



EASTERN MICHIGAN UNIVERSITY

GameAbove College of Engineering & Technology Annual Assessment Report 2020 - 2021

1. Assessment Process

Introduction

The GameAbove College of Engineering & Technology currently has 29 academic programs that are located in four different schools: School of Engineering, School of Information Assurance & Applied Computing, School of Technology & Professional Services Management, and School of Visual & Built Environments. The college has seen a growth in many of its programs as a result of changes made to the programs in response to new and emerging technologies, industry demands, and student expectations. Most programs have Advisory Boards whose members consist of current students, faculty, alumni, and industry experts. The Advisory Boards are key to helping programs stay abreast of the needs of students and industry through their feedback and recommendations. Two primary goals of the college, which tie closely with the assessment process, are to advance the overall quality of academic programs and to increase recognition for the college by pursuing accreditation from external accreditation bodies.

Assessment Process

The GameAbove College of Engineering & Technology's Assessment Committee is made up of the Associate Dean and an elected faculty member from each of the four schools. The Assessment Committee initially meets at the beginning of each fall semester to discuss the previous year's assessment and to identify changes that may be needed during the upcoming year regarding the college assessment process and/or template. The Committee members serve as facilitators between the Assessment Committee and the faculty in each of their respective schools regarding any changes or recommendations. All committee and faculty meetings for 2020-2021 were held virtually via Zoom due to restrictions as a result of COVID-19.

The Directors for each school determine who will conduct the assessment for each of their programs. The assessment is traditionally conducted by the program coordinator; however, the Director may choose to select another senior faculty member due to extenuating factors. The Directors of each school are responsible for initially reviewing and approving the assessment reports submitted by the program coordinators or faculty from their school before they are submitted to the Associate Dean.

Accreditation Process

Assessments are a key factor for all accreditation bodies and meeting their strict mandates and criteria are necessary before any program is accredited. Because of the diversity of the college programs, this becomes complex because there are currently 9 different external accreditation bodies that review and monitor 16 programs in the college. Figure 1 identifies the current accreditation bodies and programs that are either currently accredited or in the approval process. The accreditations require that programs and certain courses within those programs be assessed or reviewed yearly using metrics identified by the accreditation body or by the program (ex: enrollment, sustainability rate, graduation rate, results from surveys distributed to current students, graduating students, and alumni).

Figure 1 shows the accreditation bodies and programs that are either currently accredited or in the approval process.

- **ABET-EAC:** Accreditation Board for Engineering & Technology – Engineering Accreditation Commission:
 - ◆ Mechanical Engineering, B.S.
 - ◆ Electrical & Computer Engineering, B.S.
- **ABET-ETAC:** Accreditation Board for Engineering & Technology – Engineering & Technology Accreditation Commission:
 - ◆ Mechanical Engineering Technology, B.S.
 - ◆ Product Design & Development, B.S.
 - ◆ Electronics Engineering Technology, B.S.
 - ◆ Computer Engineering Technology, B.S.
- **ABET-CAC:** Accreditation Board for Engineering & Technology – Computer Accreditation Commission
 - ◆ Information Assurance, B.S.
 - ◆ Information Technology, B.S.
- **ACCE:** American Council for Construction Education Accreditation:
 - ◆ Construction Management, B.S.
- **CIDA:** Council for Interior Design Accreditation
 - ◆ Interior Design, B.S.
- **NASAD:** National Association of Schools of Art & Design
 - ◆ Simulation, Animation, and Gaming, B.S.
 - ◆ Interior Design, B.S.
- **AABI:** Aviation Accreditation Board International
 - ◆ Aviation Flight Technology, B.S.
 - ◆ Aviation Management Technology, B.S.
- **ACPHA:** Accreditation Commission for Programs in Hospitality Administration
 - ◆ Hotel & Restaurant Management, B.S.
- **ABA:** American Bar Association
 - ◆ Paralegal, B.S.

Figure 1: Accreditation bodies for GACET programs (currently accredited or in the approval process)

GACET Assessment Template

Figure 2 shows the template used by GACET programs for the college assessment report.

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| <p style="text-align: center;">College of Engineering and Technology Program Annual Assessment Report AY21 (Fall 2020-Winter 2021)</p> <p>Program name: Report Year: Fall 2020-Winter 2021 Submitted on (date): Completed by: Approved by:</p> <p>Instructions: Please complete Parts I, II, III, & IV. Submit the assessment report to your school director by the due date listed below.</p> <p><u>Part I:</u> What actions were taken to ‘close the loop’ on the assessment conducted last year (ex: specific recommendations made in the plan of action)?</p> <p><u>Part II: Current Year Assessment – Include the Following</u></p> <ol style="list-style-type: none">1. Program Student Learning Outcomes (SLO)2. Curriculum Map3. Program Student Learning Outcome Assessed:4. Method of Assessment:5. Assessment Findings:6. Plan of Action: <p><u>Part III: Planning for the Future:</u> Include a chart or list indicating what classes will be assessed over the next 5 years. This is already a requirement for most accreditation bodies.</p> |
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Figure 2: GACET Assessment Template

2. Specific examples of improvements made to courses, programs, instructional approach, etc.:

A. Electrical and Computer Engineering - EECE 342

The EECE program is an ABET accredited program in the School of Engineering. Last year, several recommendations were made to the program and courses. Based on the assessment and recommendations, the following actions were taken to 'close the loop':

- Prerequisites changes were made to EECE 341 and EECE 371. The changes were updated to better fit the course level.
- EECE 400 was moved from being offered fall semester to winter semester. Based on student feedback and the rollout of the classes, it was found in previous assessments that EECE 400 was offered in various semesters without thought to when it was needed for their senior final exam. The decision was made to make this a 10-week course and offer it winter semester just prior to the final exam.
- Last year's assessment found that students who took a required class (ME100 or ET100) were missing key elements needed for the EECE program. Therefore, a new course (EECE 100) was created to replace the other courses. Thus, more EECE related course content can be introduced into the course for students.

These changes were made based on previous assessments. However, they were changed during AY21 and the program has not had an opportunity to assess the outcomes of these changes.

The program uses embedded materials, such as design materials and survey results to assist with their assessment. The assessment materials have corresponding performance criteria that must be met for each course. Not meeting the performance criteria means that appropriate changes need to be made to improve the students' achievement of that SLO, such as the examples given above for 'closing the loop'. The embedded assessment is used to evaluate select SLOs in the course content. Each performance indicator is rated as exemplary, satisfactory, developing, and unsatisfactory. The performance criteria for a course indicates that the performance indicator should score no less than 75% of students to the Satisfactory category or above. This year, the program assessed EECE 342. All seven SLOs for the course were assessed. The results showed that the students met or exceeded the performance target for each area other than SLO#4: An ability to recognize ethical and professional responsibilities in engineering situations and make informed judgements, which must consider the impact of engineering solutions in global, economic, environmental, and societal contexts. The students scored 60% and the performance target was 75%. The faculty indicated that this content may not have been adequately covered to the extent necessary in the class, assignments may not have been relevant to that SLO, or students may not have understood how the course material tied to the SLO. The program faculty will need to address this when they return in the fall to see how changes should be made to address this.

Based on the scores and feedback from the students/faculty, the following actions were recommended:

- Change the senior design course from one semester to two semesters to allow students more time to complete the project and incorporate the elements from these classes into the final project.

- In the senior design course, more emphasis needs to be placed on engineering standards and design constraints and embed the content from this course into the final project. Thus, the final project would have a scaffolding effect from previous courses.
- Turn EECE 480 into a writing intensive course. Currently, students are required to take a general SET 350W course and it is felt that the EECE students would benefit more from a writing intensive course that focuses on the content, material, and assignments relevant to the EECE program.

B. Information Assurance & Cyber Defense (IA/CD) – IA 385

IA 385 is a Database and Web Application Security class offered to junior level students. The course emphasizes database administration and protection and includes instruction on equipment and procedures. This year, they assessed the following SLOs:

- Ability to analyze a problem, and identify and define the computing requirements appropriate to its solution.
- Ability to function effectively on teams to accomplish a common goal.
- Ability to use current techniques, skills, and tools necessary for computing practice.

The assessment method used was based on different direct assessment methods such as individual hands-on lab projects, exams, and quizzes with different weight of value were used to assess students learning outcome in this class. Each of these assessment methods aimed to evaluate students’ learning outcomes that include: Students’ ability to 1. Define and identify: the nature of database and information systems security; the characteristics of viruses and how they infiltrate systems; security threats; the characteristics of viruses and how they infiltrate systems; specific types of operational security; the information security life cycle; and the multilayered nature of security architecture. 2. Define a database and identify the basic components of a database management system. 3. Identify and describe the architecture of Oracle, MySQL, and Microsoft SQL Server. 4. Secure the installation and configuration of MySQL server, Microsoft SQL Server, and Oracle. 5. Implement authentication, authorization, user management, password, roles and privileges with SQL Server, MySQL, and Oracle 6. Understand a SQL injection and identify how injections are executed, as well as defense strategies against SQL injection exploits. 7. Understand the security and database auditing processes. 8. Understand the methodology used to perform a security test.

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|--------------|------|
| Exam I | 20% |
| Exam II | 20% |
| Quizzes | 10% |
| Labs | 30% |
| Presentation | 20% |
| Total | 100% |

The course materials were prioritized and condensed in this lab-intensive class. While exams and quizzes assessed students’ theoretical comprehension in the subject matter, the lab assignments assessed their practical hands-on learning. The final project was suitable measurement to assess students’ technical writing as well as team work achievement of learning objective in this class.

The rubric and results of the assessment are shown in the following table:

| Students Achieved | Criteria | | | | Overall |
|-----------------------------|----------------------------|---|---|--------------------|---------|
| | Understand of SQL language | Identify, install, and manage SQL Server, MySQL, and Oracle | Understand SQL injection and identify how injections are executed | Report Preparation | |
| >= 80% | 89.8% | 82.1% | 89.8% | 100% | 89.8% |
| <80% | 10.2% | 7.7% | 0% | 0% | 10.2% |
| Did not Attempt or Complete | 0% | 10.2% | 10.2% | 0% | 0% |

The assessment findings indicated that target for Information Assurance program was that 80% of the students should be able to demonstrate competency with 80% accuracy. The overall outcome in IA 385 class in fall 2019 shows that more than 89% students' grades in this class fall within the 80% -100% categories. That is, upon completion of the class 89 % of the students were able to demonstrate competency with 80% accuracy in Understand of SQL language; Identify, install, and manage SQL Server, MySQL, and Oracle; Understand SQL injection and identify how injections are executed, and Report Preparation. About 10 % were below 80% and none of them did not completely attempt the class.

In order to have a continuous improvement that may assist the 0 - 10% students, who did not achieve the goal of 80% learning outcome goal, the faculty realized that changes needed to be made. The IA385 is a required course for students in undergraduate Information Assurance and Cyber Defense (IACD) program. The depth and scope of coverage in this course could be challenging for those students who were in this class without proper knowledge background of database systems. The students in the class were from very diverse background with their expertise, skillset and knowledge in the subject matter. Therefore, it is recommended to provide one-to-one tutoring for the students without any prior background in database systems. In addition, it is recommended to consider designing a new section of this course to introduce foundation knowledge of the database systems.

While these changes were not identified from the previous assessment because another class was assessed, it is important that this was identified for this class. The faculty will discuss these findings to the Director of the SISAC program and the Curriculum Committee for AY22 and propose they set up a tutoring session, similar to what we currently have in the college for writing and math. Additionally, an additional course will be recommended to address those students who do not have the foundational knowledge necessary to successfully achieve the results and SLOs for this course. While these changes cannot be measured as they were just identified, they are extremely important to the overall success of the program and this particular class. The Director will follow up on this and additional assessments be conducted over the next few years as changes are made.

It should be noted that the tutoring recommendation had been made on the 2019-2020 assessment. However, because changes as a result of COVID-19 and the lack of a permanent director for SISAC, no changes were made to address this in AY21. It was noted for AY22.

3. Changes made to student learning outcomes and/or assessment processes (if any):

Based on the feedback received from the faculty, Directors, and past assessments, the committee made several changes to the college assessment template/report/process for AY21:

- **'Close the Loop':** In past assessments, the focus was on assessing the different courses each year and failed to include follow-up actions/reviews from the previous year's report. The Committee added the following question to the template: Part I: What actions were taken to 'close the loop' on the assessment conducted last year? Examples of 'closing the loop' were given to faculty early in the assessment process and they were noted on the assessment reports.
- **Timeline:** In the past, the assessments were submitted too close to the end of winter semester, which did not allow the Directors time to review the reports, recommend changes, and submit them to the Associate Dean. This year, a new timeline was identified with both the Assessment Committee members and the School Directors that would allow time for completion of the assessment as well as a review by the School Director.
- **Plan of Action:** A Plan of Action item was added to the template based on the assessment findings for AY20. This allowed the faculty member to conduct the assessment, show the findings, and also include their plan of action based on the findings. Because different faculty may conduct the assessment each year, this allowed them to see the recommendations of their predecessor. This will also allow for a more consistent and cohesive assessment year to year. Because this was the first year it was added to the template, the success or viability of implementing these actions will need to be address in future assessments. Plus, the committee, program coordinators, and directors will need to address who will follow-up on the action plans.
- **Planning for the Future:** The template asked the faculty member to identify the classes that will be assessed over the next 5 years. A review of previous assessments found that some programs were assessing the same class every few years rather than having a plan in place. Again, because this was the first year this was included in the template, this will need to be reviewed in future assessments to determine if the rollout of courses and SKOs was successful.

4. Continuous improvement over time:

A. Simulation, Animation, and Gaming Program – SAG 105L4:

This course is an overview of the software and hardware associated with simulation and gaming. It also explores the creativity and development skills necessary. It is an introductory overview of the electronic game development process and underlines its history, content creation, strategies, and future trends in the industry. SAG students take this course during their first semester at EMU. The SLOs for the course are:

- Information Literacy/Communication
- Problem Solving
- Critical Thinking
- Interpersonal Skills/Teamwork

This year the assessment was conducted on Information Literacy/Communication focusing on the Team Final Project. This SLO was also assessed in the previous years and thus, the program coordinator was able to compare results for seven classes offered over two semesters. Students were assessed on the design of their final project, their presentation as a group, and the believability and follow-through of the simulation, animation, or gaming the group chose. Data was collected for two sections of the Winter 2020 semester and five sections for the fall 2020 semester. The assessment tool was a 1-4 Likert Scale on the ten assessment items. The overall average was calculated, and the accumulation of courses showed a mean of 2.63, which was the same as the 2019/2020 assessment of the course (See Figure 3).

| Evaluation Criteria | Wi 2020 Semester | | Fall 2020 Semester | | | | | Mean |
|--------------------------------|------------------|-------|--------------------|-------|-------|-------|-------|------|
| | Sec 1 | Sec 2 | Sec 1 | Sec 2 | Sec 3 | Sec 4 | Sec 5 | |
| Design | 2.6 | 3 | 2.5 | 2.3 | 1.8 | 2 | 2.3 | 2.36 |
| Presentation | 2.7 | 2.7 | 2.7 | 2.9 | 2.3 | 2.7 | 2.6 | 2.66 |
| Believability & Follow Through | 2.6 | 3 | 2.7 | 2.4 | 1.8 | 2.3 | 2.3 | 2.44 |
| Follows Directions | 2.8 | 2.9 | 3 | 2.9 | 2 | 2.5 | 2.7 | 2.69 |
| Title Page | 3.5 | 4 | 4 | 2.9 | 2.8 | 3.5 | 3.6 | 3.47 |
| Responsibilities | 2.9 | 3.1 | 2.7 | 2.4 | 1.8 | 2.7 | 2.9 | 2.64 |
| Storyboard | 2.6 | 3 | 2.7 | 2.4 | 1.8 | 2.3 | 2.6 | 2.49 |
| Summary | 2.7 | 3.1 | 2.7 | 2.4 | 1.8 | 2.3 | 2.7 | 2.53 |
| Production (Pre & Post) | 2.8 | 3 | 2.3 | 2.3 | 1.8 | 2.3 | 2.7 | 2.46 |
| Resource Page/ Bibliography | 2.8 | 3 | 2.7 | 2.4 | 1.8 | 2.3 | 2.8 | 2.54 |
| Mean | 2.8 | 3.08 | 2.8 | 2.53 | 1.97 | 2.49 | 2.72 | 2.63 |
| Number of Students | 13 | 7 | 3 | 7 | 4 | 6 | 18 | 8.29 |

Figure 3: SAG Assessment results for SAG 105L4

The assessment showed that the Information Literacy/Communication object stayed the same as the previous year. The program coordinator felt that was a result of changes they'd made to the program in 2019/2020 and 2020/2021. Prior assessments showed outcomes were varied and appeared to be based on the instructors and not necessarily by the criterion measured. Because of the number of sections offered fall and winter semesters, both tenured faculty, FTL and PTL taught the classes and a standard course shell was not always used for the class – it depended on the instructor. Thus, there was a concern that

there was a lack of consistency in how the courses were taught or assignment instructions/expectations. For 2019/2020 and 2020/2021, they attempted to have more consistency in the instructors for this course and felt that this showed in the comparison of the recent assessment (Fall 2020 vs. Winter 2020). While the courses have shown more consistency in results for the SLO identified based on the assessments and they feel the results demonstrate an overall success at achieving the SLO in the class, the faculty advised that the results also indicate more attention needs to be focused on specific criterion, such as the basics of a successful design, presentation, believability, production, and carrying-out direction. The faculty will work on identifying ways to incorporate that into the existing class and ensure that it is consistent across all sections. The faculty also recommend that students continue to see the EMU Writing Center staff more often. While students were encouraged to seek help at the Writing Center, it was voluntary and it was felt that they did not take advantage of this as needed. The SAG program has received conditional accreditation by the National Association of Schools of Art and Design (NASAD) with recommendations that SAG is working on to incorporate into their program and future curriculum. This will help with consistency, assessments, and measurements.

- B.** Unfortunately, the CET template did not ask program coordinators to include examples of continuous improvement over time. The template focused on closing the loop from the previous assessment and recommendations or a plan of action based on this year's assessment. This will be included as a recommendation in the Goals for AY22.

5. Goals for AY 2021-2022:

The following goals were identified for AY22 based on the outcomes of previous goals identified in assessment reports, as well as feedback from the faculty and directors.

- **Student Learning Outcomes:** Previously, a recommendation had been made that the SLOs for non-accredited programs be reviewed, updated, &/or validated by faculty/Directors. This was not specifically listed on the assessment report for AY21 as an action item.
 - Goal: For AY22, the goal is to include information on the Assessment template that specifically asks about identifying/updating/reviewing the SLOs.
- **Participation/Accreditation:** Several programs did not submit assessment reports for AY21. Because of the number of programs in the college that are accredited and must submit lengthy and detailed reports to their accrediting bodies, to ask faculty to submit an additional assessment report is challenging. One of our Directors headed the university assessment program for Purdue University and advised that at their university, accredited programs did not have to submit an additional assessment report – the accreditation report was sufficient.
 - Goal: The goal for AY22 is for the college Assessment Committee to discuss this issue with the School Directors to determine if a more feasible assessment process could be identified for the accredited programs.

- **Assessment Training:** For AY21, several faculty members conducted assessments for the first time, which resulted in a minimal assessment report. The committee also found that faculty who came from other universities conducted assessments differently (ex: language and metrics were not standard).
 - Goal: The committee recommended that several short instructional sessions be held for all faculty conducting assessments to not only review/explain the college template to ensure consistency, but to also instruct first-time faculty on the assessment process.
- **Identifying, assessing, and measuring 'Continuous Improvement':** The template for 2020-2021 did not include anything related to continuous improvement over a period of time (rather than the one-year assessment). Thus, the focus was on the current year's assessment and then 'closing the loop' from last year's assessment. But programs were not asked to demonstrate continuous improvement over a longer period of time.
 - Goal: The committee will look at including this in the template for this next year's assessments.
- **Assessing and measuring changes:** As the college continues to improve its assessment process and amend the assessment template, it was evident this year that the assessment process failed to follow-up and assess these changes to determine whether or not they improved the SLOs that were measured. The assessment was conducted, the assessment made, and recommendations offered to improve the course/SLOs. In some cases, changes were made, courses were added, or content was changed; however, we did not go back and measure those changes.
 - Goal: The committee will need to discuss how to add this in the assessment process. It is difficult because some courses are only offered once a year or every other year. The Committee will need to address this with the directors and program managers.