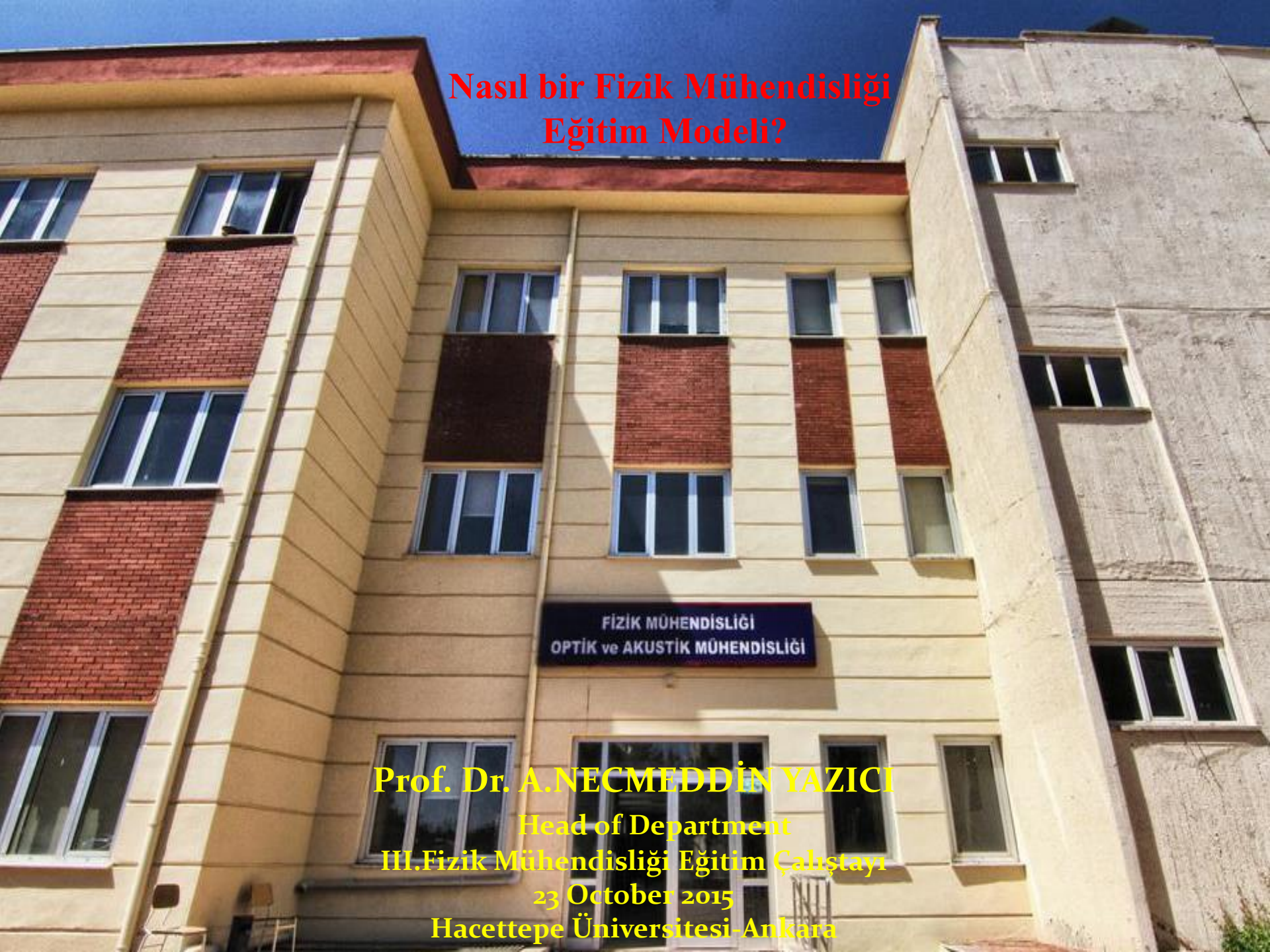
# Nasıl bir Fizik Mühendisliği Eğitim Modeli?

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III.Fizik Mühendisliği Eğitim Çalıştayı
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**Fizik Mühendisleri:** Mikroskopik boyuttan makroskopik boyutta maddenin yapısını, çevresiyle etkileşimini inceleyen, elde ettiği bilgi ve deneyimleri, teknoloji, sanayi ve endüstri alanlarında kullanılabilen, uygulayabilen, çözümler üretebilen ve teknolojik düzeyde AR-GE projeleri üretebilen uzman kişilerdir.»

**Sorular:**

1. Başta temel bilimler olmak üzere son 7-8 yıldır fizik mühendisliği bölümlerimize karşı da öğrencilerin ilgisinin azalmakta olduğu, zeki, çalışkan ve başarılı öğrencilerin bu alandan gittikçe uzaklaştıkları görülmektedir. Ülkemizde fizik mühendisliği bölümlerinin yeterince tercih edilmemesinin nedenleri neler olabilir? Bu anlamda Fizik Mühendisliğinin sadece kamuoyunda yeterince tanınmaması veya bu bölümlerimizde ülke gerçeklerinde yeterince mühendislik eğitimi verilmediği için bitirenlerin iş bulamaması gibi değişik nedenler olabilir mi?

2. Fizik mühendisliği bölümlerinden mezun olan öğrencilerin yukarıdaki tanıma uygun yeterli bir mühendislik eğitimi aldığına inanıyor muyuz? İnanmıyorsak fizik mühendisliği eğitiminde daha çok hangi lisans ders ve laboratuvarlarına ağırlık verilmelidir?

3. Halen ülkemizde mühendislerinin en çok iş buldukları alan hangisidir? Ar-Ge? Ür-Ge!? Fizik mühendisliği bölümü mezunlarının ülkemizde halen ve gelecekte bu alanlardan hangisinde daha rahat iş bulabileceğine inanıyoruz? Bu alanlardan hangisinde iş istihdamı daha fazla? Buna göre fizik mühendisliği bölümlerindeki eğitim modelini Ar-Ge mühendisimi veya Ür-Ge mühendisimi yetiştirecek şekilde kurgulamalıyız?

**Sorular:**

4. Ülke gerçeklerini düşünerek seçilecek istihdam alanına göre (Ar-Ge veya Ür-Ge) lisans seviyesinde tekrar fizik mühendisliği eğitimi verilecekse bu fiziğin hangi uygulama alanlarında olmalı?
   - Optics, Photonics, Illumination
   - Acoustics and Vibration
   - Medical Physics , Medical Instruments
   - Renewable and Nuclear energy
   - Optoelectronic physics and devices
   - Nano-system , Novel materials
   - Optical Communication technology
   - Computational Methods and Software development
   - …

5. Ülkemizde fizik mühendisliği eğitimi ve kurgusu ile fizik lisans eğitimi ve kurgusu arasında ne gibi farklar var? Fizik ve Fizik mühendisliği ayırımı gerçekçimi? Fark olması gerekiyorsa ne gibi ve hangi konularda olmalı? Fizik mühendisliği bölümlerinin eğitiminin fizik bölümlerinden farklı olması gerekiyorsa bunun yapılandırması nasıl olmalıdır?

**Sorular:**

6. Fizik mühendisliği bölümlerinde mühendislik türü yeni bir eğitim modeline geçilecekse halen fizik mühendisliği bölümlerindeki anabilim dalları ile fizik bölümlerindeki anabilim dallarının birebir aynı olması fizik mühendisliği bölümü eğitimlerinde ne kadar sağlıklı ve gerçekçi?

7. Bölüm türü bir eğitim modelinden fakülte ve/veya enstitü türü bir eğitim modeline geçmek gereklimidir?
   - Fizik Fakültesi
     - Fizik Bölümü
     - Fizik Mühendisliği Bölümü
     - Optik Mühendisliği Bölümü
     - Sağlık Fiziği Mühendisliği Bölümü
     - …

# DEPARTMENT of PHYSICS ENGINEERING
# UNDERGRADUATE CURRICULUM

| FIRST YEAR | | | |
|---|---|---|---|
| **First Semester** | | | |
| **Course Code** | Course Name | Credit | ECTS |
| **EP 111** | Mechanics | (3-0)3 | 4 |
| **EP143** | Heat | (2-0)2 | 3 |
| **EP135** | General Physics Lab 1 | (0-2)1 | 1 |
| **EP145** | Introduction to Engineering | (2-0)2 | 2 |
| **MATH151** | Calculus I | (4-0)4 | 5 |
| **FE103** | General Chemistry | (4-0)4 | 5 |
| **LENG101** | Freshman English-I | (4-0)4 | 5 |
| **EP112** | Engineering and Ethics* | (2-0)2 | 2 |
| **TURK101** | Turkish* | (2-0)2 | 2 |
| **TDP101** | Toplumsal Duyarlılık Projesi* | (1-0)1 | 1 |
| | Semester Total Credit | 20+5 | 30 |

| FIRST YEAR | | | |
|---|---|---|---|
| **Second Semester** | | | |
| **Course Code** | Course Name | Credit | ECTS |
| **EP118** | Optics and Acoustics | (3-0)3 | 3 |
| **EP124** | Electricity and Magnetism | (3-0)3 | 4 |
| **EP136** | General Physics Lab 2 | (0-2)1 | 1 |
| **EP122** | Measurement Techniques and Calibration | (2-0)2 | 3 |
| **ME101** | Engineering Graphics | (2-2)3 | 4 |
| **MATH152** | Calculus II | (4-0)4 | 5 |
| **LENG102** | Freshman English II | (4-0)4 | 5 |
| **TURK102** | Turkish* | (2-0)2 | 2 |
| **TDP102** | Toplumsal Duyarlılık Projesi* | (1-2)2 | 2 |
| *** | Common Elective* | (1-0)1 | 1 |
| | Semester Total Credit | 20+5 | 30 |

| SECOND YEAR | | | |
|---|---|---|---|
| **Third Semester** | | | |
| **Course Code** | Course Name | Credit | ECTS |
| **EP201** | Modern Physics | (3-0)3 | 5 |
| **EP215** | Circuit Analysis | (3-0)3 | 5 |
| **EP219** | Mathematics for Engineers and Physicists-I | (3-0)3 | 4 |
| **EP241** | Computer Programming | (3-2)4 | 5 |
| **EP235** | Physics Lab 1 | (0-2)1 | 1 |
| **ENG*** ** | Non-Technical Elective 1 | (2-0)2 | 3 |
| **EP*** ** | Technical Elective 1 | (3-0)3 | 5 |
| **HIST201** | Atatürk's Principles and the History of the Turkish Renovation* | (2-0)2 | 2 |
| | Semester Total Credit | 19+2 | 30 |

| SECOND YEAR | | | |
|---|---|---|---|
| **Fourth Semester** | | | |
| **Course Code** | Course Name | Credit | ECTS |
| **EP208** | Computational Methods in Physics | (3-2)4 | 5 |
| **EP220** | Mathematics for Engineers and Physicists-II | (3-0)3 | 4 |
| **EP222** | Material Science | (3-0)3 | 5 |
| **EP226** | Electronics | (3-0)3 | 5 |
| **EP236** | Physics Lab 2 | (0-2)1 | 1 |
| **ENG*** ** | Non-Technical Elective 2 | (2-0)2 | 3 |
| **EP*** ** | Technical Elective 2 | (3-0)3 | 5 |
| **HIST202** | Atatürk's Principles and the History of the Turkish Renovation* | (2-0)2 | 2 |
| | Semester Total Credit | 19+2 | 30 |

| THIRD YEAR | | | |
|---|---|---|---|
| **Fifth Semester** | | | |
| **Course Code** | Course Name | Credit | ECTS |
| **EP331** | Electromagnetic Theory I | (3-0)3 | 5 |
| **EP341** | Quantum Physics | (3-0)3 | 4 |
| **EP335** | Physics Lab 3 | (0-2)1 | 1 |
| **EP*** ** | Technical Elective 1 | (3-0)3 | 5 |
| **EP*** ** | Technical Elective 2 | (3-0)3 | 5 |
| **EP*** ** | Technical Elective 3 | (3-0)3 | 5 |
| **EP*** ** | Technical Elective 4 | (3-0)3 | 5 |
| | Semester Total Credit | 19+0 | 30 |

| THIRD YEAR | | | |
|---|---|---|---|
| **Sixth Semster** | | | |
| **Course Code** | Course Name | Credit | ECTS |
| **EP346** | Nuclear Physics I | (3-0)3 | 4 |
| **EP364** | Solid State Physics I | (3-0)3 | 4 |
| **EP336** | Engineering Physics Lab 1 | (0-2)1 | 1 |
| **EP*** ** | Technical Elective 5 | (3-0)3 | 5 |
| **EP*** ** | Technical Elective 6 | (3-0)3 | 5 |
| **EP*** ** | Technical Elective 7 | (3-0)3 | 5 |
| **EP*** ** | Technical Elective 8 | (3-0)3 | 5 |
| **INF398** | Etkinliklere Katılım* | (2-2)4 | 1 |
| | Semester Total Credit | 19+4 | 30 |

| FOURTH YEAR | | | |
|---|---|---|---|
| **Seventh Semester** | | | |
| **Course Code** | Course Name | Credit | ECTS |
| **EP499** | Graduation Project | (2-0)2 | 2 |
| **EP435** | Engineering Physics Lab 2 | (0-2)1 | 1 |
| **EP***** | Technical Elective 1 | (3-0)3 | 5 |
| **EP***** | Technical Elective 2 | (3-0)3 | 5 |
| **EP***** | Technical Elective 3 | (3-0)3 | 5 |
| **EP***** | Technical Elective 4 | (3-0)3 | 5 |
| **EP***** | Technical Elective 5 | (3-0)3 | 5 |
| **EP399** | Summer Practice* | (1-0)1 | 2 |
| | Dönem Ders Yükü Kredisi | 18+1 | 30 |

| FOURTH YEAR | | | |
|---|---|---|---|
| **Eight Semester** | | | |
| **Course Code** | Course Name | Credit | ECTS |
| **EP400** | Engineering Orientation | (4-0)4 | 30 |
| | Semester Total Credit | 4+0 | 30 |

# TEŞEKKÜRLER

## What is Engineering?

- **Engineering** is the discipline, art, skill and profession of acquiring and applying scientific, mathematical, economic, social, and practical knowledge, in order to design and build structures, machines, devices, systems, materials and processes.

## What is Engineering Physics?

- The **engineering physics** is augmented with a selection of engineering course options that prepare the student to tackle the complex problems faced by society.
- The program is recommended for students interested in newly developing areas of physics, high technology, instrumentation and communications.
- For example, the study of Engineering Physics emphasizes the application of basic scientific principles to the design of equipment, which includes electronic and electro-mechanical systems for use in measurements, communications, data acquisition and etc.
- Engineering physics is respected academic degrees awarded in many countries.
- In some countries, it would be translated as "technical physics" or “applied physics”.
- Engineering physics is a branch of applied science that emphasizes both engineering and physics.
- Engineering physics is the study of the combined disciplines of physics and engineering in order to develop an understanding of the interrelationships of these two disciplines.
- The Engineering Physics major allows students with strong interests in both physics and engineering to concentrate their studies in the common areas of these disciplines.

## What is Engineering Physics?

- The Engineering Physics major prepares students to pursue careers in industry, either directly after undergraduate study or following graduate study.
- Engineering Physics is a link between basic science and the traditional branches of engineering, utilizing concepts which are critical in today's rapidly changing engineering environment.
- The mission of the Engineering Physics program is to prepare students for careers in the engineering field where physics principles can be applied to the development of technology.
- The Engineering Physics program will develop sufficient depth in both engineering and physics skills to produce engineers who can relate fundamental physics to practical engineering problems.
- This education at the intersection of engineering and physics will enable students to seek employment in engineering upon graduation.
- At the same time, this education provides a firm foundation for the pursuit of graduate studies in either engineering or physics.
- The program will provide a curriculum and environment to develop interdisciplinary collaboration.
- The engineering physics curriculum is designed to fulfill the educational requirements for professional work in various fields of applied science which are based upon a thorough knowledge of physics and foundation of basic scientific principles, as well as the theoretical knowledge and skills required for specific engineering applications.

## About the Program

- In order to realize this mission, the Engineering Physics Program will pursue the following objectives:
  - The Engineering Physics students will have a deep knowledge of physics equal to that of students in the B.S. Physics program.
  - This will provide students with the tools to address new engineering problems and contribute to emerging technology.
  - The Engineering Physics students will have a strong grounding in engineering design, science, practice and the application of physics to engineering.
  - The Engineering Physics students will have extensive experience with laboratory methods, instrumentation, materials, and data analysis.
  - The engineering physics students will have strong communication skills, work well in teams, and be knowledgeable in ethical and societal issues important for practicing engineers and scientists.

## What do Engineering Physicists do?

- Engineering physicists find employment in a huge variety of areas.
- Engineering Physics students develop a thorough understanding of fundamentals of physics and the application of this knowledge to practical problems.
- Because the program emphasizes science and mathematics, students are well-prepared to pursue graduate studies in physics or engineering.
- This background prepares them for careers in engineering, applied science or applied physics with positions in industry, national research laboratories, and universities or even as scientific entrepreneurs.
- Engineering physicists work in advanced and emerging technology areas.
- They integrate new discoveries in physics and science into the manufacturing and technology sectors.
- Engineering physicists work in newly developing areas of physics, high technology, instrumentation and communications.