Both Electrical Engineering and Computer Engineering students must choose a primary technical core (includes 8 courses) and a secondary technical core (includes 4 courses). Electrical Engineering students must choose their primary technical core from the Electrical Engineering technical cores listed below; Computer Engineering students must choose theirs from the Computer Engineering technical cores. For the secondary technical core, students may choose any technical core, including Academic Enrichment.

**IMPORTANT NOTES:**
- Courses in brackets [ ] denote general prerequisite requirements, which are subject to change.
- Registrar’s online course schedule contains the most accurate course topics and pre-requisites.
- UT course syllabi are available at [https://utdirect.utexas.edu/apps/student/coursedocs/nlogon/](https://utdirect.utexas.edu/apps/student/coursedocs/nlogon/)
- Consult the department offering a course if you have any questions about pre-requisite requirements.
- You must complete at least 48 credit hours of engineering topics for your degree. Required courses (EE 302, 306, 411, 312, 313, 319K, 333T, 351K, 364, 464) yield 25 credit hours of engineering topics, 4 in math & basic sciences and 3 in other. Math courses count as math & basic sciences. See the Technical Core ABET advising sheet.
- All primary technical core courses and electives must be engineering courses with the exception of the advanced math course listed for the primary technical core.

## ELECTRICAL ENGINEERING TECHNICAL CORES

### COMMUNICATION, SIGNAL PROCESSING, NETWORKS AND SYSTEMS

This technical core considers communication systems, system and signal analysis, networking theory and protocols, and control and optimization theory. Applications include wireless communications; speech, audio, image and video processing; and feedback control and robotics.

**Required:**

<table>
<thead>
<tr>
<th>Advanced Math</th>
<th>Core</th>
<th>Core</th>
<th>Core Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 427L Adv Calculus for Applications II Pre-requisite: M 408D, 408L or 408S</td>
<td><strong>OR</strong> EE 325 Electromagnetic Engineering Pre-requisites: EE 411; M 427K or 427R; PHY 303N and 103L Co-requisite: M 427L</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Students must pick 4 additional electives from the following Technical Core courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
<th>Prerequisites</th>
</tr>
</thead>
<tbody>
<tr>
<td>EE 325</td>
<td>Electromagnetic Engineering [EE 411; M 427] or 427K; PHY 303N and 103L; co-requisite: M427L</td>
<td></td>
</tr>
<tr>
<td>EE 325K</td>
<td>Antennas and Wireless Propagation [EE 325]</td>
<td></td>
</tr>
<tr>
<td>EE 445S</td>
<td>Real-Time Digital Signal Processing Laboratory [EE 312, 313 and 319K; co-requisites: EE 333T and 351K]</td>
<td></td>
</tr>
<tr>
<td>EE 351M</td>
<td>Digital Signal Processing [EE 313; co-requisite: EE 351K]</td>
<td></td>
</tr>
<tr>
<td>EE 360C</td>
<td>Algorithms [EE 312 and M 325K]</td>
<td></td>
</tr>
<tr>
<td>EE 360K</td>
<td>Introduction to Digital Communications [EE 351K]</td>
<td></td>
</tr>
<tr>
<td>EE 361M/461P</td>
<td>Introduction to Data Mining/Data Science Principles [EE 351K and 360C, M 340L]</td>
<td></td>
</tr>
<tr>
<td>EE 362K</td>
<td>Introduction to Automatic Control [EE 313 and M 340L]</td>
<td></td>
</tr>
<tr>
<td>EE 363M</td>
<td>Microwave and Radio Frequency Engineering [EE 325]</td>
<td></td>
</tr>
<tr>
<td>EE 471C</td>
<td>Wireless Communications Laboratory [EE 445S, 351M or 360K; co-requisite: EE 333T]</td>
<td></td>
</tr>
<tr>
<td>EE 371R</td>
<td>Digital Image and Video Processing [EE 351K]</td>
<td></td>
</tr>
<tr>
<td>EE 379K/479K</td>
<td>Data Science Laboratory [EE 351K and 360C, M 340L]</td>
<td></td>
</tr>
</tbody>
</table>

See the Technical Core ABET advising sheet for allocation of engineering versus math & basic science topics. All primary technical core courses and electives must be engineering courses with the exception of the advanced math course.
ELECTRONICS AND INTEGRATED CIRCUITS
This core trains students for careers involving design of electronics and integrated circuits including analog and digital integrated circuits, radio frequency circuits, power electronics, and biomedical electronics. The additional elective is only required for those picking this technical core as primary.

Required:

<table>
<thead>
<tr>
<th>Advanced Math</th>
<th>Core</th>
<th>Core</th>
<th>Core Lab</th>
<th>Additional Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-requisite: M 408D, 408L or 408S</td>
<td>Pre-requisites: EE 411; M 427 or 427K; PHY 303N and 103L</td>
<td>Pre-requisite: M 427L</td>
<td>Pre-requisite: EE 411, PHY 303N and 103L</td>
<td>Pre-requisite: EE 313 and 333T</td>
</tr>
<tr>
<td></td>
<td>Co-requisite: M 427L</td>
<td>Co-requisite: M 427L</td>
<td>Co-requisite: EE 313 &amp; 333T</td>
<td></td>
</tr>
</tbody>
</table>

Students must pick 3 additional electives from the following Technical Core courses:
- EE 438K Analog Electronics [EE 438]
- EE 338L Analog Integrated Circuit Design [EE 438]
- EE 440 Microelectronics Fabrication Techniques Laboratory [EE 339; co-requisite: EE 333T]
- EE 445L Embedded Systems Design Laboratory [EE 411, 312, 313 and 319K; co-requisite: EE 333T]
- EE 445S Real-Time Digital Signal Processing Laboratory [EE 312, 313 and 319K; co-requisites: EE 333T and 351K]
- EE 460M Digital Systems Design Using HDL [EE 312, 316 and 319K]
- EE 460N Computer Architecture [EE 306, 312, and 319K]
- EE 460R Introduction to VLSI Design [EE 316 and 438]
- EE 361R Radio Frequency Circuit Design [EE 325 and 438]
- EE 363M Microwave & Radio Frequency Engineering [EE 325]
- EE 374K Biomedical Electronic Instrument Design [EE 438]
- EE 374L Applications of Biomedical Engineering [EE 374K; co-requisite: EE 333T]

See the Technical Core ABET advising sheet for allocation of engineering versus math & basic science topics. All primary technical core courses and electives must be engineering courses with the exception of the advanced math course.

ENERGY SYSTEMS AND RENEWABLE ENERGY
This technical core area provides the foundation for a career in electric power systems, generation, grid operation, motors and drives, and renewable energy sources. The additional elective is only required for those picking this technical core as primary.

Required:

<table>
<thead>
<tr>
<th>Advanced Math</th>
<th>Core</th>
<th>Core</th>
<th>Core Lab</th>
<th>Additional Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 427L</td>
<td>EE 325 Electromagnetic Engineering</td>
<td>EE 368L Power Systems Apparatus &amp; Lab</td>
<td>EE 462L Power Electronics Laboratory</td>
<td>EE 362K Introduction to Automatic Control</td>
</tr>
<tr>
<td>Pre-requisite: M 408D, 408L or 408S</td>
<td>Pre-requisites: EE 411; M 427 or 427K; PHY 303N and 103L</td>
<td>Pre-requisite: EE 313</td>
<td>Pre-requisite: EE 313</td>
<td>Pre-requisites: EE 313 &amp; M 340L</td>
</tr>
<tr>
<td></td>
<td>Co-requisite: M 427L</td>
<td>Co-requisite: EE 333T</td>
<td>Co-requisite: EE 333T</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OR EE 369 Power Systems Engineering</td>
<td>OR</td>
<td>OR</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pre-requisite: EE 313</td>
<td>Pre-requisite: EE 313</td>
<td>Pre-requisite: EE 313</td>
<td></td>
</tr>
</tbody>
</table>

Students must pick 3 additional electives from the following Technical Core courses:
- EE 339 Solid-State Electronic Devices [M 427 or 427K; PHY 303L and 103N]
- EE 339S Solar Energy Conversion Devices
- EE 341 Electric Drives and Machines [EE 313]
- EE 362Q Power Quality and Harmonics [EE 413]
- EE 362R Renewal Energy and Power Systems [EE 313]
- EE 362S Development of a Solar-powered Vehicle [EE 313]
- EE 368L Power Systems Apparatus and Laboratory [EE 313; co-requisite: EE 333T]
- EE 369 Power Systems Engineering [EE 313]
- EE 379K Smart Grids [EE 313]
- ME 337C Intro to Nuclear Power Systems [ME 218; PHY 303L and 103N]

ME 337C has all credit hours in engineering topics. See the Technical Core ABET advising sheet for allocation of engineering versus math & basic science topics. All primary technical core courses and electives must be engineering courses with the exception of the advanced math course.
FIELDS, WAVES AND ELECTROMAGNETIC SYSTEMS

Students in this technical core area study different aspects of applied electromagnetics, including antennas, radio wave propagation, microwave and radio frequency circuits and transmission structures, optical components and lasers, and engineering acoustics. The additional elective is only required for those picking this technical core as primary.

Required:

<table>
<thead>
<tr>
<th>Advanced Math</th>
<th>Core</th>
<th>Core</th>
<th>Core Lab</th>
<th>Additional Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-requisites: M 408D, 408L or 408S</td>
<td>Pre-requisites: M 427J or 427K, PHY 303N and 103L</td>
<td>Pre-requisite: EE 411 &amp; 333T</td>
<td>Pre-requisite: EE 325</td>
</tr>
<tr>
<td></td>
<td>EE 325 Electromagnetic Engineering</td>
<td>EE 339 Solid-State Electronic Devices</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>EE 462L Microwave and Radio Frequency Engineering</td>
<td>Co-requisite: EE 331</td>
<td>Pre-requisite: EE 333T</td>
<td>Pre-requisite: EE 325</td>
</tr>
</tbody>
</table>

Students must pick 3 additional electives from the following Technical Core courses:

EE 325K Antennas and Wireless Propagation [EE 325]
EE 341 Electric Drives and Machines [EE 313]
EE 347 Modern Optics [EE 313 and 325]
EE 348 Laser and Optical Engineering [EE 339]
EE 361R Radio Frequency Circuit Design [EE 325, 438 and 339]
EE 363M Microwave and Radio Frequency Engineering [EE 325]
EE 363N Engineering Acoustics [M 427K]
EE 369 Power Systems Engineering [EE 313]
EE 374K Biomedical Electronic Instrument Design [EE 438]
EE 374L Applications of Biomedical Engineering [EE 374K; co-requisite: EE 333T]

See the Technical Core ABET advising sheet for allocation of engineering versus math & basic science topics. All primary technical core courses and electives must be engineering courses with the exception of the advanced math course.

NANOELECTRONICS AND NANOTECHNOLOGY

Students in this technical core area learn about the materials and devices used in modern electronic and optoelectronic systems.

Required:

<table>
<thead>
<tr>
<th>Advanced Math</th>
<th>Core</th>
<th>Core</th>
<th>Core Lab</th>
<th>Additional Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 427L</td>
<td>EE 325 Electromagnetic Engineering</td>
<td>EE 339 Solid-State Electronic Devices</td>
<td>EE 440 Microelectronics Fabrication Techniques Laboratory</td>
<td>EE 325K Antennas and Wireless Propagation</td>
</tr>
<tr>
<td></td>
<td>Pre-requisites: M 408D, 408L or 408S</td>
<td>Pre-requisites: M 427J or 427K, PHY 303N and 103L</td>
<td>Pre-requisite: EE 339</td>
<td>Pre-requisite: EE 325</td>
</tr>
<tr>
<td></td>
<td>EE 325 Electromagnetic Engineering</td>
<td>EE 339 Solid-State Electronic Devices</td>
<td>OR</td>
<td>OR</td>
</tr>
<tr>
<td></td>
<td>EE 462L Microwave and Radio Frequency Engineering</td>
<td>Co-requisite: M 427L</td>
<td>Pre-requisite: EE 333T</td>
<td>Pre-requisite: EE 325</td>
</tr>
</tbody>
</table>

Students must pick 4 additional electives from the following Technical Core courses:

EE 438 Fundamentals of Electronic Circuits I Laboratory [EE41; Credit or registration of EE 313]
EE 338L Analog Integrated Circuit Design [EE 438]
EE 339S Solar Energy Conversion Devices
EE 347 Modern Optics [EE 313 and 325]
EE 348 Laser and Optical Engineering [EE 339]
EE 460R Introduction to VLSI Design [EE 316, 438 and 339]
EE 379K High-Throughput Nanopatterning

See the Technical Core ABET advising sheet for allocation of engineering versus math & basic science topics. All primary technical core courses and electives must be engineering courses with the exception of the advanced math course.
COMPUTER ENGINEERING TECHNICAL CORES

COMPUTER ARCHITECTURE AND EMBEDDED SYSTEMS
This core involves understanding the operation and design of computers and embedded systems on many different levels, including the instruction set, microarchitecture, logic design, stand-alone systems, and software and hardware components of a larger system. The additional elective is only required for those picking this technical core as primary.

Required:

<table>
<thead>
<tr>
<th>Advanced Math</th>
<th>Core</th>
<th>Core</th>
<th>Core Lab</th>
<th>Additional Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 325K</td>
<td>EE 316</td>
<td>EE 460N</td>
<td>EE 445L</td>
<td>EE 360C</td>
</tr>
<tr>
<td>Discrete Mathematics</td>
<td>Digital Logic Design</td>
<td>Computer Architecture</td>
<td>Embedded Systems Design Laboratory</td>
<td>Algorithms</td>
</tr>
<tr>
<td>Pre-requisite: M 408D, 408L or 408S</td>
<td>Pre-requisite: EE 306</td>
<td>Pre-requisites: EE 306, 312 and 319K</td>
<td>Pre-requisites: EE 411, 312, 313 and 319K</td>
<td>Pre-requisites: EE 312 and M 325K</td>
</tr>
</tbody>
</table>

Students must pick 3 additional electives from the following Technical Core courses:

EE 422C Software Design & Implementation II [EE 312 or CS 312]
EE 445M Embedded and Real-Time Systems Laboratory [EE 445L or EE 445S; co-requisite: EE 333T]
EE 445S Real-Time Digital Signal Processing Laboratory [EE 312, 313 and 319K; co-requisites: EE 333T and 351K]
EE 460M Digital Signal Processing Laboratory [EE 312, 316 and 319K]
EE 360P Concurrent and Distributed Systems [EE 422C]
EE 460R Introduction to VLSI Design [EE 316 and 438]
EE 361C Multicore Computing [EE 422C]
EE 461S Operating Systems [EE 312 and 319K, and M 325K]
EE 362K Introduction to Automatic Control [EE 313 and M 340L]

See the Technical Core ABET advising sheet for allocation of engineering versus math & basic science topics. All primary technical core courses and electives must be engineering courses with the exception of the advanced math course.

DATA SCIENCE AND INFORMATION PROCESSING
This technical core trains students in information and signal processing, data mining as well as decision and control algorithms. Applications include data analytics, machine learning, sound and image processing as well as knowledge extraction and actuation. The additional elective is only required for those picking this technical core as primary.

Required:

<table>
<thead>
<tr>
<th>Advanced Math</th>
<th>Core</th>
<th>Core</th>
<th>Core Lab</th>
<th>Additional Elective</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 325K</td>
<td>EE 361M or EE 461P</td>
<td>EE 360C</td>
<td>EE 479K or EE379K</td>
<td>EE 351M</td>
</tr>
<tr>
<td>Discrete Mathematics</td>
<td>Data Science Principles</td>
<td>Algorithms</td>
<td>Data Science Laboratory</td>
<td>Digital Signal Processing</td>
</tr>
<tr>
<td>Pre-requisite: M 408D, 408L or 408S</td>
<td>Pre-requisites: EE 351K, EE 360C, EE 340L</td>
<td>Pre-requisite: EE 312 and M 325K</td>
<td>Pre-requisites: EE 312, 313 and 360C</td>
<td>Pre-requisite: EE 351K</td>
</tr>
</tbody>
</table>

Students must pick 3 additional electives from the following Technical Core courses:

EE 422C Software Design & Implementation II [EE 312 or CS 312]
EE 445S Real-Time Digital Signal Processing Laboratory [EE 312, 313 and 319K; co-requisites: EE 333T and 351K]
EE 360P Concurrent and Distributed Systems [EE 422C]
EE 361C Multicore Computing [EE 422C]
EE 461L Software Engineering and Design Laboratory [EE 422C and M 325; co-requisite: EE 333T]
EE 362K Introduction to Automatic Control [EE 313 and M 340L]
EE 471C Wireless Communications Laboratory [EE 445S, 351M or 360K; co-requisite: EE 333T]
EE 371R Digital Image and Video Processing [EE 351K]
EE 379K Architecture for Big Data Science [EE 422C and 351K, and M 340L]

See the Technical Core ABET advising sheet for allocation of engineering versus math & basic science topics. All primary technical core courses and electives must be engineering courses with the exception of the advanced math course.
**SOFTWARE ENGINEERING AND DESIGN**

This core covers the engineering life cycle of software systems, including requirement analysis and specification, design, construction/programming, testing, deployment, maintenance, and evolution.

**Required:**

<table>
<thead>
<tr>
<th>Advanced Math</th>
<th>Core</th>
<th>Core</th>
<th>Core Lab</th>
</tr>
</thead>
<tbody>
<tr>
<td>M 325K</td>
<td>EE 422C</td>
<td>EE 360C</td>
<td>EE 461L</td>
</tr>
<tr>
<td>M 408D, 408L, or 408S</td>
<td></td>
<td></td>
<td>Co-requisite: EE 333T</td>
</tr>
</tbody>
</table>

Students must pick 4 additional electives from the following Technical Core courses:

- **EE 316**
  - Digital Logic Design [EE 306 or CS429]
- **EE 445L**
  - Embedded Systems Design Laboratory [EE 411, 312, 313 and 319K; co-requisite: EE 333T]
- **EE 445M**
  - Embedded and Real-Time Systems Laboratory [EE 445L or 445S; co-requisite: EE 333T]
- **EE 360F**
  - Intro to Software Engineering [EE 422C or CS 314 (or 314H)]
- **EE 460N**
  - Computer Architecture [EE 306, 312 and 319K]
- **EE 360P**
  - Concurrent and Distributed Systems [EE 422C]
- **EE 360T**
  - Software Testing [EE 422C]
- **EE 361C**
  - Multicore Computing [EE 422C]
- **EE 361M/461P**
  - Introduction to Data Mining/Data Science Principles [EE 351K and 360C; M 340L]
- **EE 361Q**
  - Requirements Engineering [EE 312]
- **EE 461S**
  - Operating Systems [EE 312 and 319K, and M 325K]
- **EE 379K/479K**
  - Data Science Laboratory [EE 351K and 360C, and M 340L]

*If you are choosing Software Engineering and Design along with Academic Enrichment, and your EE 364/464 senior design project does NOT have a significant hardware component, you MUST take two of the following Technical Core Electives: EE 316, EE 445L OR EE 445M. If your EE 364/464 senior design project involves a significant hardware component, then the electives they choose must include at least one of EE 316, EE 445L, OR EE 445M.*

See the Technical Core ABET advising sheet for allocation of engineering versus math & basic science topics. All primary technical core courses and electives must be engineering courses with the exception of the advanced math course.

**ACADEMIC ENRICHMENT TECHNICAL CORE**

A student may choose the Academic Enrichment as his or her secondary technical core ONLY. For this core, the student selects 14 hours of coursework to support his or her personal or career goals. At least three of the 14 hours must be an upper division math/science course. Before registering for these courses, the student must prepare a career plan statement and a list of relevant electives, and the Undergraduate Faculty Advisor must approve the plan.

You must complete at least 48 credit hours of engineering topics for your degree. Required courses (EE 302, 306, 411, 312, 313, 319K, 333T, 351K, 364, 464) yield 25 credit hours of engineering topics, 4 in math & basic sciences and 3 in other, as described on the last page. The primary technical cores described above would yield a minimum of 22 / 23 credit hours of engineering topics and 4 / 3 hours of math & basic science topics, depending on whether M 427L / M 325K were taken.

Academic Enrichment courses may include traditional upper-division technical courses in Electrical Engineering and other allied fields. For example, those wanting to strengthen their mathematical background might consider the courses listed on the next page. In particular, those wanting to prepare for graduate studies in communications, data science, machine learning, networks, signal processing, and/or systems/controls, might consider the following:

- **M 362M**
  - Introduction to Stochastic Processes [M 362K or EE 351K]
- **M 365C**
  - Real Analysis I [At least two of the following: M 325K, M 328K, M 340L/341; consent of undergraduate advisor]
- **M 378K**
  - Introduction to Mathematical Statistics [M 362K or EE 351K]
Those wanting a stronger background in system software might consider the following courses:

- CS 356: Computer Networks [CS 439 or 372]
- CS 371P: Object-Oriented Programming [CS 310 or 429]
- CS 375: Compilers [CS 310 or 310H; CS 336 or 336H; M 408D or 408M]
- EE 360P: Concurrent and Distributed Systems [EE 422C]
- EE 461S: Operating Systems [EE 312 and 319K, and M 325K]

Academic Enrichment courses may be in other fields at the University, such as business, economics, communication, music, and philosophy; or research done with a faculty member in EE X60 Special Problems in Electrical and Computer Engineering. The courses must be completed in residence; courses in an approved study abroad program require the approval of the Undergraduate Faculty Advisor. There may include up to three hours of EE 325L Cooperative Engineering, EE 225M Cooperative Engineering, and EE 125S Internship in Electrical and Computer Engineering.

**ALTERNATIVE ADVANCED MATH COURSES**

**If a student chooses BOTH Electrical Engineering Technical Core Areas**

- M 325K: Discrete Mathematics [M 408D, 408L or 408S]
- M 328K: Introduction to Number Theory [M 325K]
- M 348: Scientific Computing [M 340L; CS 303E or 307]
- M 358K: Applied Statistics ## [M 362K or EE 351K]
- M 361: Theory of Functions of Complex Variables [M 427K or 427L]
- M 362M: Introduction to Stochastic Processes [M 362K or EE 351K]
- M 365C: Real Analysis I [At least two of the following: M 325K, M 328K, M 340L/341; consent of undergraduate advisor]
- M 374: Fourier and Laplace Transforms [M 427K]
- M 374M: Mathematical Modeling in Science and Engineering [M 427K; M 340L or 341]
- M 378K: Introduction to Mathematical Statistics ## [M 362K or EE 351K]

**ALTERNATIVE ADVANCED MATH COURSES**

**If a student chooses BOTH Computer Engineering Technical Core Areas**

- M 427L: Advanced Calculus for Applications II [M 408D or 408M]
- M 328K: Introduction to Number Theory [M 325K]
- M 343K: Introduction to Algebraic Structures [two of the following: M 325K, M 328K and M 341]
- M 344K: Intermediate Symbolic Logic [PHL 313, 313K or 313Q]
- M 348: Scientific Computation in Number Analysis [M 340L; CS 303E or 307]
- M 358K: Applied Statistics ## [M 362K or EE 351K]
- M 365C: Real Analysis I [At least two of the following: M 325K, M 328K, M 340L/341; consent of undergraduate advisor]
- M 378K: Introduction to Mathematical Statistics ## [M 362K or EE 351K]
- CS 341: Automata Theory [Computer Science 429 (or 310) or 429H (or 310H)]
- CS 346: Cryptography [CS 429 (or 310) or 429H (310H); 331 (or 357), 331H (or 357H), 341, and 341H; co-requisite: M 340L]

## M 378K Introduction to Mathematical Statistics [M 362K or EE 351K] is more in-depth than M 358K

***Check with the CS Dept. / Advisor for ALL PREREQUISITE REQUIREMENTS & CLASS SEAT AVAILABILITY***