Application for Approval
Undergraduate Curricula Plans for the College of
Applied Science and Engineering

Following in principle the type of curricula prepared by an ad hoc committee of UWM in
the spring of 1964, a planning and development committee of the College of Applied
Science and Engineering has been studying undergraduate curricula since organization of
the College in October, 1964. The committee has been ably assisted by a committee from
Madison consisting of Professors Thomas Higgins, Gerald Nadler and Charles Salmon. In
addition, reference was made to numerous school catalogs, articles in engineering jour-
nals, and visits were made to such campuses as University of Illinois - Chicago, Case
Institute of Technology, University of New York at Buffalo, Rensselaer Polytechnic
Institute, Dartmouth College, and Brooklyn Polytechnic Institute. The evidence obtained
points quite definitely to the trend in engineering education as exemplified by the
following characteristics:

1. A common core of engineering science courses.
2. A substantial amount of humanistic-social science courses.
3. A tendency toward elimination of departmental barriers at the undergraduate
   level.
4. Greater opportunity for course election on the part of the student.
5. Shifting of professional engineering education to the graduate level.
6. Introduction of "newer" engineering science courses into the curriculum
   such as operations research techniques, engineering systems design and
   control theory.

This is but a brief evaluation of these trends, but it is apparent to the committee and
to anyone studying engineering education that they are developing rapidly.

In anticipation of these changes and in keeping with the objective of UWM to be a leader
in education, the College of Applied Science and Engineering is submitting herewith a
curriculum plan for approval. The details of the various curricula have not been com-
pletely established, nor have the specific outlines of each of the courses. However,
in order for us to proceed with our study and to hire staff who may be assigned to the
important course detailing and advanced curricula planning, it is essential that we gain
early approval of the Faculty, the Board of Regents, and the Coordinating Committee on
Higher Education.

As indicated by the sample curriculum on p.4, the four-year program leading to the
B. S. in Applied Science and Engineering can be separated into the following units:

1. Basic sciences
2. Engineering science
3. Engineering science applications
4. English and humanistic-social studies

The Planning and Development Committee studied the needs of the students in the light
of job opportunities, the offerings at Madison, and the areas of research which could
be pursued effectively at UWM. This analysis suggests that our initial options in
engineering science applications available as technical electives (Point 3 above), largely
in the junior and senior years, would be best concentrated in the subjects indicated in
the sample curriculum. The first five of these options were also advocated by the ad hoc
committee working on this problem last year.
It is quite possible that the Engineers' Council for Professional Development would recognize some of the options as being adequate to qualify for a B.S. degree in some specified field of engineering. Yet, adequacy alone is not our goal. It is our objective to place training for professional engineering at the graduate level. Therefore, the first degree will be undesignated as to field of engineering, but at the same time it is our intention to give the terminal student enough of a background in his chosen specialty so that he can function effectively in an engineering environment.

While graduate programs are being planned, they have not been developed to the point where they can be presented now.

In summary, the College of Applied Science and Engineering is requesting approval of the following:

1. A curriculum based on a common core of courses in science, engineering science, and humanistic-social studies, and an elective engineering science applications area of concentration, leading to the degree B.S. (Applied Science and Engineering)

2. Majors in the following categories with the option to request approval for others at some later time:
   a. Electrical science
   b. Mechanical design
   c. Engineering mechanics
   d. Materials science
   e. Structural design
   f. Industrial operations
   g. Engineering science
   h. Engineering management
   i. Energy conversion

3. A statement providing minimum percentages in the first three categories listed in (1) to serve as the framework within which future adjustments in curricula can be made without the need for full faculty action.

It is understood that lists of courses to meet the requirements for each of the categories listed above will be offered later.

COLLEGE OF APPLIED SCIENCE AND ENGINEERING
PLANNING AND DEVELOPMENT COMMITTEE

H. Boettcher
V. Cutler
G. Elmergreen
P. Rosenthal
J. Van Vleet, Chairman
Statement of Curricula

The College of Applied Science and Engineering recommends that the following statement regarding its minimum curricula requirements be approved:

Curricula in Applied Science and Engineering

Curricula leading to the Bachelor of Science degree in Applied Science and Engineering consist of minimal course credit distributions as follows:

I. Basic Science 20% Min.
   Mathematics
   Physics
   Chemistry
   Geology and
   Natural Sciences

II. Engineering Sciences and Applications 40% Min.
   A. Engineering Sciences
      Mechanics of Solids and Fluids
      Thermodynamics
      Transfer and Rate Mechanisms
      Electrical Theory
      Nature and Properties of Materials
      Engineering Systems
      Engineering Graphics
      Computer Science
   B. Engineering Science Applications
      Analysis
      Design
      Construction and Manufacturing
      Operations and Processes
      Economics
      Administration and Management

III. English and Humanistic-Social Studies 15% Min.
    Electives

Detailed curricula meeting or exceeding the above minimum requirements will be specified by the Faculty of the College of Applied Science and Engineering. These curricula will generally exceed these minimum percentages and the balance of the 128 credits required for graduation will be available for free electives.
TYPICAL CURRICULUM

An example of a typical curriculum meeting and exceeding these minimal requirements would be:

<table>
<thead>
<tr>
<th>Credits</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. Basic Science</td>
<td></td>
</tr>
<tr>
<td>Mathematics</td>
<td>16</td>
</tr>
<tr>
<td>Physics</td>
<td>12</td>
</tr>
<tr>
<td>Chemistry</td>
<td>8</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>36 cr.</td>
</tr>
</tbody>
</table>

II. Engineering Sciences and Applications

A. Engineering Science

<table>
<thead>
<tr>
<th></th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engineering Graphics</td>
<td>3</td>
</tr>
<tr>
<td>Computer Science</td>
<td>3</td>
</tr>
<tr>
<td>Solid Mechanics</td>
<td>9</td>
</tr>
<tr>
<td>Electrical Science</td>
<td>7</td>
</tr>
<tr>
<td>Materials Science</td>
<td>4</td>
</tr>
<tr>
<td>Linear Systems Analysis</td>
<td>3</td>
</tr>
<tr>
<td>Thermodynamics</td>
<td>3</td>
</tr>
<tr>
<td>Statistical Methods</td>
<td>3</td>
</tr>
<tr>
<td>Fluid Mechanics or Transport Phenomena</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>38 cr.</td>
</tr>
</tbody>
</table>

B. Engineering Science Applications

An elective sequence of 4 to 6 courses in a specific engineering area such as:*

1. Electrical Science
2. Mechanical Design
3. Structural Design
4. Materials Science
5. Engineering Mechanics
6. Industrial Operations
7. Engineering Science
8. Engineering Management
9. Energy Conversion

**Total** 18 cr. 14%

III. English and Humanistic-Social Studies Elective

21 cr. 16%

IV. Electives

**Total** 15 cr. 12%

128 cr. 100%

*These areas have been selected to represent those which appear to be in greatest need or which supplement and complement the offerings at Madison. Others may be added as demand warrants.