4. Professional Component
The curriculum meets EAC/ABET and Mechanical Engineering Program Criteria for
content and content distribution. The program, described below, culminates in a major
design experience that builds on previous courses.

4.1 Curriculum Course Content:
The curriculum for the Bachelor of Science in Mechanical Engineering degree is given in
Table I-1, Basic Level Curriculum for Mechanical Engineering (Appendix I.A). A total of
128 semester hours are required for the degree, including 33 semester hours (26%, or 1.04
years) of math and basic science, 57 semester hours (45%, or 1.8 years) of engineering
topics, 30 semester hours (23%, or 0.92 year) of humanities and social sciences and 8
semester hours (6% or 0.24 year) classified as “other”.

Consistent with offering a program with flexibility and encouraging life-long learning, the
curriculum includes nine hours of required Technical Electives. Students are free to
choose Technical Electives from any 4000 or 5000 level technical electives offered by the
Department of Mechanical Engineering. The constituents and faculty desire students who
can contribute in a significant area of Mechanical Engineering upon graduation. Electives
are offered in each of the four academic areas so that a student can concentrate their study
in one of these areas and gain the proficiency that our constituents seek. Student
advisement regarding scheduling and elective selection is on an as needed basis as
described under Section B.1 Students.

The Mechanical Engineering Program Criteria require expertise in a number of areas.
The abilities specified in the Program Criteria are a component of the Program
Outcomes expected of all graduates. These criteria are fully described in Section 8.

The Program Educational Objectives for the Department have been described in Section
B2. The objectives of each Mechanical Engineering course are related to the Program
Educational Objectives in the individual course syllabi. Syllabi for courses required for
the degree are contained in Appendix I.B. Each Mechanical Engineering course typically
contains a number of objectives and each course objective may relate to one or more of
the Program Educational Objectives (this linkage is shown on each syllabi included in
Appendix I.B). The course syllabi for all required courses taught in Mechanical
Engineering (Appendix I.B) contain specific outcomes for each course objective.

The policy of the Department is to offer every required Mechanical Engineering course
every semester, including summer. This policy is intended to facilitate academic
planning and is especially useful for students in the co-op program. Table I-2, Course
and Section Size Summary for Mechanical Engineering (Appendix I.A), is a
compilation of all courses offered and section sizes for the 2003-04 academic year.

4.2 Engineering Design Experience:
Design is an integral part of the Mechanical Engineering curriculum. Table I-1, Basic-
Level Curriculum for Mechanical Engineering (Appendix I.A), indicates required courses
that, based on their syllabi, have significant design content. The majority of the design experience for students in the Mechanical Engineering program is contained in six courses. This is an increase in design hours over what was in our quarter-based curriculum. Students’ first exposure to the rudiments of design occurs in their freshmen year when they take Introduction to Engineering (ENGR 1110). Here students learn about everything from hand sketching and solid modeling to rapid prototyping. In Concepts in Design and Manufacturing (MECH 2210), students are taught the fundamentals of design using lectures. The course emphasizes problem formulation and decision-making and includes a variety of oral and written assignments. The third course, Computer Aided Engineering (MECH3220), stresses computer tools used in the design process and drawing and graphical techniques used in the design process.

The fourth and fifth courses focus on component design including both mechanical (MECH 3230, Machine Design) and thermal (MECH 3020, Thermodynamics II).

The Capstone design sequences of courses are Comprehensive Design I (MECH 4240) and Comprehensive Design II (MECH 4250), respectively. The intent of these courses is to provide a realistic design experience in an academic environment. The experience relies on student knowledge and skills acquired in earlier course work to enhance their ability to design. Student teams address a significant design problem drawn from industry and are expected to proceed through the entire design process from problem formulation to a working machine. Projects are varied including product design, design of one-of-a-kind machines, mechatronics, and thermal design. Students who do not produce a practical working machine are penalized in grade. All students receive significant shop training and personally fabricate and assemble their machine. The shop experience allows the student to understand the need to consider the manufacturing process in the design process. Teamwork is emphasized including teaming with students from other disciplines. Students must consider appropriate engineering standards including safety and ergonomics, realistic constraints supported by economic analysis and, where appropriate, environmental impact. Examples of machines designed and built include A dryer vent cleaning machine, a machine to automatically “point” wooden hubs of various sizes, a machine to automatically set a number of foam molds used to make automotive parts, and a high efficiency (95%+) commercial water heater.