

# ASSESSMENT REPORT 2016-2017

## Computer Science

## B.S.

### **Program Mission:**

The mission of the Computer Science B.S. Program is to provide students with a challenging, market relevant and high-quality education in computer science.

### **Student Learning Outcome 1:**

Understand basic computer science terminology, technology and programming methods.

### **NMHU Traits Specifically Linked to Student Learning Outcome 1**

- Mastery of Content Knowledge and Skills

### **First Means of Assessment for Outcome 1:**

Final grade from CS 144: Introduction to Computer Science; introduction to relevant terminology, technology and programming methods in computer science. Students mastery will be measured with a C or better in the course.

### **Summary of Data:**

Number of Students Meeting Criterion:	<b>21</b>	Number of Students Not Meeting Criterion:	<b>0</b>
Total Number of Students Assessed:	<b>23</b>	Percent of Students Meeting Criterion:	<b>91.3%</b>

### **Second Means of Assessment for Outcome 1:**

Final grade from CS 145: Introduction to Object Oriented Programming; introduction to relevant object oriented terminology, technology and programming methods in computer science. Students mastery will be measured with a C or better in the course.

### **Summary of Data:**

Number of Students Meeting Criterion:	<b>7</b>	Number of Students Not Meeting Criterion:	<b>1</b>
Total Number of Students Assessed:	<b>8</b>	Percent of Students Meeting Criterion:	<b>88%</b>

### **Interpretation of Results for Outcome 1:**

*The marked improvement in students meeting criterion correlates to a freshman cohort that are strongly motivated to learn the basic CS and Programming techniques. Attendance and participation in CS 145 lecture and lab in particular were excellent.*

**Student Learning Outcome 2:**

Successfully apply knowledge of advanced programming methodology to complex problems in computer science.

**NMHU Traits Specifically Linked to Student Learning Outcome 2**

- Critical and Reflective Thinking Skills
- Effective Use of Technology

**First Means of Assessment for Outcome 2:**

Programming Labs and Exams from CS 245: Advanced Computer Programming evaluating current knowledge of software engineering, debugging/testing, simple data structures and object oriented programming principles. Students' ability to successfully accomplish the above topics in programming methods will be measured by an achievement of a C or above in their final grade.

**Summary of Data**

Number of Students Meeting Criterion:	<b>11</b>	Number of Students Not Meeting Criterion:	<b>0</b>
Total Number of Students Assessed:	<b>11</b>	Percent of Students Meeting Criterion:	<b>100%</b>

**Second Means of Assessment for Outcome 2:**

Programming Labs and Exams from CS 345: Data & File Structures evaluating current knowledge of advanced programming techniques and technologies involving complex data structures and algorithms, graphical user interfaces and object-based programming utilizing sophisticated software development and debugging tools. Students' ability to successfully accomplish the above programming tasks will be measured by an achievement of a C or above in their final grade.

**Summary of Data:**

Number of Students Meeting Criterion:	16	Number of Students Not Meeting Criterion:	1
Total Number of Students Assessed:	17	Percent of Students Meeting Criterion:	<b>94%</b>

**Third Means of Assessment for Outcome 2:**

Programming Labs and Exams from CS 451: Software Engineering evaluating current knowledge of concepts and techniques of software engineering as related to object

oriented design principles, integration of systems analysis into all aspects of the software life cycle, correctness and functionality of large scale software projects as formally specified in the design process. Students' ability to successfully accomplish the above programming tasks will be measured by an achievement of a C or above in their final grade.

**Summary of Data:**

Number of Students Meeting Criterion:	11	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	11	Percent of Students Meeting Criterion:	<b>100%</b>

**Interpretation of Results for Outcome 2:**

*The junior/senior cohort in this academic year has shown stronger maturity towards rigorous study of complex problem solving in data and file structures. Students across the board demonstrate consistent attendance and participation. Students' attitude towards complex software engineering techniques and tools remained excellent throughout. The above suggests that these upper division students are gaining confidence and competence for working in their fields.*

**Student Learning Outcome 3:**

Effectively design/implement a relevant computer science project and communicate ideas, information and results, both verbally and in writing that (1) demonstrate consistent logic/critical thinking; (2) are well organized; (3) state and defend a thesis; and (4) demonstrate competent use of language in oral and written reports. (5) Project works as designed with a complete demonstration to students and faculty.

**NMHU Traits Specifically Linked to Student Learning Outcome 3**

- Effective Communication Skills
- Mastery of Content Knowledge and Skills
- Critical and Reflective Thinking Skills
- Effective Use of Technology

**First Means of Assessment for Outcome 3:**

Final grade (Oral presentation/Technical report) from CS 481: Senior Design term project in which students submit project proposal to computer science faculty for approval/modification Once approved student will successfully integrate previous course work into project and submit technical report to faculty as well as do an oral presentation for all computer science students and faculty at the end of the term. Students' ability to effectively communicate scientific ideas, information, and results will be measured by achievement of a score of a C or better on final grade in the course.

### Summary of Data

Number of Students Meeting Criterion:	7	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	7	Percent of Students Meeting Criterion:	<b>100%</b>

### Second Means of Assessment for Outcome 3:

Final grade (Oral presentation/Technical report) from CS 482: Senior Implementation term project in which students implement project proposal. A technical report to faculty as well as do an oral presentation for all computer science students and faculty at the end of the term will be required. Additionally, students will upload all source code and documentation to an open-source entity such as Github to build their professional portfolio as well as create a tracking/critique mechanism for faculty and external advisory board members to provide critical feedback to the students and program. Students' ability to effectively communicate computer science ideas, information, and results will be measured by achievement of a score of a C or better on their final grade in the course.

### Summary of Data

Number of Students Meeting Criterion:	3	Number of Students Not Meeting Criterion:	0
Total Number of Students Assessed:	3	Percent of Students Meeting Criterion:	<b>100%</b>

### Interpretation of Results for Outcome 3:

*The senior cohort in this academic year has shown stronger maturity towards rigorous study of complex project implementation. Students across the board demonstrate consistent attendance and participation. Students' attitude towards working on a complex project was excellent. They achieved goals set in the design phase and successfully submitted a completed project for graduation.*

### Utilization of Results:

The results of our assessments will be made available to our external advisory board and faculty. The feedback we receive regarding the results of our assessment will close the loop on our assessment system. This will allow us to apply both our internal faculty critique (internal feedback) and external advisory board critique (external feedback) to provide the proper amount and direction for growth and change in the program.

### Changes to Program Based on Results:

Scholarship/internship opportunities will increase undergraduate student numbers. The bottleneck to our growth is in funding options for our undergraduate students. Additionally, our tenure-tenure track faculty in CS is quite small. Currently, it's possible

to cover course offerings and mentor graduate students with this number of faculty, but in the near future it will be very difficult to give both areas fair coverage. We believe the need for more resources within the CS field are necessary for growth as well. By this, we mean it would greatly enhance our program to have the most current hardware platforms for computing as well as software to achieve growth in areas such as high performance computing, machine learning, data science, cyber-security, human-computer interface design and advanced visualization. Our hope is to identify infrastructure grants as well as external advisory board groups to this end.

### **Retention Strategies:**

The greatest growth areas can be seen in our transfer students from community colleges. Once again, retention for both these groups depends on scholarship/internship funding and financial aid. Our students have very limited budgets and we must address this problem by offering cost offsets such as scholarships and internships. The ability to offer some type of funding to our two our undergraduate students will increase our retention greatly.