BİLKENT UNIVERSITY
ELECTRICAL and ELECTRONICS ENGINEERING
What does an Electrical and Electronics Engineer Do?

• By using system analysis and synthesis methods which are mainly built on mathematics and physics basis, Electrical and Electronics Engineers:
  – determine,
  – solve,
  – develop prototype systems,
  – realize production.

of current problems which can push further the boundaries of technology.
Energy

Smart Grids

Solid-State Lighting

Fuel Cell

Renewable Energy
Health

Bio-sensors

Imaging

Da Vinci Robot Operator

Tele-health
Transportation

Embedded Systems

Hybrid Cars

Smart Transportation Systems
Haberleşme

Telecommunications

Haberleşme

Telecommunications

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Telecommunications

Haberleşme

Telecommunications

Turkish Scientist Signature on 5G Standard

Huawei, which is the leading telecommunication company of China, announced that it developed a new technology for 5G standard based on the discovery of a Turkish scientist named as “Polar Codes”. Polar Code discovery was first presented to the world literature by a paper published by Bilkent University faculty member Prof. Dr. Erdal Arikan in 2009. The discovery deem suitable of two major paper awards by the Institute of Electrical and Electronics Engineers (IEEE) because of the fact that it solved a problem in Shannon Information Theory which was ambiguous for 60 years.

http://www.webtekno.com/sektorel/5g-standartinda-turk-bilim-adami-damgası-h9015.html
Education Degrees

**Bachelor's degree**
- It includes 4 years of fundamental engineering education.
- Students are equipped with abilities to work on production and test applications.

**Master's Degree**
- It is a 2 or 3 years of education and research period after the undergraduate education.
- Students prepare a thesis study in their area of interest.
- They can work on industry including research and development (R&D) applications.

**PhD Degree**
- It is a 4 or 5 years of education after master’s degree and comprehensive research period.
- Students prepare a thesis study in their area of interest which contains scientific contribution at the international level.
- They take part in advanced level of R&D applications and development process of competent products in industry. They conduct advanced level of research studies as an academic member in universities and contribute to the education of creative and equipped young engineers.
Primary Sectors which Employ Electrical and Electronics Engineer

- Telecommunication
- Semi-conductors
  - nanotechnology
- Biomedical
- Defense
- Aerospace
- Automotive and transportation
- Production
- Computer
- Energy and Electric Power
- Education and Research
Department Graduates

- TURKEY 68.44%
- U.S. 20.37%
- GERMANY 1.82%
- SWITZERLAND 0.75%
- UNITED ARAB EMIRATES 0.31%
- SWEDEN 0.67%
- BEIULGIUM 0.22%
- CANADA 0.49%
- U.K. 1.15%
- SWEDEN 0.67%
- UNITED ARAB EMIRATES 0.31%
- OTHER 1.42%
Department Graduates

- Industry: 66%
- Student: 18%
- Academy: 12%
- Other: 4%
Department Graduates

- Engineer: 35%
- Top-Level Manager: 3%
- Manager: 14%
- Student: 18%
- Academy: 12%
- Other: 2%
- Researcher: 8%
- Consultant: 2%
- Industry-Other: 4%
- Co-founder: 2%
- Student: 18%

Bilkent University Electrical and Electronics Engineering

21 November 2017
Situation in Industry in Turkey

Primary EE Engineer Employers:

- Aselsan, Havelsan, Roketsan, TAI
- Türk Telekom, Türkcell, Ericsson, Vodafone
- Karel, Netaş, Alcatel-Lucent
- Siemens, Meteksan, Koç Sistem
- Arçelik, Vestel
- ...

21 November 2017
Bilkent Among Top 50 in THE Asia University Rankings

- Bilkent University has been ranked 46th in the inaugural Times Higher Education Asia University Rankings, and among the top three universities in Turkey on the list. The rankings compile a listing of the top 300 universities in Asia.

- Employing 13 separate performance indicators, The Asia University Rankings judge world-class universities on the continent across all of their core missions such as teaching, research, knowledge transfer and international outlook.
In Bilkent University, there are 11,578 undergraduate students and 1385 graduate students.

Teaching staff consists of approximately 1000 faculty members from 40 different countries.

For the last 5 years, average annual exogenous research project’s budget is more than 32 million US Dollar.

– Major part of the exogenous funds arise from the projects conducted by EEE faculty members.

It has student exchange program agreement with more than 240 universities in the world.
2017-2018 Fall Semester Students

- Undergraduate Program Student Number: 894
  - Freshman year: 180
  - Sophomore year: 182
  - Junior year: 212
  - Senior year: 210
  - Preparatory class: 110

- Graduate Program Student Number: 174
  - Master’s Degree (MS): 97
  - PhD Degree (PhD): 77
Student Profile

- Electrical and Electronics Engineering department is the department which requires the highest grade in Undergraduate Placement Exam in Bilkent University.

- It is a department in which students that have a special curiosity about mathematics and physics are found.
Minor Programs

- Physics, Chemistry, Mathematics, Molecular Biology and Genetics, Economics, International Relations, Psychology, Political Science, American Culture and Literature, Archaeology, Philosophy, English Language and Literature, History, Graphic Design, Communication and Design, Music Performance, Food and Beverage Management, Performing Arts, Software Development

- To be eligible to apply for admission to a minor program, the cumulative GPA (CGPA) of a student has to be 3.0 or greater.

- To qualify for a minor program certificate, a student must complete all courses for the minor program with a C or higher grade and have a minor program CGPA of at least 2.5.

- A minor program certificate is not equivalent to a diploma.

- Note: Student numbers show numbers of the students who are currently enrolled in minor programs.
Exchange Programs (2016-2017)

- **Universities from Asia, USA and Canada**
  - The State University of New York, USA (1 student)
  - University at Buffalo, USA (1 student)
  - University of Massachusetts, Lowell, USA (1 student)
  - Case Western Reserve University, USA (2 students)
  - National University of Singapore, Singapore (6 students)
  - Nanyang Technological University, Singapore (3 students)
  - Korea University, Korea (1 student)
  - Nagoya University, Japan (1 student)
  - City University of Hong Kong, China (1 student)

- **European Universities (Erasmus Program)**
  - TelecomSudParis, France (3 students)
  - Ecole Polytechnique Federale de Lausanne, Switzerland (5 students)
  - AGH University of Science and Technology, Poland (1 student)
  - Friedrich-Alexander-Universitat Erlangen-Nurnberg, Germany (7 students)
  - University of Erlangen, Germany (1 student)
  - Autonomous University of Madrid, Spain (2 students)
  - Autonomous University of Barcelona, Spain (1 student)
  - Aston University, UK (1 student)
  - AGH University of Science and Technology, Poland (1 student)
Industrial Design Projects

• Senior year students form a project team of 5 or 6 person and develop a prototype system with the leading companies in Turkey during two semesters.

Project Team

• Companies provide financial support to the projects and one company employee is charged with keeping track of the project development.

• Faculty members from our department contributes to the development of each project as an academic advisor.

• Students can use the laboratory which contains a personal desk for each student all the time.
Industrial Design Projects

- In three years, 245 student successfully terminated 44 different projects.
- These projects are conducted with 13 different leading companies of Turkey and Europe.
- Our students published 8 national and international paper related with the project outcomes.
- Among 40 project applications, 38 of them deserved to have a TÜBİTAK fund.
- Our students had the chance to exhibit their projects in various fairs and contests.

Companies that Performed Joint Projects with Our Students

- aselsan
- B/S/H/
- FORD
- OTOSAN
- HAVELSAN
- KAREL
- METEKSAN
- NANO
- MAGNETICS
- INSTRUMENTS
- OTONON
- POLARAN LTD
- Fraunhofer
- IIS
- TAI
- roketsan
- arçelik
Industrial Design Projects

Photos from Our Project Fair
 İlker Karakaşoğlu, Class of 2012, has been granted "The International Fulbright Science and Technology Award" for his PhD studies. He is the only recipient of this prestigious award in Turkey.

Fulbright S&T is designed to be the most prestigious international scholarship in science and technology and to demonstrate the United States' commitment to welcoming top-notch future researchers and leaders to pursue serious scientific study and research at U.S. institutions.

Grantees receive three years of funding from ECA followed by support from their U.S. host institution until the completion of Ph.D. programs.*

[*] http://scienceandtech.fulbrightonline.org/index.php
Graduate Student Achievements

- Mert Pilancı
  - BS, Bilkent (2008)
  - MS, Bilkent (2010)
  - PhD, University of California, Berkeley (2016)
  - Faculty member, University of Michigan, Ann Arbor

- Alper Turgut
  - BS, Bilkent (1993)
  - MS, Northeastern University, Boston (1995)
  - MBA, MIT Sloan School of Management (1997)
  - Vercata Inc., CEO
  - Head of Google Cloud Video Engineering, Anvato

Google bought Anvato

Google bought software company Anvato which was found by Alper Turgut in 2007 at Silicon Valley. Anvato continues to its R&D studies as a part of the Google Cloud Platform team.

## Graduate Student Achievements

<table>
<thead>
<tr>
<th>Name</th>
<th>Degree</th>
<th>Year</th>
<th>Position</th>
<th>Company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batuhan Sütbaş</td>
<td>BS</td>
<td>2017</td>
<td>RF Design Engineer</td>
<td>AB MikroNano</td>
</tr>
<tr>
<td>Feride Gözde Özer</td>
<td>BS</td>
<td>2016</td>
<td>Vodafone</td>
<td></td>
</tr>
<tr>
<td>Gökçe Kuralay</td>
<td>MS</td>
<td>2015</td>
<td>System Engineer</td>
<td>Delphi Diesel Systems</td>
</tr>
</tbody>
</table>
## Academic Staff

### Professors

<table>
<thead>
<tr>
<th>Name</th>
<th>Year of Graduation</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>N. AKAR</td>
<td>1994</td>
<td>Bilkent</td>
</tr>
<tr>
<td>A. ALTINTAŞ</td>
<td>1986</td>
<td>Ohio State</td>
</tr>
<tr>
<td>E. ARIKAN</td>
<td>1985</td>
<td>MIT</td>
</tr>
<tr>
<td>O. ARIKAN</td>
<td>1990</td>
<td>UIUC</td>
</tr>
<tr>
<td>A. ATALAR</td>
<td>1978</td>
<td>Stanford</td>
</tr>
<tr>
<td>E. ATALAR</td>
<td>1991</td>
<td>Bilkent</td>
</tr>
<tr>
<td>O. AYTÜR</td>
<td>1991</td>
<td>Northwestern</td>
</tr>
<tr>
<td>B. BARSHAN</td>
<td>1991</td>
<td>Yale</td>
</tr>
<tr>
<td>E. ÇETİN</td>
<td>1987</td>
<td>Univ. Pennsylvania</td>
</tr>
<tr>
<td>H. V. DEMİR</td>
<td>2004</td>
<td>Stanford</td>
</tr>
<tr>
<td>T. M. DUMAN</td>
<td>1998</td>
<td>Northeastern</td>
</tr>
<tr>
<td>V. B. ERTÜRK</td>
<td>2000</td>
<td>Ohio State</td>
</tr>
<tr>
<td>S. GEZİCİ</td>
<td>2006</td>
<td>Princeton</td>
</tr>
<tr>
<td>Y. Z. İDER</td>
<td>1979</td>
<td>Northwestern</td>
</tr>
<tr>
<td>E. KARAŞAN</td>
<td>1995</td>
<td>Rutgers</td>
</tr>
<tr>
<td>H. KÖYMEN</td>
<td>1979</td>
<td>Univ. Birmingham</td>
</tr>
<tr>
<td>Ö. MORGÜL</td>
<td>1989</td>
<td>UC Berkeley</td>
</tr>
<tr>
<td>L. ONURAL</td>
<td>1985</td>
<td>SUNY</td>
</tr>
<tr>
<td>H. ÖZAKTAŞ</td>
<td>1991</td>
<td>Stanford</td>
</tr>
<tr>
<td>E. ÖZBAY</td>
<td>1992</td>
<td>Stanford</td>
</tr>
<tr>
<td>H. ÖZBAY</td>
<td>1989</td>
<td>Univ. Minnesota</td>
</tr>
<tr>
<td>A. B. ÖZGÜLER</td>
<td>1982</td>
<td>Univ. Florida</td>
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### Associate Professors

<table>
<thead>
<tr>
<th>Name</th>
<th>Year of Graduation</th>
<th>Institution</th>
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<tbody>
<tr>
<td>S. S. KOZAT</td>
<td>2004</td>
<td>UIUC</td>
</tr>
<tr>
<td>F. Ö. İLDAY</td>
<td>2003</td>
<td>Cornell</td>
</tr>
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### Assistant Professors

<table>
<thead>
<tr>
<th>Name</th>
<th>Year of Graduation</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>T. ÇUKUR</td>
<td>2009</td>
<td>Stanford</td>
</tr>
<tr>
<td>E. Ü. SARITAŞ</td>
<td>2009</td>
<td>Stanford</td>
</tr>
<tr>
<td>C. TEKİN</td>
<td>2013</td>
<td>Univ. Michigan</td>
</tr>
</tbody>
</table>

### Instructors

<table>
<thead>
<tr>
<th>Name</th>
<th>Year of Graduation</th>
<th>Institution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dr. M. ALPER KUTAY</td>
<td>1999</td>
<td>Bilkent</td>
</tr>
</tbody>
</table>

* Fizik Bölümü ile paylaşımı
Scientific Research Areas

- Biomedical
- Computer networks
- Electromagnetics
- Electronics
- Nanotechnology
- Optics and Photonics
- Robotics
- Signal Processing
- Systems and Control
- Telecommunications
Research Centers

- NANOTAM (Nanotechnology Research Center) (E. Özbay)
- BASTA (Bilkent Acoustics and Underwater Technologies Research Center) (H. Köymen)
- İSYAM (Communications and Spectrum Management Research Center) (A. Altıntaş)
- UMRAM (National Magnetic Resonance Research Center) (E. Atalar)
Academic Awards of Our Faculty Members

2013 IEEE BAKER PRIZE
PAPER AWARD
Erdal Arıkan

IEEE Fellows
Erdal Arıkan
Abdullah Atalar
Enis Çetin
Tolga M. Duman
Levent Gürel (emekli)
Levent Onural
Özay Oral
Haldun Özaktaş

EU Descartes Award
Ekmel Özbay (2005)

TÜBİTAK Science Awards
Ergin Atalar (2006)
Ekmel Özbay (2006)
Haldun Özaktaş (1999)
Abdullah Atalar (1994)
Özay Oral (1985)

TÜBA Members
Abdullah Atalar
Haldun Özaktaş
Ekmel Özbay

ISMRM Fellow
Ergin Atalar (2011)
Academic Awards of Our Faculty Members

IEEE 3. Millennium Medal
Ayhan Altıntaş
Levent Onural
Tolga M. Duman

TÜBİTAK Encouragement Awards
Özay Oral (1978)
Abdullah Atalar (1982)
Erol Sezer (1985)
Bülent Özgüler (1987)
Enis Çetin (1993)
Levent Onural (1995)
Ayhan Altıntaş (1996)
Ömer Morgül (1997)
Ekmel Özbay (1997)
Billur Barshan (1998)
Orhan Aytür (1999)
Orhan Arıkan (2002)
Levent Gürel (2003) (emekli)
H.Volkan Demir (2009)

TÜBA-GBİP Awards
Tolga Çukur (2015)
Emine Ü. Sarıtaş (2015)
Sinan Gezici (2013)
S. Serdar Kozat (2010)

2010 IEEE Information Theory Paper Award
Erdal Arıkan
Our Undergraduate Students and Research

• Some of our students take part in the research projects from the sophomore year in accordance with their interests and abilities.
  – In this year’s Graduate Research Conference (GRC), one of our senior class students won an award in the best poster presentation category.
  – Some of our senior class students are among the authors of national/international papers.

• Apart from a mandatory project course in senior year, another senior project can be performed as an elective course under the supervision of a faculty member.
Last Words

- Electrical and Electronics Engineering is an occupation in which students that are:
  - Creative
  - Interrogator
  - Talented about mathematics and physics can have a very successful career.

- We provide our students with a superior level of education and enable them to carry their abilities to the uppermost level.

- Our graduate students can make successful careers in international level and they can be the source of pride for all of us.