A. CHANGE IN DEGREE REQUIREMENTS:  (Brief statement of program/degree changes and objectives)

The Final Cabinet Decision of the UAF Special Academic Program Review in 2014-2015 was to combine the MEE (Master of Electrical Engineering) with the MSEE (Master of Science in Electrical Engineering) as a non-thesis option. Therefore, we are deleting the MEE degree program (submitted separately in a Format 4 – Program Deletion Request) and adding a non-thesis option to the MSEE degree. This brings Electrical Engineering in line with other engineering programs (Geological, Mechanical, Mining and Petroleum) in CEM regarding having a non-thesis option under the MS degree.

Additionally, we are unifying the number of credits for the MSEE degree for all options: thesis, project and coursework only, at 32 credits.

B. CURRENT REQUIREMENTS AS IT APPEARS IN THE CATALOG:

Page 207 of catalog: under Types of Master’s Degrees

Master of Electrical Engineering

1. Complete at least 32 credits of course work. At least 26 credits, including those earned for thesis and research/project, must be at the F600-level.
2. Complete a comprehensive exam or capstone course that includes demonstration of the ability to synthesize information in the field at a level appropriate for a master’s degree.
3. Archive the thesis or project in the UAF Rasmuson Library.
Electrical Engineering

College of Engineering and Mines
Department of Electrical and Computer Engineering
907-474-7137
http://cem.uaf.edu/ece/

BS, MEE, MS Degrees

Downloadable PDF

Minimum Requirements for Degrees: MEE: 32 credits; MS: 30 credits

The MEE degree program is designed for the practicing professional engineer, and focuses on a major project. The MS degree includes a written thesis and oral defense for students interested in research and development. UAF offers an engineering PhD program for students with an approved curriculum. Capable students with undergraduate degrees in physics, mathematics or related sciences, as well as in various branches of engineering, may also be admitted for graduate study. A student with adequate background can usually complete MS requirements within two years and a PhD in another three years.

Graduate degree programs in electrical and computer engineering are closely connected with faculty research activities. Main areas of research include communications, radar, lidar and sonar remote sensing, instrumentation and microwave circuit design, electric power and energy systems, digital and computer engineering, nanotechnology, controls and robotics. Current research topics include high latitude satellite communications, rocket telemetry, radio wave propagation, ultra-wide-band wireless communications, electromagnetic and acoustic wave propagation, remote biomedical and environmental instrumentation, microwave design, digital signal processing, digital and physical electronics, computer applications, remote hybrid electric power systems, electric power system design and analyses, electric power quality improvement, system identification, simulation, computer-controlled systems, control theory, robotics, and automation.

A number of on- and off-campus research facilities are available to students. Satellite, rocket and ground-based communication studies are carried out on campus and at Poker Flat Research Range-- the only university-operated rocket range in the world. The Sounding Rocket Laboratory provides opportunities for developing instrumentation for sounding rocket payloads. The Arctic Region Supercomputing Center on campus provides a wide array of tools for digital system research. Department research laboratories include microwave, wireless communications, ultra-wide-band technology, waves, power electronics/robotics, instrumentation and digital laboratories.

Alaska's environment and remote location provide unique opportunities for research, such as the use of acoustic, light and radio wave techniques for measuring fish in Alaska rivers to the geophysical properties of the aurora. Remote sensing for biomedical (animal tracking) and environmental (groundwater and air monitoring) applications is an important research area for Alaska. Electric power systems research includes issues related to isolated rural Alaska communities, analysis of larger interconnected generation, transmission and distribution systems serving major Alaska population centers, and the use of alternative energy systems.
Graduate students in electrical and computer engineering at UAF receive the highest quality contemporary education available at the graduate level and perform research appropriate to the technical needs of the state of Alaska, the nation and the world.

MEE Degree

1. Complete the following admission requirement:
   a. Submit GRE scores.
2. Complete one of the following admission requirements:
   a. Complete a bachelor's degree in electrical engineering.
   b. Students with bachelor's degrees in other fields should work out a program to address any background deficiencies with their graduate committee.
3. Complete the general university requirements.
4. Complete the master’s degree requirements.
5. Minimum credits required*--32 credits

* At least 26 credits must be at the F600 level. A research project is not required, although up to 6 credit hours of research may be completed as part of the degree program. If a research project is part of the degree program, an oral project presentation and defense is required.

MS Degree

1. Complete the following admission requirement:
   a. Submit GRE scores.
2. Complete one of the following admission requirements:
   a. Complete a bachelor's degree in electrical engineering.
   b. Students with bachelor's degrees in other fields should work out a program to address any background deficiencies with their graduate committee.
3. Complete the general university requirements.
4. Complete the master’s degree requirements.
5. Minimum credits required--30 credits*

* At least 24 credits must be at the F600 level.

See Engineering for PhD program.

C. PROPOSED REQUIREMENTS AS IT WILL APPEAR IN THE CATALOG WITH THESE CHANGES:
(Underline new wording strike-through-old-wording and use complete catalog format)

Page 207 of catalog: under Types of Master's Degrees

Master of Electrical Engineering

1. Complete at least 32 credits of course work. At least 26 credits, including those earned for thesis and research/project, must be at the F600 level.
2. Complete a comprehensive exam or capstone course that includes demonstration of the ability to synthesize information in the field at a level appropriate for a master's degree.
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BS, MSEE, MS Degrees

Minimum Requirements for Degrees: MEE: 32 credits; MS: 30 credits

The MEE degree program is designed for the practicing professional engineer, and focuses on a major project. The MS degree includes three options: a written thesis and oral defense option for students interested in research and development, a project option, and a coursework only option. UAF offers an engineering PhD program for students with an approved curriculum. Capable students with undergraduate degrees in physics, mathematics or related sciences, as well as in various branches of engineering, may also be admitted for graduate study. A student with adequate background can usually complete MS requirements within two years and a PhD in another three years.

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A number of on- and off-campus research facilities are available to students. Satellite, rocket and ground-based communication studies are carried out on campus and at Poker Flat Research Range--the only university-operated rocket range in the world. The Sounding Rocket Laboratory provides opportunities for developing instrumentation for sounding rocket payloads. The Arctic Region Supercomputing Center on campus provides a wide array of tools for digital system research. Department research laboratories include microwave, wireless communications, ultra-wide-band technology, waves, power electronics/robotics, instrumentation and digital laboratories.

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analysis of larger interconnected generation, transmission and distribution
systems serving major Alaska population centers, and the use of alternative energy systems.

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contemporary education available at the graduate level and perform research appropriate to
the technical needs of the state of Alaska, the nation and the world.

MEE Degree

1. Complete the following admission requirement:
   a. Submit GRE scores.

2. Complete one of the following admission requirements:
   a. Complete a bachelor's degree in electrical engineering.
   b. Students with bachelor's degrees in other fields should work out a program to
      address any background deficiencies with their graduate committee.

3. Complete the general university requirements.
4. Complete the master's degree requirements.
5. Minimum credits required – 32 credits

# At least 26 credits must be at the F600 level. A research project is not required, although up
to 6 credit hours of research may be completed as part of the degree program. If a research
project is part of the degree program, an oral project presentation and defense is required.

MS Degree

1. Complete the following admission requirement:
   a. Submit GRE scores.

2. Complete one of the following admission requirements:
   a. Complete a bachelor's degree in electrical engineering.
   b. Students with bachelor's degrees in other fields should work out a program to
      address any background deficiencies with their graduate committee.

3. Complete the general university requirements.
4. Complete the master's degree requirements.
5. Complete the thesis or non-thesis requirements:

Thesis

a. EE F699 – Thesis ........................................6 – 12
b. At least 26 credits must be at the F600 level
c. Minimum credits required .........................32

Non-Thesis

a. At least 26 credits must be at the F600 level. A research project is not required,
   although up to 6 credit hours of research may be completed as part of the degree
   program. If a research project is part of the degree program, an oral project
   presentation and defense is required.
b. If a project is completed, archive the project in the UAF Rasmuson Library.
c. Minimum credits required ........................................32

At least 24 credits must be at the F600 level.

See Engineering for PhD program.

D. ESTIMATED IMPACT

WHAT IMPACT, IF ANY, WILL THIS HAVE ON BUDGET, FACILITIES/SPACE, FACULTY, ETC.

This will have no impact as the MEE students took the same courses as the MSEE students.

E. IMPACTS ON PROGRAMS/DEPTS:

What programs/departments will be affected by this proposed action?
Include information on the Programs/Departments contacted (e.g., email, memo)

None.

F. IF MAJOR CHANGE - ASSESSMENT OF THE PROGRAM:

Description of the student learning outcomes assessment process.)

The only change to the SLOA process will be to modify the question regarding research.

JUSTIFICATION FOR ACTION REQUESTED

The purpose of the department and campus-wide curriculum committees is to scrutinize program/degree change applications to make sure that the quality of UAF education is not lowered as a result of the proposed change. Please address this in your response. This section needs to be self-explanatory. If you drop a course, is it because the material is covered elsewhere? Use as much space as needed to fully justify the proposed change and explain what has been done to ensure that the quality of the program is not compromised as a result.

We were directed to take this action by Provost Henrichs, based on the Final Cabinet Decision of the UAF Special Academic Program Review in 2014-2015 to combine the MEE (Master of Electrical Engineering) with the MSEE (Master of Science in Electrical Engineering) as a non-thesis option. The Final Cabinet Decisions are posted on:
http://www.uaa.alaska.edu/finserv/omb/budget-planning/Academic_Special_Program_Review_WEB-PUBLISHED-LIST.pdf

The inclusion of a non-thesis option in the MS degree program brings Electrical Engineering in line with other engineering programs (Geological, Mechanical, Mining and Petroleum) in CEM.
The change in the minimum degree requirements from 30 to 32 credits was made to unify the requirements for all options under the MSEE degree. An examination of the last ~20 masters degrees in EE showed that all students took at least this many credits while earning their masters degree.

| APPROVALS: SIGNATURES MUST BE OBTAINED PRIOR TO SUBMISSION TO THE GOVERNANCE OFFICE |
|---------------------------------|------------------|
| Signature, Chair, Program/Department of: | Date |
| Charles E. Mayo | 9/21/15 |

| Signature, Chair, Program/Department of: | Date |
| College of Engineering and Mines | 9/26/15 |

| Signature, Dean, College/School of: | Date |
| College of Engineering and Mines | 10/5/15 |

| CHAIR SIGNATURE OBTAINED FOLLOWING APPROVAL BY FACULTY SENATE COMMITTEE |
|---------------------------------|------------------|
| Signature, Chair, UAF Faculty Senate | Date |
| Curriculum Review Committee |
| Graduate Academic and Advisory Committee |

Evelyn's note:

Email from Charlie

Justifying credit increase from 30 to 32 is attached.
SK,

Thanks to the CEM CRC for their thorough review of our proposed program change. The topic of changing credit hours for the MSEE degree was discussed at several department meetings, starting last AY. The final discussion was early this fall and the oral vote to go to 32 credits was unanimous.

There are a number of different models for graduate education in the U.S. For example, Texas A&M University, the 3rd largest in engineering enrollment, has MSEE degree requirements of 32 hours, with a minimum of 24 classroom hours.

One major difference between the ECE department at UAF and most other CEM engineering departments is that ECE allows up to 12 hours of thesis credits. ECE faculty did not want to lower this requirement. Note that if a student does a 12-credit thesis, the student is taking 20 hours of classes.

Another major difference between the ECE department at UAF and most other CEM engineering departments is that ECE has a number of 4-credit courses that graduate students routinely take, including EE 651 (Digital Signal Processing), EE 545 (Embedded Systems Design), and EE 608 (Power Electronics Design), as well as numerous 400-level 4-credit courses, of which many grad students take one (up to 6-credits of 400-level courses are allowed in the MS degree).

I'm not quite sure how to respond to the quote you provided. Regarding "It is pretty standard across most Universities that MS programs (Thesis and Non-Thesis options) require fulfillment of 30 credits and a average 3.0 GPA. We have to have a very good justification if only UAF would like to be an outlier and why," the following table is my best understanding of UAF CEM masters degree requirements.

<table>
<thead>
<tr>
<th>Program</th>
<th>Thesis Degree</th>
<th>Degree Credits</th>
<th>Thesis Credits</th>
<th>Non-thesis degree</th>
<th>Degree Credits</th>
<th>Project Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CE</td>
<td>MS</td>
<td>30</td>
<td>6 - 12</td>
<td>MCE</td>
<td>30</td>
<td>3 - 6</td>
</tr>
<tr>
<td>EE</td>
<td>MS</td>
<td>30</td>
<td>6 - 12</td>
<td>MEE</td>
<td>32</td>
<td>0 - 6</td>
</tr>
<tr>
<td>GE</td>
<td>MS</td>
<td>30</td>
<td>6</td>
<td>MS</td>
<td>33</td>
<td>6</td>
</tr>
<tr>
<td>ME</td>
<td>MS</td>
<td>30</td>
<td>6</td>
<td>MS</td>
<td>30</td>
<td>3</td>
</tr>
</tbody>
</table>
Clearly there is no 30 credit standard in CEM for an MS degree. Similarly, I do not understand the question regarding international students. A large fraction of our MSEE students are international.

If there are other concerns or questions regarding the proposed MS degree program change, I would be glad to provide further clarification.

Regards,

Charlie