December 26, 2013

TO: Vice Chancellor Susan J. Hunter
University of Maine System

FR: Paul W. Ferguson
President

RE: Request for Policy Exception (UMS Policy 303.1)
121 Undergraduate Credit Limit

This is to formally request a policy exemption to the 121 credit hour limit for undergraduate degrees from the College of Engineering at the University of Maine.

Please see the attached justification for this request from Provost Hecker and Dean Humphrey. This justification is based both upon ABET accreditation needs as well as demonstrated student success in engineering programs requiring 126-132 credits. I fully support this request.

Thanks very much for your assistance and consideration.

cc: Provost Jeff Hecker
Dean Dana Humphrey
MEMORANDUM

TO: PAUL W. FERGUSON, PRESIDENT
FROM: JEFFREY E. HECKER, EXECUTIVE VICE PRESIDENT FOR ACADEMIC AFFAIRS AND PROVOST - DESIGNATE
SUBJECT: REQUEST FOR EXCEPTION TO POLICY TO “LIMIT UNDERGRADUATE DEGREES TO 121 CREDIT HOURS”
DATE: 12-23-13
CC: JULIE HOPWOOD

Please see the attached memo and request from the College of Engineering for an exception to the UMS policy 303.1 Limit Undergraduate Degrees to 121 Credits.

The curriculum of the seven undergraduate majors within the College of Engineering received thorough analyses to discern the potential to reduce the required credits for graduation. Participants in the reviews included program faculty as well as the external industrial advisory committee for each program. Considerations included the impact on general education, employer expectations, and accreditation requirements of the Accreditation Board for Engineering and Technology (ABET).

Subsequent to this careful review and analyses, the determination was made that, while there was some ability to reduce the number of credits, it is not possible to limit the programs to 121 credits.

It is important to note that one concern leading to the development of the policy is the ability of students to complete a program within four years. The UMaine College of Engineering has demonstrated a four-year graduation rate 4 percentage points higher than the averages for the other colleges. The six-year graduation rate is 11 percentage points higher. Thus, concerns regarding “time to degree” for Engineering students should not outweigh the other important considerations factored into the review, analyses, and conclusions for the total credits required for these programs.

I support the proposal and request that you send it forward to the Vice Chancellor for Academic Affairs for approval.

Please let me know if you have any questions.
December 19, 2013

Dr. Jeffery Hecker  
Executive Vice President for Academic Affairs  
    and Provost  
University of Maine  
Alumni Hall 201  
Orono, ME  04469

RE: Request for exception to policy to “Limit Undergraduate Degrees to 121 Credit Hours”

Dear Dr. Hecker:

The College of Engineering requests an exception to the Board of Trustees policy to “Limit Undergraduate Degrees to 121 Credit Hours”. The policy allows for exceptions on a case by case basis taking into account factors such as accreditation requirements.

It is not possible for the programs within the College of Engineering to reduce the credits required for graduation to 121, although some programs were able to achieve some reduction in credit hour requirements. The reasons for the greater credits needed for graduation are: ABET accreditation requirements, constraints imposed by the University’s general education requirements, maintaining parity with similar degree programs in the Northeast, and expectations of the employers of our graduates.

One rationale for the policy was concern that the growing number of credit hours required to earn a degree were making it more difficult to complete a degree in four years. However, this is not the case for engineering as UMaine engineering graduates have a four-year graduation rate that is 4 percentage points higher than the averages for the other four academic colleges and a six-year graduation rate that is 11 percentage points higher even though the number of credits required to earn a bachelor’s degree in engineering is greater than in the other colleges. Thus, for the UMaine College of Engineering time to graduation is not a compelling justification for reduction in the number of credits.

The specific request is detailed in the attached. I urge you to support this request. Please feel free to contact me if you have any questions or concerns.

Sincerely,

[Signature]
Dana N. Humphrey, Ph.D., P.E.  
Dean of Engineering

cc: Associate Dean Mohamad Musavi  
Engineering department chairs/director
REQUEST FOR EXCEPTION TO BOARD OF TRUSTEES POLICY FOR A MAXIMUM OF 121 CREDITS FOR BACHELORS DEGREES

The seven engineering degree programs currently require between 127 and 132 credits to earn a Bachelor of Science degree. The four engineering technology degrees require between 126 and 128 credits to earn a BS degree. On November 9, 2012 each of the program’s external industrial advisory committee’s (IACs) met to discuss the feasibility and desirability of reducing the number of credits to 121 to come into compliance with the BOT policy. The topic was also thoroughly discussed by the faculty in each program. The IAC’s and faculty uniformly felt that it was not feasible to comply with this policy because of constraints imposed by University general education requirements, accreditation requirements imposed by ABET, and expectations of the employers of our graduates. Moreover, the current credit hour requirements do not hinder a student’s ability to complete their degree in a timely manner.

The minimum number of credits required to earn a B.S. degree in engineering is constrained by the Engineering Accreditation Commission (EAC) of ABET, the nongovernmental organization that accredits programs in applied science, computing, engineering and engineering technology. For all engineering programs, ABET requires a minimum of 32 credits of mathematics and basic science and 48 credits of engineering. ABET imposes additional requirements that are specific to each degree program. For some, programs like bioengineering, computer engineering, chemical engineering, and engineering physics these requirements stem from the discipline operating at the interface between engineering and science, thereby imposing additional science requirements. For other programs like civil, electrical, and mechanical engineering, these requirements stem from the breadth of the discipline requiring a broad range of engineering courses. Finally, for some disciplines the reality of engineering practice requires knowledge beyond that required by ABET or the University. For example, most disciplines require knowledge of statistics. Another example is that civil engineering practice requires knowledge of project management along with engineering skills. This is summarized for each of our programs in Table 1.

The minimum number of credits required to earn a B.S. degree in engineering technology is constrained in a similar fashion by the Engineering Technology Accreditation Commission (ETAC) of ABET. For all engineering technology programs, a minimum of 1/3 of the total credit hours for the program must contain technical content that focuses on the applied aspects of science and engineering. It further requires the application of integral and differential calculus. Each program must develop student competency in the use of equipment and tools common to the discipline. Each of the programs must also meet additional program criteria specific to the field of study. For example, electrical engineering technology programs are required to demonstrate that graduates demonstrate competency in topics such as statistics, applied differential equations, project management, instrumentation, control systems and power systems.
Table 1. Credit hour requirements for engineering degree programs.

<table>
<thead>
<tr>
<th></th>
<th>Math &amp; basic science</th>
<th>Core engineering</th>
<th>Additional requirements</th>
<th>University</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>BEN (bio)</td>
<td></td>
<td></td>
<td>Math</td>
<td>3 (a)</td>
<td>25 (c,d)</td>
</tr>
<tr>
<td>CEN (computer)</td>
<td></td>
<td></td>
<td>Science</td>
<td>6 (a,b)</td>
<td>10 (h)</td>
</tr>
<tr>
<td>CHE (chemical)</td>
<td></td>
<td></td>
<td>Program-specific</td>
<td>3 (a)</td>
<td>17 (d)</td>
</tr>
<tr>
<td>CIE (civil)</td>
<td></td>
<td></td>
<td>engineering</td>
<td>3(a)</td>
<td>22 (g)</td>
</tr>
<tr>
<td>ELE (electrical)</td>
<td></td>
<td></td>
<td></td>
<td>3 (a)</td>
<td>4 (h)</td>
</tr>
<tr>
<td>EPS (eng. physics)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>3</td>
</tr>
<tr>
<td>MEE (mechanical)</td>
<td></td>
<td></td>
<td></td>
<td>3 (a)</td>
<td>20 (g)</td>
</tr>
</tbody>
</table>

a. Statistics  
b. Discrete mathematics  
c. Biology & physiology  
d. Advanced chemistry  
e. Computer science  
f. Senior EPS career preparation seminar  
g. Breadth and depth of knowledge in four technical areas and project management  
h. Computing science (programming, operating systems)  
i. Computer architecture/organization  
j. Electromagnetics, electronics  
k. Electrical Circuits and Statics & Strength of Materials  
l. Design intensive courses including capstone sequence

Table 2 provides a summary demonstrating how the School of Engineering Technology meets these requirements. It should be noted that they are able to accomplish this while requiring less credit hours than any of the New England peer institutions.
Table 2. Credit hour requirements for engineering technology degree programs.

<table>
<thead>
<tr>
<th></th>
<th>Additional requirements</th>
<th>Universit y</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>HVSC + English comp.+ writing intensive</td>
<td></td>
</tr>
<tr>
<td>CMT (construction)</td>
<td>8(b,c,d) 1 (d)</td>
<td>31</td>
<td>126</td>
</tr>
<tr>
<td>EET (electrical)</td>
<td>10 (a,b,c) 3(d)</td>
<td>28</td>
<td>127</td>
</tr>
<tr>
<td>MET (mechanical)</td>
<td>9(a) 3 (d)</td>
<td>30</td>
<td>128</td>
</tr>
<tr>
<td>SVT (surveying)</td>
<td>8(b,c,d,e) 1</td>
<td>31</td>
<td>126</td>
</tr>
</tbody>
</table>

a. Differential Equations (4)
b. Statistics (3)
c. Engineering Economics (3)
d. Accounting (3)
e. Free Elective or Computer Science

Other requirements are imposed by the University’s general education requirements. UMaine requires 18 credits of human values and social context (HVSC) electives. This is greater than required by the University of Vermont (15 credits) or the University of Massachusetts Amherst (16 credits). The HVSC credits required at the other New England land grants is the same as UMaine. In addition, UMaine has requirements for ethics, writing intensive courses, and a capstone experience. When these requirements are combined with the constraints imposed by ABET and the expectations of the employers of our graduates, it is not possible to reduce our credit requirements to 121.

The degree requirements were carefully examined by the faculty and IAB's for each department. The electrical (ELE) and computer (CEN) engineering programs were able to reduce their credit requirements from 130 for ELE and 131 for CEN to 124 credits. Moreover, the engineering physics program was able to reduce their credit requirements from 127 to 122 credits. Reductions are not feasible to the remaining programs. The rationale for each program will be discussed after presentation of additional background information.

It is important that UMaine’s requirements be comparable to other similar institutions in the region because our graduates must compete for jobs with an equivalent or superior skill level. For engineering programs, the other New England land grants are a reasonable comparison group. The credit requirements for engineering programs are summarized in Table 3. Notes have been added to show university level differences in general education requirements and course structure. Engineering physics is not included in the table because there are no comparable programs in New England.
Table 3. Credit hour requirements for engineering degree programs at New England land grant universities.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Biological</th>
<th>Chemical</th>
<th>Civil</th>
<th>Electrical/Computer</th>
<th>Mechanical</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMaine</td>
<td>132</td>
<td>130</td>
<td>127</td>
<td>124</td>
<td>131</td>
</tr>
<tr>
<td>UNH</td>
<td>130</td>
<td>129</td>
<td>130</td>
<td>127</td>
<td>128</td>
</tr>
<tr>
<td>UVM***</td>
<td>**</td>
<td>**</td>
<td>122</td>
<td>126</td>
<td>128</td>
</tr>
<tr>
<td>UConn</td>
<td>128</td>
<td>128</td>
<td>128</td>
<td>126</td>
<td>128</td>
</tr>
<tr>
<td>URI‡</td>
<td>122-127</td>
<td>120*</td>
<td>124</td>
<td>123-126</td>
<td>130</td>
</tr>
<tr>
<td>UMass Amherst****</td>
<td>**</td>
<td>126</td>
<td>120</td>
<td>126-127</td>
<td>124</td>
</tr>
</tbody>
</table>

*No capstone design sequence
**Does not offer degree
***UVM requires 15 cr.hr. HVSC electives vs. 18 cr.hr. at UMaine
†UMass-Amherst requires 16 cr.hr. HVSC vs. 18 cr.hr. at UMaine and 14 cr.hr. math vs. 16 cr.hr. UMaine; UMass-Amherst has no technical writing requirement
‡URI’s core math sequence is 14 cr.hr. vs. 16 cr.hr. at UMaine.

Some of the differences in Table 3 stem from differences in university level general education requirements or course structure. UMass Amherst requires only 16 credits of HVSC compared to 18 credits at UMaine. Moreover, UMass Amherst’s calculus III and differential equations courses are 3 credits rather than 4. UMass Amherst also does not require technical writing (3 credits), a key requirement of UMaine’s engineering program which meets UMaine’s general education requirement for writing intensive courses. Thus, 7 credits must be added to the requirements for each program at UMass Amherst to be comparable to UMaine. The University of Vermont requires only 15 credits of HVSC. Thus, 3 credits must be added to UVM to be comparable to UMaine. URI’s calculus III and differential equations are 3 credits rather than 4. Thus, 2 credits must be added to URI to be comparable to UMaine. At the program level, URI’s civil engineering program does not have a capstone course sequence, which is incompatible with UMaine’s general education requirements. Four credits need to be added to make this program comparable to UMaine. These adjustments have been applied in Table 4. Once these adjustments have been made it is seen that UMaine’s credit hour requirements are very similar to those of our New England peers.

Table 4. Credit hour requirements for engineering degree programs at New England land grant universities after adjustment for institution level differences in general education requirements or course structure.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Biological</th>
<th>Chemical</th>
<th>Civil</th>
<th>Electrical/Computer</th>
<th>Mechanical</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMaine</td>
<td>132</td>
<td>130</td>
<td>129</td>
<td>124</td>
<td>131</td>
</tr>
<tr>
<td>UNH</td>
<td>130</td>
<td>129</td>
<td>130</td>
<td>127</td>
<td>128</td>
</tr>
<tr>
<td>UVM</td>
<td>**</td>
<td>**</td>
<td>126*</td>
<td>129*</td>
<td>131*</td>
</tr>
<tr>
<td>UConn</td>
<td>128</td>
<td>128</td>
<td>128</td>
<td>126</td>
<td>128</td>
</tr>
<tr>
<td>URI</td>
<td>124-129*</td>
<td>126*</td>
<td>126*</td>
<td>125-128*</td>
<td>132*</td>
</tr>
<tr>
<td>UMass Amherst</td>
<td>**</td>
<td>133*</td>
<td>127*</td>
<td>131-133*</td>
<td>130*</td>
</tr>
</tbody>
</table>

*Adjusted to be compatible with UMaine general education and course structure
**Does not offer degree
Likewise, it is important that the requirements for UMaine’s engineering technology degrees be comparable to similar institutions in the region. The peer group for engineering technology degree programs includes both public and private institutions. The comparison in Table 5 shows that the credits needed for UMaine’s engineering technology programs are already at the lower bound of its peers leaving no flexibility for reducing current requirements.

Table 5. Credit hour requirements for engineering technology degree programs in northeast.

<table>
<thead>
<tr>
<th>Institution</th>
<th>Construction Management Technology</th>
<th>Electrical Engineering Technology</th>
<th>Mechanical Engineering Technology</th>
<th>Surveying Engineering Technology</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMaine</td>
<td>126</td>
<td>126</td>
<td>128</td>
<td>126</td>
</tr>
<tr>
<td>UNH</td>
<td>*</td>
<td>128</td>
<td>128</td>
<td>*</td>
</tr>
<tr>
<td>Wentworth</td>
<td>*</td>
<td>140</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>Vermont Tech</td>
<td>*</td>
<td>135</td>
<td>137</td>
<td>*</td>
</tr>
<tr>
<td>UMass Lowell</td>
<td>*</td>
<td>127</td>
<td>127</td>
<td>*</td>
</tr>
<tr>
<td>Univ. of Hartford</td>
<td>*</td>
<td>132</td>
<td>128</td>
<td>*</td>
</tr>
<tr>
<td>Rochester Institute of Tech</td>
<td>*</td>
<td>127</td>
<td>128</td>
<td>*</td>
</tr>
</tbody>
</table>

*Does not offer degree

The credits required to earn an engineering or engineering technology degree at the University of Maine do not hinder a student’s ability to compete their degree in a timely manner. In fact, engineering’s four-year graduation rate is 6 percentage points higher that the University as a whole even though almost all degree programs outside of engineering have lower credit hour requirements. Thus, timely completion of a degree cannot be used as justification to alter the credits required to earn an engineering degree.

Engineering and engineering technology B.S. degree graduates are in great demand by industry and graduate schools. Based on the most recent Life After UMaine Survey, 97% of engineering graduates had either full-time employment or were in graduate school full-time within six months after graduation. Moreover, their average starting salary was reported as $53,000, the highest of any degree group at UMaine. This shows both the overall high demand for engineering graduates and that industry greatly values the preparation that our graduates receive during their education. This further justifies the credits needed to earn an UMaine engineering degree.

The BOT 121-credit policy was enacted because in some cases the growing number of credit hours required to earn a degree were making it more difficult to complete a degree in four years. Engineering graduates have a four-year graduation rate that is 4 percentage points higher than the averages for the other four academic colleges and a six-year graduation rate that is 11 percentage points higher even though the number of credits required to earn a bachelor’s degree in engineering is greater than in the other colleges. Thus, time to graduation is not a compelling justification for reduction in the number of credits.
EXCEPTION REQUEST

The programs in the College of Engineering request an exception to the Board of Trustees policy to “Limit Undergraduate Degrees to 121 Credit Hours”. The policy allows for exceptions on a case by case basis taking into account factors such as accreditation requirements. It is not possible for the programs within the College of Engineering to reduce the credits required for graduation to 121, although some programs were able to achieve some reduction in credit hour requirements. The reasons for the greater credits needed for graduation are: ABET accreditation requirements, constraints imposed by the University’s general education requirements, maintaining parity with similar degree programs in the Northeast, and expectations of the employers of our graduates. The College therefore requests an exception BOT policy and that the maximum number of credits required for graduation listed in Table 6 be allowed.

Table 6. Requested maximum number of allowable degree credits

<table>
<thead>
<tr>
<th>Program</th>
<th>Maximum allowable credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bioengineering (BEN)</td>
<td>132</td>
</tr>
<tr>
<td>Chemical engineering (CHE)</td>
<td>130</td>
</tr>
<tr>
<td>Civil engineering (CIE)</td>
<td>129</td>
</tr>
<tr>
<td>Computer engineering (CEN)</td>
<td>124</td>
</tr>
<tr>
<td>Electrical engineering (ELE)</td>
<td>124</td>
</tr>
<tr>
<td>Engineering physics (EPS)</td>
<td>122</td>
</tr>
<tr>
<td>Mechanical engineering (MEE)</td>
<td>131</td>
</tr>
<tr>
<td>Construction management technology (CMT)</td>
<td>126</td>
</tr>
<tr>
<td>Electrical engineering technology (EET)</td>
<td>126</td>
</tr>
<tr>
<td>Mechanical engineering technology (MET)</td>
<td>128</td>
</tr>
<tr>
<td>Surveying engineering technology (SVT)</td>
<td>126</td>
</tr>
</tbody>
</table>

Additional rationale for each program is given in Appendix I.
APPENDIX I - PROGRAM SPECIFIC RESPONSES

Bioengineering

The bioengineering industrial advisory board unanimously voted to ask for an exemption to the Board of Trustees 121 credit policy. The following motion was passed: “After comprehensive review of the Bioengineering Curriculum, an application for exemption for the mandated credit hour limit is crucial to avoid the deleterious effects to the quality and competence of the education of the students secondary to any resultant course reduction or alteration. Furthermore, this mandated limit should be revised for effects and implications it has on campus-wide undergraduate educational programs.”

Chemical engineering

The chemical engineering industrial advisory board unanimously voted to keep degree requirements for the Bachelor of Science in Chemical Engineering at its current level of 130 credits. The rational for this decision included that students needed to stay marketable and competitive. The general consensus was that reduction to 121 credits would hurt competitiveness of our graduates, thereby reducing the value of a UMaine BS CHE. This would be a significant disadvantage to the UMaine brand.

Civil engineering

The members of the Civil Engineering Association (CEA) (the external advisory board for the Department of Civil and Environmental Engineering) reached a unanimous consensus that the program should remain at 129 credit hours. The CEA considered several options for reducing the number of credit hours including:

- Eliminating the required course in surveying. This met resistance from several members, who feel strongly that this course is very important.
- It was suggested that HVSC credits be reduced, but not all members felt that this was a good approach, and it would not be allowed by the University in any case.
- There was a suggestion to reduce math requirements, but math through differential equations is required of all accredited civil engineering programs, and knowledge of statistics is important to civil engineering.

The advisory board agreed that we should uniformly oppose a reduction in credit hours. All committee members were tasked with e-mailing the Chair their rationale for maintaining the program at 129 credit hours, which is summarized as follows:

- Civil engineering requires the study of multiple disciplines, including environmental, structural, transportation, geotechnical and water resources engineering. Career choices
are vast and a civil engineer must be versed in all areas. The requisite breadth and depth cannot be achieved with fewer credit hours than the current number of 129.

- UMaine civil engineering graduates quickly become productive after their initial employment because of their breadth and depth of knowledge; this is not true of civil engineering graduates of all Universities. Limiting the curriculum will not only hurt the graduate but adversely impact employers and the ability to find the well-rounded graduate. One CEA member commented: “I have 8 of 10 Maine graduates and am proud that they are able to attack any task with limited assistance. The rounded education they have is a definite benefit to us as employers.”

- Civil engineers bear significant responsibility for public safety and environmental stewardship, which would be compromised if the graduation requirements were to be reduced.

- Reducing the credit hours will hurt an excellent program that has taken years to build and has a strong national reputation as evidenced by the number and quality of employers that participate in the UMaine engineering job fairs and hire UMaine graduates.

Electrical and computer engineering

The Department of Electrical and Computer Engineering has investigated several possible plans for reducing the number of credit hours required for its programs, and discussed possible plans at length with its ECE Advisory Board in its Fall 2012 meeting. The advisory board had significant reservations at the possible reduction to 121 credit hours, and strongly suggested that ECE investigate a 124-credit option, and apply for an exception to the UMaine Board of Trustees (BOT) 121-credit limit policy. Note that in 2012/2013, the Electrical Engineering degree requires 131 credits, and the Computer Engineering degree requires 130 credits: a reduction (even to 124 credits) is a significant change in both programs. The advisory board is in agreement with the faculty that reduction to 121 credits could jeopardize the integrity of the programs, and put the programs at risk of losing accreditation.

Subsequent to the Advisory Board Meeting, the ECE faculty approved a plan follow the Board recommendation, and reduced the degree requirements for both degrees to 124 credits effective Fall 2013. The department respectfully requests an exception to the BOT 121-credit policy so that further reductions are not required. The faculty and Advisory Board agree that further reductions will have a serious negative impact on the learning experience of students. The following observations provide the rationale for the request:

- The 121-credit requirement places the UMaine ECE degrees significantly below the regional norms for Electrical or Computer Engineering degrees. (A survey of neighboring New England Schools shows Electrical Engineering degree requirements ranging from 126 to 130 credits.) UMaine ECE could be perceived as less rigorous than at competing institutions, and graduates could be at a competitive disadvantage as they enter the workplace.
- Reductions below 124 credits decrease the number of technical electives available to students. Both Electrical and Computer Engineering are extremely diverse fields, and employers expect a significant degree of specialization in their new hires.

- Any reduction below 124 credits results in a reduction in the number of technical electives available to students: they will have reduced ability to pursue a deeper knowledge in an area where they have a strong interest. Electrical Engineering and Computer Engineering are extremely diverse fields, and it’s important that students have the opportunity to gain depth in a desired concentration. This specialized knowledge is expected by industry who are recruiting graduates.

- While the overall reduction in credit hours may seem a small percentage of the program total, the reduction would reduce the number of technical electives taken by a student by nearly 30%. This is a significant change, and would have a negative impact on the ability of graduates to immediately contribute to the workplace.

- Unless accompanied by a compensating increase in enrollments, the number of students taking technical electives will decrease by almost 30%. The result could be that some technical electives would become difficult to populate, and would not be offered. Students would ultimately be unable to take courses to support a desired career option, and faculty may be inhibited from teaching the breadth of their interests.

Engineering physics

The advisory board for the Engineering Physics program felt that 5 credit hours of free electives could be eliminated from the program requirements. This would reduce the number of credits required for a Bachelor of Science in Engineering Physics from 127 credits to 122 credits. The board did not see a way to maintain the program that covers the essentials of physics, engineering, and mathematics with any further reductions in credit hours. The Physics faculty thoroughly discussed options for modifying program credits requirements in several meetings over the past year, agreeing with the advisory board that dropping the requirement for 5 credit hours of free electives was appropriate but concluding also that any further reduction would substantially weaken the degree. The free electives had been maintained as a program requirement to allow some flexibility in the program and especially as a ‘buffer’ for some non-engineering prerequisites to some of the basic engineering courses required in two of our Engineering area concentrations (Bioengineering and Chemical Engineering). Students will now have an even more prescribed program in order to graduate at the 122 credit minimum, but as long as needed course offering frequencies can be maintained, it will be possible for EPS students electing any of the concentration areas to do so.
Mechanical engineering

The members of the Mechanical Engineering Department faculty (MEE) reached a consensus that the program should remain at 131 credit hours. The MEE considered several options for reducing the number of credit hours including:

1. Eliminate the Basic Science Elective (reduction of 4 credits)
   While basic science courses such as Astronomy, Geology and Biology help students broaden their knowledge of the physical sciences, they are secondary to the technical courses in terms of importance to mechanical engineers. (Majority of faculty opposed this elimination)

2. Eliminate COS 215 Fortran Programming (reduction of 3 credits)
   Students don't seem to be getting much out of COS 215. We can potentially eliminate COS 215 and include the basics of computer programming in MEE 101 and continue to reinforce those concepts throughout the curriculum by giving computer assignments and projects in courses such as MEE 370 (Controls), MEE 381 (Design I), MEE 432 (Heat Transfer) and MEE 471 (Vibrations). (Majority of faculty opposed this elimination)

3. Reduce MEE 381 Design II to 3 credits (reduction of 1 credit)
   Students currently have to wait until the third year to learn CAD. By moving it to MEE 101, students will be exposed to CAD and solid modeling sooner in the curriculum and they will feel that they are doing something related to mechanical engineering early on. This will also help with student retention. (Majority of faculty opposed this elimination)

4. Increase MEE 101 to 3 credits (addition of 2 credits)
   Include computer programming and CAD as part of MEE 101 and change it from Pass/Fail to a graded course. Mick already teaches Octave (a free high-level interpreted language similar to Matlab that can be used for programming and data visualization) in MEE 101. By adding credits, the computer programming component can be expanded with students being introduced to concepts of structured programming (conditional statements, loops and subroutines) in the context of engineering applications. In addition, this course will introduce students to the principles of engineering graphics and computer-aided design. (Majority of faculty opposed this elimination)

However, the majority of the faculty was opposed to any reduction of hours from 131. Thus, it was not practical to reduce the hours across the board in the MEE dept.

School of Engineering Technology

Construction Management Technology

The members of the Construction Management Technology Industrial Advisory Committee recommend maintaining the number of credits required for a BS degree at 126 credits. It is very important for CMT students to earn minors, particularly the business minor. Having several
required technical electives encourages CMT students to take courses that count toward a minor. Any reduction in credits would have to come from decreasing the number of required technical electives.

**Electrical engineering technology**

The Board of Trustees is requesting that each program consider reducing the number of credit hours to no more than 121 credits. The Industrial Advisory Committee for the BS in Electrical Engineering Technology strongly disagrees with reducing the current number of credit hours. The EET Coordinator, Jude Pearce, is attempting to have the required course EET 386, Project Management, approved as a HVSC elective. If this is possible, the program requirements can be reduced by 3 credit hours.

**Mechanical engineering technology**

The Board of Trustees is requesting that each program consider reducing the number of credit hours to no more than 121 credits. The Industrial Advisory Committee for the BS in Mechanical Engineering Technology strongly disagrees with reducing the current number of credit hours.

**Surveying engineering technology**

The Surveying Engineering Technology Industrial Advisory Committee strongly disagrees with the requirement that all bachelor of science programs be no more than 121 credits. This would reduce the course curriculum that has been developed by the SVT IAC in recognition of what is required of the graduates. Specifically, the SVT IAC feels that the reduction in the number of credits would eliminate the ability of students to receive a minor which is an important requirement of the curriculum.