aspects of operator algebras, specifically through the examination of properties in the motivating examples such as $L^1(G)$, $C(X)$, $B(H)$.
- 2023 Spring Spectral Theory of Compact, Self-Adjoint, and Unitary Operators; Banach algebras and their Ultraproducts
- I took a deep dive into the Advanced Functional Analysis with the professors Asgar Jamneshan and Rainer Nagel
 - As a final project, I wrote an analysis of the specific ultraproduct of Banach spaces with their biduals that we came up with, and analyzed the behavior of approximate point spectrum under this ultraproduct.
- 2022 Fall Banach Spaces, Hilbert Spaces, and Infinite Dimensional Spectral Theory
- I studied Functional Analysis extensively with Asgar Jamneshan
 - As a final project, I wrote a self-contained summary of my personal approach to the proof of spectral theorem for bounded linear operators on Banach spaces.

Scholarship and Awards

- 2025 – Present Koç University Presidential Fellowship
- 2022 – Present TEV Outstanding Success Scholarship
- 2022 – Present TOG Bezmen Maths and Science Scholarship
- 2021 – 2025 The Scientific and Technological Research Council of Türkiye (TÜBİTAK), Fundamental Sciences Scholarship (Highest degree)
- 2021 – 2025 Koç University KUDEB Scholarship
- 2021 – 2024 Vehbi Koç Honor Award in 2021, 2022, 2023, and 2024

Summer Camps

- 2025 Summer Erasmus UNIC Summer School on Mathematics – Koc University (with ECTS credit)
- 2024 Summer Erasmus UNIC Summer School on Mathematics – University of Zagreb (with ECTS credit)
- 2023 Summer Summer School on Positive Operator Semigroups – University of Wuppertal
- 2023 Summer 20th International Workshop on Pseudo-Hermitian Hamiltonians in Quantum Physics
- 2022 Summer Measure Theory School (İlgar Eroğlu) – Çakıllarısı Mathematics Village
- 2022 Summer The “Other” Quantum Mechanics (Zafer Gedik) – Village of Sciences

Selected Pre-University Distinctions

- 2019 – 2020 Technology Student Association TEAMS (Tests of Engineering Aptitude, Mathematics, and Science)
- As a team, we solved mathematics and physics problems driven by engineering challenges
 - My team ranked 1st in the countrywide finals and represented Turkey in the grand finals in the US
- 2016 – 2021 TEVİTÖL
- A high school of TEV which only accepts students with exceptional intelligence and collaboration capabilities
 - Graduated as 1st from the program
 - I continue to give courses on mathematics and physics to gifted students in Tevitöl.
- 2013 – 2016 ÜYEP (Education Platform for Gifted Students)
- Ranked 1st among Turkey in the IQ test designed by Anadolu University

Hobbies

- 2021 – Present Writing Detailed Album Reviews
- I am the lead author of technical metal genre in A Certain Taste, a music review website from Scotland
- 2016 – Present Playing the Drums
- I took stage in one of the biggest stages in Istanbul: Dorock XL Venue in 2022
 - I give drum lessons in Koç University
- 2017 – Present Theater Technical Crew Lead
- I directed the team of sound man and light man in more than 20 official theater performances

Internship

- 2024 Summer Beko Global – Central R&D
- I designed and prototyped a robust void fraction sensor to control refrigeration cycles.
 - I worked on solutions of the Maxwell equations in the setting of a double helical capacitor.

References

- Asgar Jamneshan Professor of Mathematics, University of Bonn
- Interests: Functional Analysis, Fourier Analysis, Measure Theory
 - Email: ajamnesh@math.uni-bonn.de
 - Phone: +49 351-463-41211
- Hasan İnci Professor of Mathematics, Koç University, Istanbul
- Interests: Partial Differential Equations, Euler Equations
 - Email: hinci@ku.edu.tr
 - Phone: +90 212-338-1845
- Alper Erdoğan Professor of Electrical Engineering, Koç University, Istanbul
- Interests: Adaptive Signal Processing, Polytopic Matrix Factorization
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Fatih Karabacak ÜYEP Central Administrator, Anadolu University, Eskişehir

- Interests: Head of IQ test development team, Mentoring gifted students
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