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 is expanding its options in embedded systems design, starting in fall 2015. The Embedded Systems Engineering (ESE) professional master’s program was 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.

This new program is offered under the College of Engineering and Applied Science’s Master of Engineering degree. Through flexible core course options and electives, students enrolled in the ESE program may pursue a 9-credit hour certificate or a 30-credit hour degree at an introductory cost of $860/credit hour (residents) or $990/credit hour (non-residents).

With our newly added ESE classes, students now have access to all of the courses 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 ecee.colorado.edu/academics/cert_programs/embedded.html
### ESE Program Courses (Current & Planned)

<table>
<thead>
<tr>
<th>Course Name</th>
<th>Emphasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mastering Embedded Systems Architecture</td>
<td>Processor/OS selection and architecture migration</td>
</tr>
<tr>
<td>Programmable Systems on a Chip</td>
<td>FPGA/SoC solutions; embedded ARM to SI and PDN challenges</td>
</tr>
<tr>
<td>Embedded System Design</td>
<td>Embedded system design fundamentals</td>
</tr>
<tr>
<td>Real-Time Embedded Systems</td>
<td>RTOS implementation and rate monotonic theory</td>
</tr>
<tr>
<td>Real-Time Digital Media</td>
<td>Digital media encode/decode and transport</td>
</tr>
<tr>
<td>Advanced Computer Architecture</td>
<td>Design of high-performance computer systems</td>
</tr>
<tr>
<td>Computer/Machine Vision</td>
<td>Image capture, processing and filtering</td>
</tr>
<tr>
<td>Mobile Computing &amp; IoT Security</td>
<td>Wireless protocols, internet security and IoT solutions</td>
</tr>
<tr>
<td>Industrial Applications Control</td>
<td>Motor control; home automation schemes</td>
</tr>
<tr>
<td>Low-power Design Techniques</td>
<td>Power conversion; MCU selection; battery mgmt</td>
</tr>
<tr>
<td>Sensing, Signal Chain &amp; Data Conversion</td>
<td>Sensor signal capturing, filtering and processing</td>
</tr>
<tr>
<td>Firmware Essentials</td>
<td>Intro to current embedded software concepts, languages and tools</td>
</tr>
<tr>
<td>Embedded Interface Design</td>
<td>Techniques for optimal environmental capture &amp; conveyance of results</td>
</tr>
</tbody>
</table>

### 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
- Sensing, Signal Change/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 (Industrial)
- Consumer Wearables
- FPGA/SoC
- Home Automation (Industrial)
- Imaging
- Memory/Storage
- Sensors/MEMS
- Smartphone Apps
- Solid State Lighting
- Transportation Autonomy
- Web-enablement (IoT)
- Wireless Protocols & Devices