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/
- 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>
</table>

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

EE 325 Electromagnetic Engineering [EE 411; M 427L or 427K; PHY 303N and 103L; Co-requisite: M 427L]
EE 325K Antennas and Wireless Propagation [EE 325]
EE 445S Real-Time Digital Signal Processing Laboratory [EE 312, 313 and 319K; Co-requisites: EE 333T and 351K]
EE 351M Digital Signal Processing [EE 313; Co-requisite: EE 351K]
EE 360C Algorithms [EE 312 and M 325K]
EE 360K Introduction to Digital Communications [EE 351K]
EE 361M/461P Introduction to Data Mining/Data Science Principles [EE 351K and 360C; M 340L]
EE 362K Introduction to Automatic Control [EE 313 and M 340L]
EE 363M Microwave and Radio Frequency Engineering [EE 325]
EE 471C Wireless Communications Laboratory [EE 445S, 351M or 360K; Co-requisite: EE 333T]
EE 371R Digital Image and Video Processing [EE 313 and EE 351K]
EE 379K/460J Data Science Laboratory [EE 313, EE 351K, EE 360C, and M 340L; 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.
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>M 427L</td>
<td>EE 325</td>
<td>EE 339</td>
<td>EE 438</td>
<td>EE 316</td>
</tr>
<tr>
<td>Adv Calculus for Applications II</td>
<td>Electromagnetic Engineering</td>
<td>Solid-State Electronic Devices</td>
<td>Fundamentals of Electronic Circuits I Laboratory</td>
<td>Digital Logic Design</td>
</tr>
<tr>
<td>Pre-requisite: M 408D, 408L or 408S</td>
<td>Pre-requisite: EE 411; M 427L or 427K; PHY 303N and 103L</td>
<td>Co-requisite: M 427L</td>
<td>Pre-requisite: EE 411</td>
<td>Pre-requisite: EE 306</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</td>
<td>EE 368L</td>
<td>EE 462L</td>
<td>EE 362K</td>
</tr>
<tr>
<td>Adv Calculus for Applications II</td>
<td>Electromagnetic Engineering</td>
<td>Power Systems Apparatus &amp; Lab</td>
<td>Power Electronics Laboratory</td>
<td>Introduction to Automatic Control</td>
</tr>
<tr>
<td>Pre-requisite: M 408D, 408L or 408S</td>
<td>Pre-requisite: EE 411; M 427L or 427K; PHY 303N and 103L</td>
<td>Co-requisite: EE 313</td>
<td>Pre-requisite: EE 313</td>
<td>Pre-requisites: EE 313 &amp; M 340L</td>
</tr>
</tbody>
</table>

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

EE 339 Solid-State Electronic Devices [M 4273 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 362G Smart Grids [EE 368L or EE 369]
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>M 427L</td>
<td>EE 325</td>
<td>EE 339</td>
<td>EE 438</td>
<td>EE 325K or EE 462L</td>
</tr>
<tr>
<td>Adv Calculus for Applications II</td>
<td>Electromagnetic Engineering</td>
<td>Solid-State Electronic Devices</td>
<td>Fundamentals of Electronics Circuits I Laboratory</td>
<td>Antennas and Wireless Propagation</td>
</tr>
<tr>
<td>Pre-requisite: M 408D, 408L or 408S</td>
<td>Pre-requisites: EE 411, M 427J or 427K, PHY 303N and 101L</td>
<td>Co-requisite: M 427L</td>
<td>Pre-requisites: EE 313 &amp; 333T</td>
<td>Pre-requisites: EE 325</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>OR</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>EE 462L Power Electronics Laboratory</td>
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<td></td>
<td>Pre-requisite: EE 313</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</td>
<td>EE 339</td>
<td>EE 440</td>
<td>EE 325K or EE 462L</td>
</tr>
<tr>
<td>Adv Calculus for Applications II</td>
<td>Electromagnetic Engineering</td>
<td>Solid-State Electronic Devices</td>
<td>Microelectronics Fabrication Techniques Laboratory</td>
<td>Antennas and Wireless Propagation</td>
</tr>
<tr>
<td>Pre-requisite: M 408D, 408L or 408S</td>
<td>Pre-requisites: EE 411, M 427J or 427K, PHY 303N and 101L</td>
<td>Co-requisite: M 427L</td>
<td>Pre-requisites: EE 339</td>
<td>Pre-requisites: EE 325</td>
</tr>
<tr>
<td></td>
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<td></td>
<td>OR</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>EE 462L Power Electronics Laboratory</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pre-requisite: EE 313</td>
</tr>
</tbody>
</table>

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

- EE 438 Fundamentals of Electronic Circuits I Laboratory [EE411; 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 340P High-Throughput Nanopatterning [EE 411, EE 339, and M 427]

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-requisite: 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 Systems Design Using HDL [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]  
- EE 379K: Information Security & Privacy [EE 312 or EE 331]

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 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 if Data Science is the primary core.

**Required:**

<table>
<thead>
<tr>
<th>Advanced Math</th>
<th>Core</th>
<th>Core</th>
<th>Core Lab</th>
<th>Additional Elective</th>
<th><strong>Required Tech Elective</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>M 325K</td>
<td>EE 361M or EE 461P</td>
<td>EE 360C</td>
<td>EE 460J or EE 379K</td>
<td>EE 351M</td>
<td></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>
<td></td>
</tr>
<tr>
<td>Pre-requisite: M 408D, 408L or 408S</td>
<td>Pre-requisite: EE 351K, EE 360C, M 340L</td>
<td>Pre-requisite: EE 312 and M 325K</td>
<td>Pre-requisites: EE 313, EE 351K, EE 360C, M 340L</td>
<td>Co-requisite: EE 333T</td>
<td></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 325K; 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 313 & EE 351K]  

**If you are choosing Data Science along with Academic Enrichment, it is required you take one of the following Technical Core Electives:** EE 316 or EE 445S or E E 471C.

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>
<th><strong>Required Tech Elective</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>M 325K</td>
<td>EE 422C</td>
<td>EE 360C</td>
<td>EE 461L</td>
<td>EE 316 or EE 445L</td>
</tr>
<tr>
<td>Discrete Mathematics</td>
<td>Software Design &amp; Implementation II</td>
<td>Algorithms</td>
<td>Software Engineering and Design Laboratory</td>
<td>→ See below for pre-reqs &amp; co-reqs ←</td>
</tr>
<tr>
<td>Pre-requisite: M 405D, 408L, or 408S</td>
<td>Pre-requisites: EE 312 and M 325K</td>
<td>Pre-requisites: EE 312 and M 325K</td>
<td>Co-requisite: EE 333T</td>
<td></td>
</tr>
</tbody>
</table>

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

- EE 316 Digital Logic Design [EE 306 or CS429]
- EE 445L Embedded Systems Design Laboratory [EE 401, 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/460J Data Science Laboratory [EE 313, EE 351K, EE 360C, and M 340L; co-requisite: EE 333T]
- EE 379K Information Security & Privacy [EE 312 or EE 313]

**If you are choosing Software Engineering and Design along with Academic Enrichment, it is required you take one of the following Technical Core Electives: EE 316 or EE 445L.**

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, students are strongly encouraged to look through the Course Database on our ECE website for a list of pre-approved courses.

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, 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 346  Applied Linear Algebra [M 340L]
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 372K  Partial Differential Equations and Applications [M427K]
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 Analogy [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 374M  Mathematical Modeling in Science and Engineering [M 427K and 340L]
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, or 341H; co-requisite: M 340L]

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

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