A world-class program that cultivates creative, practical embedded systems engineers with comprehensive, current knowledge and industry context.

The Department of Electrical, Computer and Energy Engineering at the University of Colorado Boulder is excited to offer an Embedded Systems Engineering (ESE) professional master’s program, built from the ground up with comprehensive coverage of essential technologies, tools and trends. It is structured to provide students with a broad, versatile skillset and coupled with industry input for continuous curriculum updates.

The program is offered under the College of Engineering and Applied Science’s Professional Master of Science or Master’s of Engineering degree. Through core courses (offered twice a year for maximum flexibility) and a growing slate of electives, students enrolled in the ESE program may pursue a 9-credit hour certificate or 30-credit hour degree.

With our newly added ESE courses, students now have access to everything they need to complete a master’s degree in this dynamic field.

Why Embedded Systems?

Engineers with versatility in essential embedded technologies, markets and trends bring value to companies by allowing them to create new opportunities and execute on them competitively.

In a challenging business environment, ESE graduates will exude a practical sense of what is creatively possible, opening new revenue opportunities for their companies and new career opportunities for themselves.

ESE graduates will be prepared to hit the ground running, armed with state-of-the-art technology, tools and techniques.

For more information, visit www.colorado.edu/ecee/embedded-systems
### ESE Program Coverage

#### Essential Technologies
- Communication Protocols
- Controller (MCU/MPU/DSP)
- Electromechanical
- Emerging Technologies
- Human Interface and Display
- Memory (V, NV)
- Operating System/Firmware
- Power Management
- System Control
- Sensors, Signal Chain/Data Conversion

#### Primary End Markets
- Aerospace/Military
- Alternative Energy
- Consumer
- Emerging Markets
- Industrial
- Medical
- Networking/Communications
- Security
- Transportation

#### Current Trends
- ARM Processors
- Capacitive Touch
- Computer/Machine Vision
- Consumer Wearables
- FPGA/SoC
- Home Automation
- Imaging
- Memory/Storage
- Sensors/MEMS
- Smartphone Apps
- Solid State Lighting
- Transportation Autonomy
- Web-enablement (IoT)
- Wireless Protocols & Devices

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#### ESE Program Courses

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Emphasis</th>
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<tr>
<td><em>Mastering Embedded Systems Architecture</em></td>
<td>Processor/OS selection and architecture migration</td>
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<tr>
<td><em>Programmable Logic Embedded System Design</em></td>
<td>FPGA/SoC solutions; embedded ARM to SI and PDN challenges</td>
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<tr>
<td><em>Embedded System Design</em></td>
<td>Embedded system design fundamentals</td>
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<tr>
<td><em>Real-Time Embedded Systems</em></td>
<td>RTOS implementation and rate monotonic theory</td>
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<tr>
<td><em>IoT Embedded Firmware</em></td>
<td>Designing for mobility, secure IoT enablement</td>
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<tr>
<td><em>Embedding Sensors and Actuators</em></td>
<td>Sensor signal capturing, filtering and processing</td>
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<tr>
<td>Embedded Software Essentials*</td>
<td>Intro to current embedded software concepts, languages and tools</td>
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<tr>
<td>Real-Time Digital Media*</td>
<td>Digital media encode/decode and transport</td>
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<tr>
<td>Advanced Computer Architecture*</td>
<td>Design of high-performance computer systems</td>
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<tr>
<td>Embedded Machine Vision and Intelligent Automation</td>
<td>Image capture, processing and filtering</td>
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<tr>
<td>Developing Industrial Internet of Things*</td>
<td>Current technology trends, application case studies</td>
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<tr>
<td><em>Low-power Embedded Design Techniques</em></td>
<td>Power conversion; MCU selection; battery management</td>
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<tr>
<td>Embedded Interface Design*</td>
<td>Techniques for optimal environmental capture &amp; conveyance of results</td>
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*Core Course