



# Academic Assessment

## Handbook





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# *1. Introduction*

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The New York City College of Technology (City Tech) believes that a strong assessment program will result in improved student learning outcomes, enabling students to persist and complete their degree program goals. Due to the essential role that the college plays for both New York City and for City Tech students, the institution continues to closely monitor and improve traditional measures of student success, such as one-year retention rates and six-year graduation rates. Given the barriers that its students face, implementing a strong, college-wide assessment plan is critical to City Tech's success. A carefully considered assessment plan helps City Tech faculty identify academic areas where students are struggling and where they are excelling.

Faculty engagement in discussions regarding how to address the challenges in their courses and attain program outcomes – and make appropriate changes that will enable more students to succeed – has become a part of the College culture. This focus on improvement planning and implementation aligns with City Tech's Mission. Furthermore, a robust assessment system enables the College to make better decisions on the use of scarce resources, based on the data collected by faculty and administrators.

In order to receive the full benefits of assessment, City Tech faculty both actively lead and participate in the assessment process throughout the College. Because faculty are most intimately familiar with their own courses, programs, and students, they are the best resource to develop the measurement tools to assess their students and programs. At City Tech, faculty-driven assessment is required on three levels: at the institutional level with the assessment of the College's General Education/Institutional Outcomes, at the program level, and at the course level. Without faculty participation and faculty content expertise, the assessment process would be unproductive and the college would be unable to engage in effective assessment process within the Continuous Improvement Model (see Figure 1).

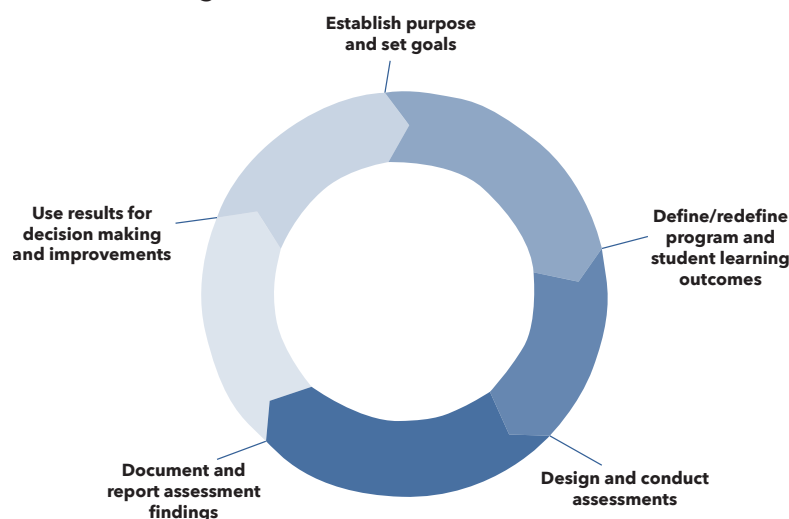


Figure 1. The model for the Cycle of Continuous Improvement. Adapted from *Enhancing Assessment in Higher Education: Putting Psychometrics to Work* (p. 22), by T. Cumming and M. D. Miller, eds, 2017, Sterling, VA: Stylus. Copyright 2017 by Stylus Publishing, LLC. Adapted with permission.

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## Purpose: How to Use This Manual

The purpose of the *Academic Assessment Handbook* is to provide guidance, tools, and resources for the City Tech assessment process, and – more broadly – for assessment best practices. This handbook also includes the College’s assessment timelines and calendars, as well as information about the College’s assessment system (TK20/Watermark). The staff of the Office of Assessment and Institutional Research (AIR) are also available to serve as a resource and to provide customized training sessions for departments and programs. Please visit our webpage for important supplemental resources at : <http://air.citytech.cuny.edu>.

## Continuous Improvement Model

As readers peruse this assessment handbook, it is important to continually bear in mind the overriding **purpose** of assessment: to provide information that will enable faculty and administrators to improve student learning by making changes in policies, curricula, and other institutional programs, and to see how these are actualized through pedagogy and the student experience. This is less a method than a **mindset**, and it has several relevant dimensions.

Firstly, the motivation for assessment resides within City Tech and the programs themselves. Far too much assessment in higher education is undertaken at the behest of government bodies and accreditors instead of arising from a genuine interest and concern on the part of institutions and their faculties about what is happening to their students (Kuh et. al, 2015). While accountability is important, City Tech maintains that assessment should be proactive rather than reactive: the questions that it seeks to answer are generated by members of an academic community itself, not by an outside body.

Those engaged in assessment – in whatever form – should bear in mind that assessment should under no circumstances be regarded as a closed enterprise that ends with definitive answers. Instead, assessment is an important part of a Continuous Improvement Cycle; readers must never forget that the foundational values of assessment lie in action and improvement.

## Continuous Improvement Plan

It is not enough to simply collect data. The most important part of the Continuous Improvement Model is ensuring that the data collected via assessment is used to inform improvement strategies at the appropriate level. After data has been collected and analyzed, faculty can generate reports using TK20/Watermark, which provides the results of the assessment. TK20/Watermark is the assessment software that has been licensed by the College to assist faculty with their assessment needs. Every faculty member at the College is assigned TK20/Watermark credentials when appointed, and training is available through the Instructional Technology & the Technology Enhancement Centers (iTEC).



Assessment results will highlight any proficiencies or insufficiencies within the course, department, or program in achieving student mastery of particular student outcomes. Once the results are disseminated, faculty will need to come together to discuss the best way to address any challenges identified within their course, program, or department. Figure 2 provides more detailed information on the Continuous Improvement Model with relevant questions that may be helpful in reviewing the assessment results.

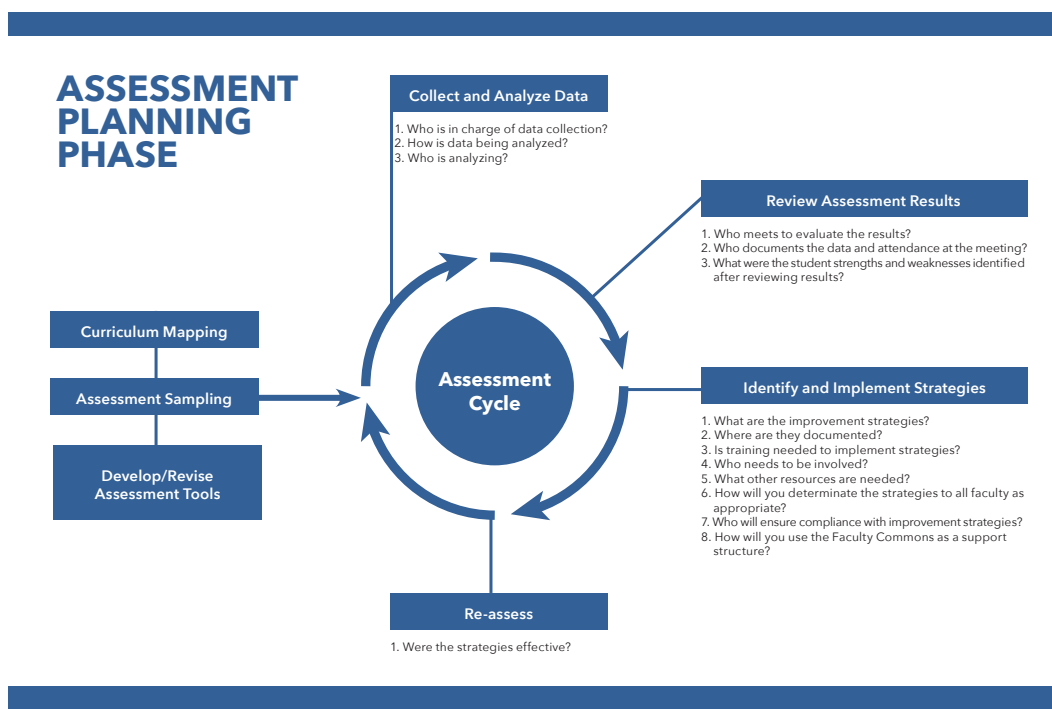


Figure 2. The Cycle of Continuous Improvement and pertinent assessment cycle questions: Assessment Planning Phase.

## A note on TK20/Watermark

Assessing student learning is meaningful when faculty are able to actively engage in the assessment process with readily available data. Due to the increased faculty assessment efforts, the AIR staff convened a task force comprised of faculty members from the three schools (Arts & Sciences, Professional Studies, and Technology & Design) to evaluate and select an assessment platform to support their assessment efforts. The College's assessment software support program (TK20/Watermark) provides results in real-time with tools for collecting evidence, scoring student work, and reporting on outcomes.

## *2. What is Assessment?*

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Assessment is an ongoing process through which faculty can appraise student learning. Cumming and Miller (2017) summarize assessment as follows:

- Establishing clear, measurable, expected outcomes of student learning;
- Ensuring that students have sufficient opportunities to achieve those outcomes;
- Gathering evidence in a systematic manner to determine how well student learning [outcomes] match expectations;
- Using the data obtained from the assessment to understand and improve student learning.

Collecting data to understand student strengths and weaknesses is one of the main reasons that we engage in assessment activities; its application helps us to optimally improve student learning.



"An assessment process is used for learning and improvement. It helps faculty better understand what is working well and on what they should be focusing their improvement efforts."

--Mohammed Kouar, Electrical and Telecommunications Engineering Technology

A rigorous, transparent, and continuous assessment cycle benefits students, faculty, programs, and the College. Students benefit from clear expectations and meaningful feedback from faculty, allowing them to better focus their learning efforts. Additionally, faculty benefit from assessment by being able to better identify which outcomes are difficult for students to attain and which outcomes are mastered. Once these have been identified, departments can adjust their curricula or course lesson plans accordingly. Lastly, the College also benefits from assessment by documenting the strengths and weaknesses of particular programs, allowing faculty and administrators to make informed decisions about resource allocation.



"City Tech's college-wide assessment process benefits departments and programs by bringing the faculty together with a common goal. It creates opportunities for conversations about teaching and learning among departments, programs, and schools."

-- Assistant Provost Pamela Brown

The American Association of University Professors (AAUP), American Federation of Teachers (AFT), and National Education Association (NEA) have recognized the importance of assessment, emphasizing that the assessment process should be faculty-driven in order to ensure that the principles of academic freedom and shared governance are honored in all phases of the assessment process (Gold, et.al., 2011). These three organizations have also emphasized that institutions be used to enhance the quality of student learning, as well as for accountability purposes. *However, it is important for faculty to understand that the administration does not view the assessment of student learning as a tool to evaluate the faculty.* Students bring various background knowledge, skills, and values to City Tech. Faculty have the responsibility to teach their courses using the tools available. However, identifying a weakness with respect to student learning is not viewed by the administration as an evaluative factor.

The American Association for Higher Education (AAHE) asked key higher education leaders to develop guidance for good practice in assessing student learning. The nine principles outlined below should inform all aspects of the assessment process on all levels: institutional, program-based, and course-based:

1. The assessment of student learning begins with educational values.
2. Assessment is most effective when it reflects an understanding of learning as multidimensional, integrated, and revealed in performance over time.
3. Assessment works best when the programs it seeks to improve have clear, explicitly stated purposes. Assessment is a goal-oriented process.
4. Assessment requires attention to outcomes, but also - and equally - to the experiences that lead to those outcomes.
5. Assessment works best when it is ongoing, not episodic. Assessment is a process whose power is cumulative.

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6. Assessment fosters wider improvement when representatives from across the educational community are involved.
  7. Assessment makes a difference when it begins with issues of use and illuminates questions that people really care about.
  8. Assessment is most likely to lead to improvement when it is part of a larger set of conditions that promote change.
  9. Through assessment, educators meet responsibilities to students and to the public. There is compelling public stake in education.

*Retrieved on March 7th from:*  
<https://ctfd.sfsu.edu/feature/nine-principles-of-good-practice-for-assessing-student-learning>

### *3. Assessment at City Tech*

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# Assessment at City Tech: A Key to Improving Student Success

City Tech is one of the largest minority-serving educational institutions in New York City and part of the City University of New York (CUNY), itself the largest urban university system in the US and one of the most diverse. City Tech provides an a crucial service to the City of New York by offering access to degree programs in highly technical fields for much of the city's underserved populations. City Tech not only helps the city develop a much-needed, highly-skilled labor force, but also provides a critical stepping stone for many of our students by preparing them for professional and personal success. According to the results of a study conducted by Chetty et. al., City Tech ranked fifth out of 369 selective public colleges in overall economic mobility and ninth among the entire sample of more than 2,000 U.S. colleges (Chetty, et. al., 2017).

"While City Tech has long been recognized for preparing the well-educated, diverse, and technologically sophisticated graduates needed to advance New York's economy, the College is particularly proud to also be identified as a significant driver of economic advancement for those who start with few resources."

--Dr. Russell Hotzler, President of City Tech

It is important to recognize that General Education/Institutional Outcomes and program outcomes are aligned with City Tech's Mission Statement (see Figure 3). All departments were required to submit and maintain documentation of their program outcomes alignment with the mission on the College's S-drive. Despite the essential role that the college plays to New York City and to its own students, it is recognized that improvements are needed in student retention and graduation rates in order to fulfill City Tech's mission:

New York City College of Technology is a baccalaureate and associate degree-granting institution committed to providing broad access to high quality technological and professional education for a diverse urban population. City Tech's distinctive emphasis on applied skills and place-based learning built upon a vibrant general education foundation equips students with both problem-solving skills and an understanding of the social contexts of technology that make its graduates competitive. A multi-disciplinary approach and creative collaboration are hallmarks of the academic programs. As a community City Tech nurtures an atmosphere of inclusion, respect, and open-mindedness in which all members can flourish.



Figure 3. A hierarchical pyramid of educational outcomes and the school and system mission.

Given the challenges that City Tech students face, and the rates of graduation and retention, implementing a strong, college-wide assessment plan is essential. A carefully considered assessment plan enables City Tech faculty to identify areas of student academic need. Once these needs are identified, departments can discuss the best strategies to improve student outcomes, ultimately improving student retention and completion.

In order to receive the full benefits of assessment, City Tech faculty actively lead and participate in the assessment process. Because faculty members are intimately familiar with their courses, programs and students, they are the best resource to develop appropriate measurement tools to assess their students and programs. Faculty-driven assessment happens on three levels: at the institution level, through the assessment of general education/institutional outcomes; at the program level, through the assessment of student outcomes, and at the course level, through the assessment of course instructional objectives. Without faculty participation and content expertise, the assessment process would not be useful, and the college unable to make properly informed decisions.





Figure 4. City Tech students at Club Hours.

## Accreditation

In addition to the benefits list on the previous page, assessment is also an important component to accreditation. In order to receive federal funding, the US federal government requires that colleges and universities be accredited by one of the regional accrediting bodies seen in Figure 5 on the next page. City Tech is accredited by the Middle States Commission of Higher Education (MSCHE). Most accrediting commissions have requirements for a well-documented and resourced assessment process.

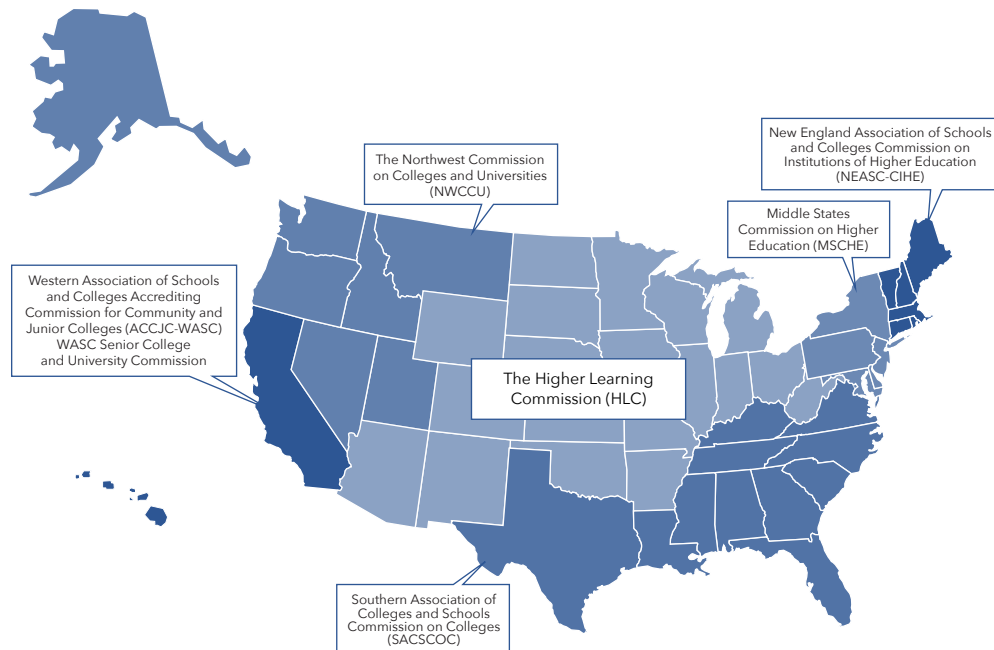


Figure 5. Regional accrediting bodies in the United States. Adapted from *Enhancing Assessment in Higher Education: Putting Psychometrics to Work* (p. xiv), by T. Cumming and M. D. Miller, eds, 2017, Sterling, VA: Stylus. Copyright 2017 by Stylus Publishing, LLC. Adapted with permission.

In 2014, MSCHE released its newly revised *Standards for Accreditation and Requirements of Affiliation* (Standards). Standard V, Education Effectiveness Assessment, details the criteria needed to receive accreditation. In addition to the assessment criteria reflected in Standard V, it also emphasizes assessment as a criterion in each of the other six standards. The Standards are provided in Appendix C1.

Many of City Tech's programs also have professional accreditation standards that they must meet. Similar to the regional accrediting bodies, these organizations have also included assessment requirements. These requirements vary by organization, but they are similar to those of MSCHE. Below is a list of additional organizations that provide professional accreditation at City Tech:

- Accreditation Commission for Education in Nursing, Inc.
- Accreditation Commission for Programs in Hospitality Administration
- Accrediting Council for Collegiate Graphic Communications
- American Bar Association
- Commission on Dental Accreditation (CODA)
- Commission on Opticianry Accreditation
- Council for Accreditation of Educator Preparation
- Council of Standards for Human Services Education
- Engineering Technology Accreditation Commission/ABET (formerly known as the Accreditation Board for Engineering and Technology)
- Joint Review Committee on Education in Radiologic Technology
- National Association of Schools of Art and Design
- New York State Board of Regents and the Commissioner of Education

# Responsibility for Assessment

Faculty and staff are responsible for all assessments conducted within their respective critical courses, programs, and departments. Department chairs and Assessment Liaisons are responsible for ensuring timely and complete assessment activities for all levels of assessment according to the planning documentation submitted to the appropriate School Dean. An organizational chart for the academic assessment process at City Tech is shown below (Figure 6). The Continuous Improvement process is often most valuable when all faculty are involved and invested in the process.

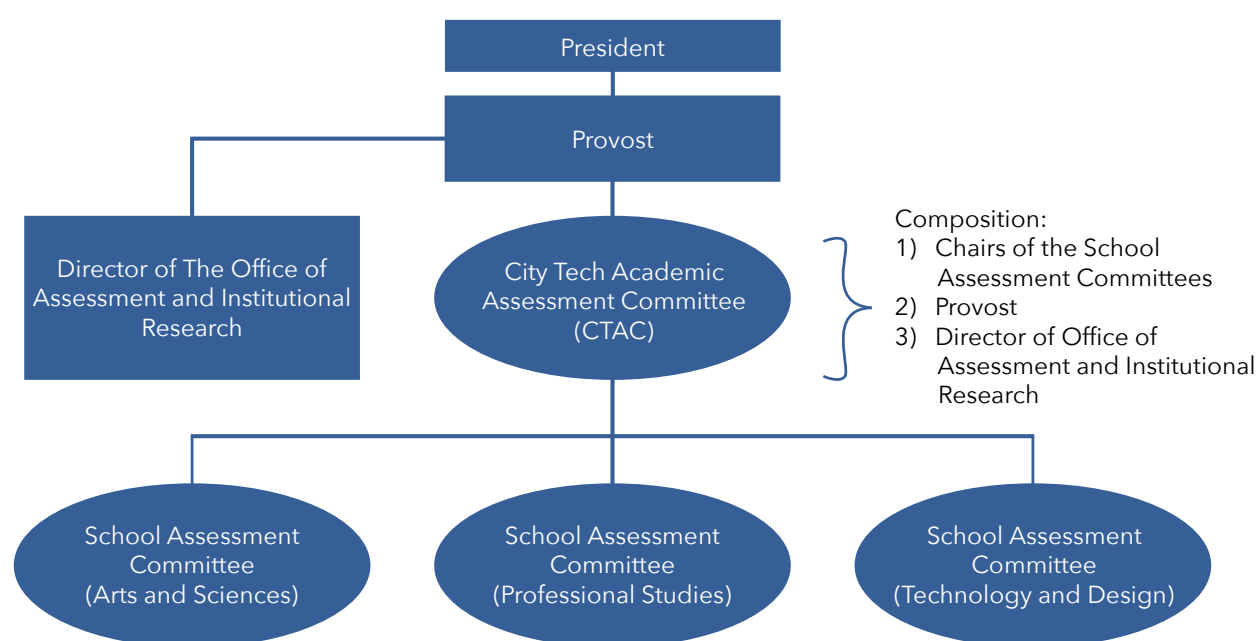


Figure 6. Organizational Chart of the City Tech Assessment Committee. Adapted from *Enhancing Assessment in Higher Education: Putting Psychometrics to Work* (p. 153), by T. Cumming and M. D. Miller, eds, 2017, Sterling, VA: Stylus. Copyright 2017 by Stylus Publishing, LLC. Adapted with permission.

Senior administrators play a central role in the assessment process by articulating and providing support and resources to faculty and staff; this is essential if the institution is to implement a sustainable and meaningful assessment process. The AIR office does not provide support for data collection efforts on behalf of individual programs and departments. However, the AIR office does provide guidance and resources with respect to assessment best practices. The AIR office also provides leadership for the College-wide General Education/Institutional Outcomes assessment process. The Associate Provost's office oversees the Comprehensive Program Review Process of the College (a comprehensive schedule is provided in Appendix Table B1).

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## Internal Review of Assessment

In the Spring 2017 semester, City Tech held its inaugural Faculty Peer Program Assessment Evaluation Session, where faculty throughout the college were trained to appraise the program assessments of faculty peers in other departments. This session provided a baseline for faculty reporting quality and provided faculty an opportunity to observe best practices from within the College. Going forward, the Faculty Peer Program Assessment Evaluation Session will be held on a biennial basis, with the next session scheduled for Spring 2019.

City Tech's inaugural Faculty Peer Critical Course Assessment Evaluation Session will be held in the Spring 2018 semester, with college faculty appraising critical course assessments from other departments. This session's mission is to provide a baseline for the faculty reporting quality for critical course reports in much the same way that the Program Assessment Evaluation Session did, with a focus on best practices for critical course assessment. This critical course session will be held on a biennial basis, alternating every Spring with the Program Assessment Evaluation Session.



## *4. Student Learning Outcomes*

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Student Learning Outcomes (SLOs) are the specific skills, attitudes, and abilities that a student should have obtained upon completion of a particular course or program. Defining SLOs should extensively incorporate faculty feedback. SLOs need to be specific enough to capture the essence of a program, yet flexible enough to apply to all students within the program (Miller et. al., 2012). In the assessment process, if a performance appraisal is conducted to measure these outcomes, the identification of measureable performance indicators (discussed in greater detail in Rubrics and Performance Indicators) need to be defined to determine whether or not students are meeting these outcomes. SLOs can be challenging to define because faculty consensus is required on the fundamental elements of a student’s education. SLOs can be discipline-specific or wide-ranging. They generally fall into several broad categories (see Table 1)

**Table 1. Descriptions and Examples of Student Learning Outcomes**

OUTCOMES	DESCRIPTION	EXAMPLE
<b>KNOWLEDGE / COGNITIVE OUTCOMES</b>	Particular areas of disciplinary or professional content that students can recall, explain, relate, and appropriately deploy	Technical proficiency within the discipline
<b>SKILLS OUTCOMES</b>	A learned capacity to do something	Critical thinking; effective communication
<b>ATTITUDINAL OR AFFECTIVE OUTCOMES</b>	Changes in beliefs or development of certain values	Ethical behavior: self-respect; empathy for others
<b>LEARNED ABILITIES OR PROFICIENCIES</b>	An integration of knowledge, skills, and attitude that require multiple elements of learning	Leadership; teamwork; effective problem solving

## A note on terminology

Some of the language in the assessment literature can be used differently by authors and practitioners. For the purposes of this handbook, Student Learning Outcomes refers to the outcomes determined by departments for their specific programs. Sometimes these outcomes may be referred to as “Program Outcomes” by various accrediting bodies, such as ETAC/ABET. At City Tech, General Education “outcomes” are also the institutional-level outcomes and are sometimes referred to as “Gen Ed competencies” by the faculty.

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At City Tech, we strive to use the following terminology consistently when engaging in assessment scholarship and initiatives:

*Accountability* is a relationship where one party is responsible to another party for achieving and assessing agreed upon goals.

*Assessment* is a term that is sometimes distinct from testing, but can be broader. It is a process that integrates test information or information from performance appraisals or other sources, but it can be as narrow as a single test (AERA, APA & NCME, 2014).

*Direct Assessment* is the measurement of student knowledge, behaviors, and learning, and is linked to specified student learning outcomes. These measures are directly observed and assessed by the content expert.

*Evaluation* is the process of assessing the value, worth, or effectiveness of an educational program, process, or curriculum.

*Goals* are the general aims or purposes of an educational system, often at the program level, that are broadly defined and include intended outcomes.

*Indirect Assessment* is the measurement of student learning experiences often linked to direct assessments but not directly measuring student learning outcomes. Consequently, indirect assessments can include opinions or thoughts about student knowledge, values, beliefs, and attitudes about educational programs, processes, and curriculum. They may also include measures of student outcomes like retention rate, course grades, or GPA that are not direct assessments of the student learning outcomes.

*Objectives* are brief clear statements of the expected learning outcomes of instruction typically at the course level.

*Outcomes* are the student results of programs including behaviors, knowledge, skills, and level of functioning. They are usually measured as a test or other assessment method, such as a performance appraisal.

*Outputs* are the results of program participation that specify types, levels, and targets of service. They are often measured as a count (e.g., number of students participating in a program).

*Reliability* is the consistency of scores across replications of a testing procedure (AERA, APA & NCME, 2014).



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*Student Learning Outcomes (SLOs)* are behavioral statements that specify what students will learn or can do as a result of a learning program, process, or curriculum.

*Test* is a device or procedure in which a sample of an examinee's behavior in a specified domain is obtained and subsequently evaluated and scored using a standardized process (AERA, APA, NCME, 2014).

*Validity* is the degree to which evidence and theory support the interpretations of test scores or assessment results for proposed uses (AERA, APA & NCME).

## *5. Assessment of Student Learning*

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# How to Assess Student Learning

## Types of Assessment

In general, there are two broad types of assessment measures, direct and indirect. Direct measures of assessment capture actual student performance or skill against measurable outcomes. Direct assessment measures include locally developed exams, portfolios with samples of student artifacts, research papers, and various other performance appraisals. Indirect measures of assessment examine the opinion or value of a certain experience or activity. Indirect assessment measures include surveys/questionnaires, focus groups, or archival records. Table 2 summarizes examples of both direct and indirect measures from all sources provided on the MSCHE website (see Figure 7). Certainly both types of assessment can yield meaningful information for faculty. However, for the purposes of assessing SLOs and performance criteria, this handbook will only focus on direct measures of assessment.

**Table 2. Direct and Indirect Methods of Assessment**

Direct	Indirect
Behavioral Observations	Archival Data
External Examiner	Exit and Other Interviews
Locally Developed Exams	Focus Groups
Oral Exams	Grade Distribution Results
Performance Appraisal	Graduation Rates
Portfolios	Job Placement Rates
Simulations	Retention Rates
Standardized Exams	Written Surveys, Questionnaires

## EXAMPLES OF EVIDENCE OF STUDENT LEARNING

*C = evidence suitable for course-level as well as program-level student learning*

### **Direct (Clear and Compelling) Evidence of What Students Are Learning**

- Ratings of student skills by field experience supervisors
- Scores and pass rates on appropriate licensure/ certification exams (e.g., Praxis, NLN) or other published tests (e.g., Major Field Tests) that assess key learning outcomes
- “Capstone” experiences such as research projects, presentations, theses, dissertations, oral defenses, exhibitions, or performances, scored using a rubric
- Other written work, performances, or presentations, scored using a rubric (C)
- Portfolios of student work (C)
- Scores on locally-designed multiple choice and/or essay tests such as final examinations in key courses, qualifying examinations, and comprehensive examinations, accompanied by test “blueprints” describing what the tests assess (C)
- Score gains between entry and exit on published or local tests or writing samples (C)
- Employer ratings of employee skills
- Observations of student behavior (e.g., presentations, group discussions), undertaken systematically and with notes recorded systematically
- Summaries/analyses of electronic discussion threads (C)
- “Think-alouds” (C)
- Classroom response systems (clickers) (C)
- Knowledge maps (C)
- Feedback from computer simulated tasks (e.g., information on patterns of actions, decisions, branches) (C)
- Student reflections on their values, attitudes and beliefs, if developing those are intended outcomes of the course or program (C)

### **Indirect Evidence of Student Learning (Signs that Students Are Probably Learning, But Exactly What or How Much They Are Learning is Less Clear)**

- Course grades (C)
- Assignment grades, if not accompanied by a rubric or scoring guide (C)
- For four-year programs, admission rates into graduate programs and graduation rates from those programs
- For two-year programs, admission rates into four-year institutions and graduation rates from those institutions
- Quality/reputation of graduate and four-year programs into which alumni are accepted
- Placement rates of graduates into appropriate career positions and starting salaries
- Alumni perceptions of their career responsibilities and satisfaction
- Student ratings of their knowledge and skills and reflections on what they have learned in the course or program (C)
- Questions on end-of-course student evaluation forms that ask about the course rather than the instructor (C)
- Student/alumni satisfaction with their learning, collected through surveys, exit interviews, or focus groups
- Voluntary gifts from alumni and employers
- Student participation rates in faculty research, publications and conference presentations
- Honors, awards, and scholarships earned by students and alumni

### **Evidence of Learning Processes that Promote Student Learning (Insights into *Why* Students Are or Aren't Learning)**

- Transcripts, catalog descriptions, and course syllabi, analyzed for evidence of course or program coherence, opportunities for active and collaborative learning, etc. (C)
- Logs maintained by students documenting time spent on course work, interactions with faculty and other students, nature and frequency of library use, etc. (C)
- Interviews and focus groups with students, asking why they achieve some learning goals well and others less well (C)
- Many of Angelo and Cross's *Classroom Assessment Techniques* (C)
- Counts of out-of-class interactions between faculty and students (C)
- Counts of programs that disseminate the program's major learning goals to all students in the program
- Counts of courses whose syllabi list the course's major learning goals
- Documentation of the match between course/program objectives and assessments (C)
- Counts of courses whose final grades are based at least in part on assessments of thinking skills as well as basic understanding
- Ratio of performance assessments to paper-and-pencil tests (C)
- Proportions of class time spent in active learning (C)
- Counts of courses with collaborative learning opportunities
- Counts of courses taught using culturally responsive teaching techniques
- Counts of courses with service learning opportunities, or counts of student hours spent in service learning activities
- Library activity in the program's discipline(s) (e.g., number of books checked out; number of online database searches conducted; number of online journal articles accessed)
- Counts of student majors participating in relevant co-curricular activities (e.g., the percent of Biology majors participating in the Biology Club)
- Voluntary student attendance at disciplinary seminars and conferences and other intellectual/cultural events relevant to a course or program (C)

Suskie, L. (2009). *Assessing student learning: A common sense guide* (2<sup>nd</sup> ed.). San Francisco: Jossey-Bass.

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## Rubrics and Performance Indicators

After defining SLOs, faculty will articulate the performance indicators that will be used to assess the attainment of the outcomes. Performance indicators are a set of observable and measurable student actions or abilities, enabling faculty to assess whether an SLO has been achieved. It is recommended that multiple faculty members be included in the process of choosing or defining performance indicators.

After establishing performance indicators, faculty can further articulate a scale with various levels of mastery. A four-point scale is commonly used when developing a scoring matrix known as a rubric. See example in Figure 8 on the next page. A rubric is a tool used in assessing student artifacts, e.g., oral exams, research papers, and capstone projects. A rubric is a matrix consisting of three parts: performance indicators, a scale, and descriptors for each of the performance indicators and the scale. Assessment rubrics are useful because they list clear expectations of student performance and provide a way to rate student work.

# TEAMWORK VALUE RUBRIC

for more information, please contact [valub@aacu.org](mailto:valub@aacu.org)



## Definition

Teamwork is behaviors under the control of individual team members (effort they put into team tasks, their manner of interacting with others on team, and the quantity and quality of contributions they make to team discussions)

Evaluators are encouraged to assign a zero to any work sample or collection of work that does not meet benchmark (all one) level performance.

A

	Highest 4	3	2	Lowest 1
<b>Contributes to Team Meetings</b>	Helps the team move forward by articulating the merits of alternative ideas or proposals.	Offers alternative solutions or courses of action that build on the ideas of others.	Offers new suggestions to advance the work of the group.	Shares ideas but does not advance the work of the group.
<b>Facilitates the Contributions of Team Members</b>	Engages team members in ways that facilitate their contributions to meetings by both constructively building upon or synthesizing the contributions of others as well as noticing when someone is not participating and inviting them to engage.	Engages team members in ways that facilitate their contributions to meetings by constructively building upon or synthesizing the contributions of others.	Engages team members in ways that facilitate their contributions to meetings by restating the views of other team members and/or asking questions for clarification.	Engages team members by taking turns and listening to others without interrupting.
<b>Individual Contributions Outside of Team Meetings</b>	Completes all assigned tasks by deadline; work accomplished is thorough, comprehensive, and advances the project. Proactively helps other team members complete their assigned tasks to a similar level of excellence.	Completes all assigned tasks by deadline; work accomplished is thorough, comprehensive, and advances the project.	Completes all assigned tasks by deadline; work accomplished advances the project.	Completes all assigned tasks by deadline.
<b>Fosters Constructive Team Climate</b>	Supports a constructive team climate by doing all of the following: <ul style="list-style-type: none"> <li>Treats team members respectfully by being polite and constructive in communication.</li> <li>Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work.</li> <li>Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it.</li> <li>Provides assistance and/or encouragement to team members.</li> </ul>	Supports a constructive team climate by doing any three of the following: <ul style="list-style-type: none"> <li>Treats team members respectfully by being polite and constructive in communication.</li> <li>Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work.</li> <li>Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it.</li> <li>Provides assistance and/or encouragement to team members.</li> </ul>	Supports a constructive team climate by doing any two of the following: <ul style="list-style-type: none"> <li>Treats team members respectfully by being polite and constructive in communication.</li> <li>Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work.</li> <li>Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it.</li> <li>Provides assistance and/or encouragement to team members.</li> </ul>	Supports a constructive team climate by doing any one of the following: <ul style="list-style-type: none"> <li>Treats team members respectfully by being polite and constructive in communication.</li> <li>Uses positive vocal or written tone, facial expressions, and/or body language to convey a positive attitude about the team and its work.</li> <li>Motivates teammates by expressing confidence about the importance of the task and the team's ability to accomplish it.</li> <li>Provides assistance and/or encouragement to team members.</li> </ul>
<b>Responds to Conflict</b>	Addresses destructive conflict directly and constructively, helping to manage/resolve it in a way that strengthens overall team cohesiveness and future effectiveness.	Identifies and acknowledges conflict and stays engaged with it.	Redirecting focus toward common ground, toward task at hand (away from conflict).	Passively accepts alternate viewpoints/ideas/opinions.

Figure 8. The City Tech Teamwork VALUE Rubric: Circle A denotes the 4-point rubric scale, with 4 being the highest score and 1 being the lowest; Circle B denotes the performance indicators for the rubric; Circle C denotes the descriptors for the performance indicators at each scale score. Adapted from Teamwork VALUE Rubric, in the Association of American Colleges & Universities, n.d., adapted March 8, 2018, from <https://www.aacu.org/value/rubrics/teamwork>.

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It should be noted that the scale used in an assessment rubric is not necessarily the same as a grade assignment. The scale refers specifically to a particular performance criterion and a student's ability to meet it. The scale allows faculty to determine with which performance indicators students struggle, and at what level. A grade is for overall performance on a student artifact or in a particular course, but it often does not have the same level of granularity. For example, a scale level of 4 – exceeds criterion 1 of 5 on a rubric – should not be confused with a grade of "A" on an assignment.

For course-level and program-level assessment, City Tech departments and their respective faculty have developed rubrics and tests for assessment purposes. While the equating of the score scale on a rubric does not necessarily correlate directly to a grade, the assessment can – and should – be used for scoring student work and assigning grades. For Gen Ed assessment, City Tech has adopted the AAC&U value rubrics, and in some cases, modified them after pilot-testing.

## Locally Developed Exams and Test Blueprints

Another tool used for assessing student learning is a Locally Developed Exam (LDE), which is an exam created locally, usually at the institution. According to MSCHE (2007), an LDE is considered a direct measure of student performance when accompanied by a test blueprint. Test blueprints map SLOs to test items, providing a tool to interpret the test item performance to the attainment of SLOs. Like rubrics, test blueprints help faculty more clearly define student learning within a course or program, as well as providing evidence of content validity.

Test blueprints may be constructed such that SLOs, course-level learning objectives, the number of test items that measure student learning, point values, and weighted percentage of the items with respect to the total exam are indicated. The instructional learning objectives on a test blueprint are similar to performance indicators on a rubric, signifying specific competencies that a student must demonstrate. Certain SLOs and learning objectives may also be more significant for a particular course; that may be reflected by the number of test items that address a certain objective or outcome, or by the weight given to a certain test item or set of test items.

When developing items for the exam, it is important to consider the level of student learning that will be assessed. Classifying the expected learning level will assist faculty in developing appropriate test items. Bloom's Taxonomy is commonly used, but other classification types may be better suited to particular departments. Bloom's Taxonomy allows for the classification of student learning in six levels, from *Knowledge* to *Evaluation* (using the original Bloom's Taxonomy commonly used by testing companies). *Knowledge* is the most basic level of learning, progressing all the way up to the most advanced level, *Evaluation*. A table with brief descriptions of Bloom's Taxonomy, as well as some examples of verbs that are commonly used to define measureable student performance is shown in Table 3.

Table 3. Bloom's Taxonomy

Level	Definition	Sample verbs					Sample behaviors
Knowledge	Student recalls or recognizes information, ideas, and principles in the approximate form in which they were learned.	arrange define describe duplicate	identify label list match	memorize name order outline	recognize relate recall repeat	reproduce select state	The student will define the 6 levels of Bloom's taxonomy of the cognitive domain
Comprehension	Student translates, comprehends, or interprets information based on prior learning.	classify convert describe defend discuss distinguish	estimate explain express extend generalize give	example(s) identify indicate infer illustrate locate	predict paraphrase recognize rewrite review select	summarize translate	The student will explain the purpose of Bloom's taxonomy of the cognitive domain.
Application	Student selects, transfers, and uses data and principles to complete a problem or task with a minimum of direction.	apply change choose compute construct	demonstrate discover dramatize employ illustrate	interpret manipulate modify operate practice	predict prepare produce relate schedule	show sketch solve use write	The student will write an instructional objective for each level of Bloom's taxonomy.
Analysis	Student distinguishes, classifies, and relates the assumptions, hypotheses, evidence, or structure of a statement or question.	apply analyze categorize change choose compute	compare contrast discover demonstrate dramatize employ	illustrate interpret manipulate modify operate practice	predict prepare produce relate separate schedule	show sketch solve use write	The student will compare and contrast the cognitive and affective domains.
Synthesis	Student originates, integrates, and combines ideas into a product, plan or proposal that is new to him or her.	arrange assemble categorize collect combine comply	compose construct create design develop devise	explain formulate generate hypothesize invent plan	prepare rearrange reconstruct relate reorganize revise	rewrite set up summarize synthesize tell write	The student will design a classification scheme for writing educational objectives that combines the cognitive, affective, and psychomotor domains.
Evaluation	Student appraises, assesses, or critiques on a basis of specific standards and criteria.	appraise argue assess attach choose compare	conclude contrast critique defend describe discriminate	estimate evaluate explain interpret judge justify	predict recommend rate relate select summarize	support value	The student will judge the effectiveness of writing objectives using Bloom's taxonomy.



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Once the test blueprint is constructed, faculty members construct the exam. If the exam is for the purpose of assessment beyond an individual faculty member's course, it is advisable that the faculty share item-writing responsibilities while constructing the test. After the test items have been written by faculty, a test key will need to be developed, indicating how the items should be scored. A sample test blueprint is provided in Table 4.

Table 4. An Example of a Test Blueprint

Program Outcome	Course Learning/ Objective Outcomes	Bloom's Taxonomy Classification	Number of Test Items	Point Value	(%) weight of test
Demonstrate mastery of the theoretical and practical knowledge of electrical and electronic circuits and systems	Define and identify the basic components of a microprocessor such as: CPU, ROM, RAM, CLOCK, Word-size, Communication Busses, lead outputs, Power requirements, etc.	Knowledge  Comprehension	1  1	2  4	4  8
	Write, run, single step and flow chart a source code program	Knowledge  Comprehension  Analysis	1  1  1	2  4  10	4  8  17
	Follow the logic and flow of information in a program	Knowledge  Comprehension  Analysis	1  1  1	2  4  10	4  8  17
Identify, formulate, and present solutions to practical technical problems in a variety of specialty areas related to electrical engineering technology programs	Use the microprocessor to solve an array of typical practical problems (timing, control, and output)	Knowledge  Comprehension  Evaluation	1  1  1	2  4  10	4  8  18
<b>Total</b>				<b>54</b>	<b>100</b>

Adapted from a blueprint from the Electrical Engineering Technology/AAS program

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## Inter-rater Reliability

Once a rubric or test blueprint has been developed, faculty are encouraged to establish inter-rater reliability. Establishing sufficient inter-rater reliability ensures faculty are scoring student work in a consistent manner using the appropriate scoring tool, such as a rubric or a test key. An assessment instrument with a high inter-rater reliability coefficient (ranging from 0 to 1) produces consistent ratings among faculty. A reliability coefficient of 1 indicates perfect consistency among raters. Essentially, if a student artifact is assigned a “low” score for a particular performance indicator by one faculty member, other faculty members should also rate the student artifact “low” for that same performance indicator for a clearly defined rubric or scoring key. Inconsistent ratings amongst faculty members using the same rubric/test scoring key for the same student artifact indicates that the scoring tool should be modified for clarity of student performance expectations at varying levels.

Once pilot data has been collected, additional faculty members are invited to assist in establishing inter-rater reliability as well as to discuss the assessment instrument. Scoring inconsistencies are noted and used to inform faculty on where assessment instrument improvement is needed; faculty members meet to discuss any difficulties they had with the scoring tool and to agree on any modifications. Modifications are made before the full-scale data collection, but assessments are reviewed routinely within the assessment cycle.

Discussing student work and the scoring tools often provides faculty with an opportunity to meaningfully interact with each other during the assessment process. The discussions centered on student learning and how to both assess and maximize that learning are an important and rewarding part of the assessment process for many faculty. These discussions engage faculty in the assessment process and facilitate intellectual stimulation around student learning.



Figure 9. Faculty engaging in an Inter-rater Reliability activity.

## *6. Types of Assessment at City Tech*

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There are three types of assessment activities supported at City Tech: course-level, program-level and institutional level/general education. Course-level assessment examines course-based learning outcomes in “critical” courses that have been identified within each department at City Tech. Program-level assessment examines student learning outcomes for each program at City Tech. General education assessment examines broader, college-wide student learning outcomes across all three schools at City Tech. The three levels of assessment are related (see Figure 10). Each assessment activity is discussed in more detail below.

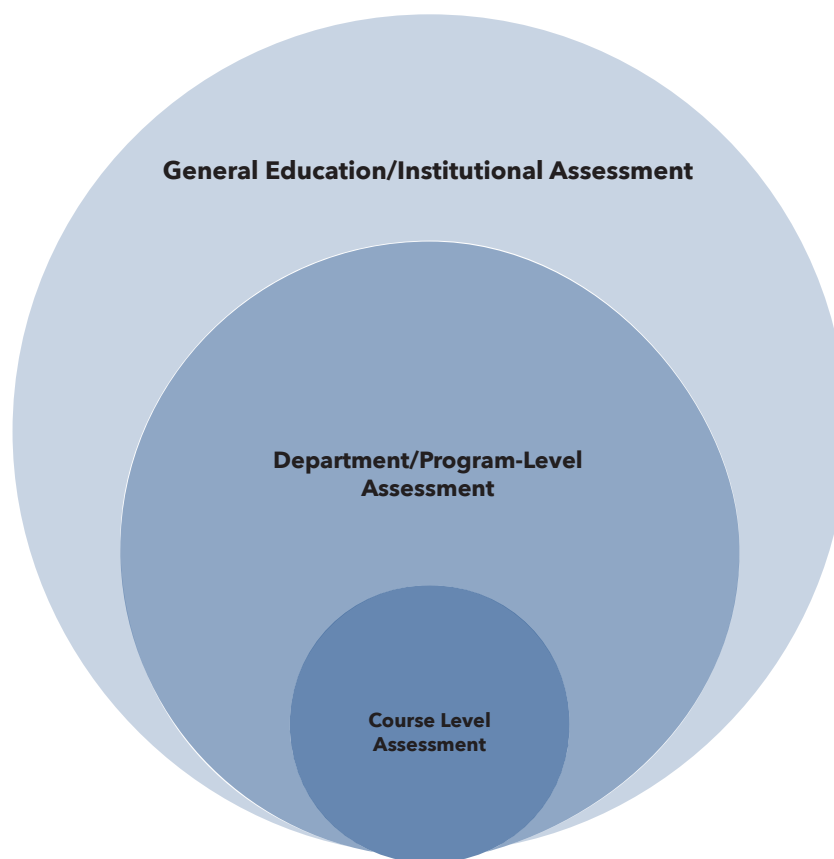


Figure 10. The three levels of assessment at City Tech.

## Course-Level Assessment

Critical course assessment focuses on instructional objectives that are considered critical to a particular department or program. In many cases, instructional objectives that have been aligned with the program outcomes of interest are selected for evaluation. It should be noted that all course-level objectives have been mapped to program-level outcomes. When a department has indicated they will assess a particular “critical” course (or multiple courses), a rationale form is completed (see Figure 11).

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## Selecting a Critical Course

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Critical Course Selected for Assessment: **Anatomy and Physiology I**

School: School of Arts and Sciences

Department/Program: **Biology**

Date Prepared: **February 19, 2015**

**This is a summary of the guidelines that you should keep in mind when selecting a "Critical Course" for your department/program:**

- Course focuses on outcomes that are critical to your department/program.
- Course has been identified for your department/program goals for the PMP.
- Course has a high level of failing/non-completing students.
- Course has been identified as a prerequisite for a key course within the department.
- Course has been identified as a key/capstone course within the department that needs improvement.
- Course will enable improvement for your department/program.
- Course serves a majority of your student constituency.

**Please address the following items.**

**State briefly why the faculty have selected the critical course for assessment activities.**

Anatomy and Physiology (A&P) I is the first of a two-semester course sequence. It introduces concepts that are built upon in A&P II and provides information on some of the human organ systems. The two A&P sequences are required in our Biomedical Informatics program and health-related professions offered by City Tech.

**State briefly how improving the outcomes of this course can be used to identify areas to improve the program/department.**

Most of the outcomes are designed to imbue students with the knowledge and skills about human anatomy and physiology that they need to apply in their respective disciplines. Improving the outcomes predicated on areas where students had difficulty will enable students being better prepared for higher level courses.

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Critical courses can range from i) courses that a large number of students in a department must take, such as a pre-requisite or a required course for a certain program, ii) courses with a high failure rate, iii) or upper-division capstone courses that have been identified by faculty as needing improvement.

Each department determines the assessment cycle for its critical courses; however, it is recommended that critical courses be assessed on a cycle of every one to two years. After a certain time, as course outcomes improve through the continuous improvement model, departments may select a replacement critical course, or add an additional critical course to assess. Each department should have at least one critical course being assessed on a specified cycle.

## Course-Level Objectives

Course-level objectives are defined to detail the abilities, skills, or attitudes that students should have upon successful completion of a course, and as defined earlier as brief, clear statements of the expected learning outcomes of instruction. It is noteworthy to mention that course-level objectives are listed for students on the course outline. The course outline and course-level objectives must be approved by College Council before the course is approved and adopted at the College.

Departments are asked to submit a critical course assessment planning document (see Table 5) to ensure the following:

1. assessment is conducted as scheduled,
2. results are evaluated by appropriate faculty,
3. improvement strategies are identified and communicated to relevant constituencies, and
4. improvement strategies are implemented by faculty teaching the course.

**Table 5. An Example of Assessment Planning for a Critical Course**

Course Outcomes	Assessment Methods	Data Collection Date	Assessment Coordinator(s)	Improvement Planning Meeting(s)	Train Faculty to Implement Improvement Strategies	Implement Improvement plan	Re-Assess	Evaluate Effectiveness of Improvement Plan
List the stages involved in product development and apparel manufacturing from concept to consumer.	Final Exam Comprehensive Problem/Term Project	Fall 2017	Brathwaite	Spring 2018	Spring 2018	Fall 2018	Fall 2019	Spring 2020
Evaluate how the strategic planning process is utilized in the development of merchandise plans for business use.	Final Exam Comprehensive Problem/ Term Project	Fall 2017	Brathwaite	Spring 2018	Spring 2018	Fall 2018	Fall 2019	Spring 2020
Explain the apparel manufacturing process, sizing and measurement specifications.	Final Exam Comprehensive Problem/Term project	Fall 2017	Brathwaite	Spring 2018	Spring 2018	Fall 2018	Fall 2019	Spring 2020
Assess knowledge of the mass production process and implementation of strategies for developing individual apparel collections.	Final Exam Comprehensive Problem/ Term Project	Fall 2017	Brathwaite	Spring 2018	Spring 2018	Fall 2018	Fall 2019	Spring 2021

*Adapted from the Business & Technology of Fashion/BS program*



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## Program-Level Assessment

Every degree program offered at the College is required to engage in program-level assessment. Once the SLOs for the program are published in the college catalog, departments are required to maintain a curriculum map that identifies the course alignment with the program outcomes (see Table 6). Several courses can be aligned with one outcome, and often courses reinforce SLOs throughout the duration of the program.

Table 6. An Example of Curriculum Mapping

	ENVC 1110	ENVC 1111	ENVC 1120	ENVC 1210	ENVC 1211	ENVC 1220	ENVC 1250	ENVC 2311	ENVC 2312	ENVC 2321	ENVC 2322	ENVC 2340	ENVC 2401	ENVC 2411	ENVC 2420	ENVC 2421	ENVC 2432	ENVC 2436
Design heating, air conditioning, and ventilation systems.	I		I			E	R		E		E	E					E	
Efficiently operate and manage the environmental systems of large commercial, institutional, residential, and similar facilities.	I	I		E		R	R		R	E	E	E	E	E	E	R	E	R
Install, maintain, and repair the full range of heating and air conditioning systems in use today and the evermore sophisticated systems planned for the future.	I	I		R	E			E							E	R		R
Demonstrate quantitative literacy through hydronic systems.	I		R			E												
Possess basic multidisciplinary knowledge and teamwork skills.		I			R			E										

Note: I denotes Introduced; R denotes Reinforced; E denotes Emphasized  
Adapted from the Environmental Control Technology/AAS program

SLOs should be assessed on a rotating basis. Programs do not need to assess all SLOs at the same time – for many programs, a 3-year assessment cycle is recommended, with a Program Review occurring every 7 years (see Figure 12).

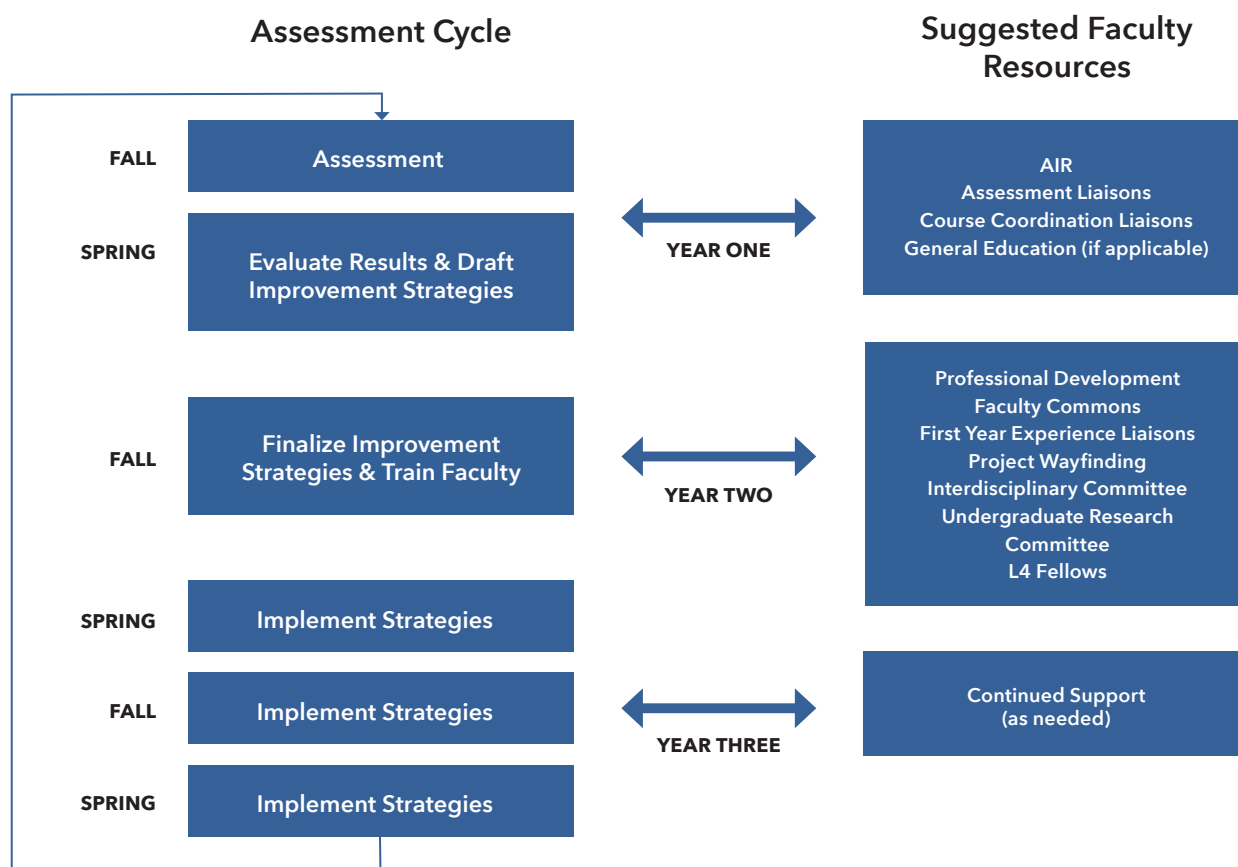


Figure 12. A 3-Year proposed assessment cycle and an abridged list of resources.

Similar to critical course assessment requirements, programs are required to provide assessment planning documentation for each of the program outcomes (see Table 7). The planning document provides a roadmap to ensure:

1. courses utilized for program level assessment have been selected for sampling,
2. assessment is conducted as scheduled,
3. faculty are aware of their assessment responsibilities,
4. results are evaluated by appropriate faculty,
5. improvement strategies are identified and disseminated, and
6. improvement strategies are implemented by faculty teaching the course.

**Table 7. An Example of Assessment Planning for a Program**

Program Outcome	Assessment Methods	Course(s) selected for Data Collection	Time of Initial Data Collection	Assessment Coordinator(s)	Improvement Planning Meeting(s)	Implement Improvement Plan	Re-Assess	Evaluate Effectiveness of Improvement Plan
<b>GenEd Outcomes (AAS and BTEch)</b>								
An ability to apply written, oral, and graphical communication in both technical and non-technical environments; and an ability to identify and use appropriate technical literature.	Writing Rubric	CST 1100	Spring 2015	Delores Archibald	Fall 2015	Spring 2016 to Fall 2017	Spring 2018	Fall 2018
An ability to conduct standard tests and measurements, and to conduct, analyze, and interpret experiments.	Locally Developed Rubric	CST2400	Spring 2017	Fangyang Shen	Spring 2017	Fall 2017 to Spring 2019	Fall 2019	Spring 2020
An ability to function effectively as a member of a technical team.	Teamwork Rubric	CST4714	Spring 2016	Ashwin Satyanarayana	Fall 2016	Spring 2017 to Fall 2018	Spring 2019	Fall 2019
An ability to apply the knowledge, techniques, skills, and modern tools of the discipline to Computer Systems Technology activities.	Inquiry and Analysis Rubric	CST1204	Spring 2016	Elizabeth Milonas	Fall 2016	Spring 2017 to Fall 2018	Spring 2019	Fall 2019
An ability to apply a knowledge of mathematics, science, engineering, and technology to Computer Systems problems that require application of principles and practical knowledge.	Locally Developed Exam	CST1101	Fall 2014	Candido Cabo	Spring 2015	Spring 2015 to Fall 2016	Spring 2017	Fall 2018
<b>AAS Specific Outlines</b>								
Managing and troubleshooting a computer information system.	Locally Developed Rubric	CST2400	Spring 2017	Fangyang Shen	Spring 2017	Fall 2017 to Spring 2019	Fall 2019	Spring 2020
Applying and evaluating technological solutions to solve real-world problems.	Locally Developed Rubric	CST2307	Fall 2017	Janusz Kusyk	Fall 2017	Spring 2018 to Fall 2019	Spring 2020	Fall 2020
Basic problem solving through various fundamental algorithms.	Quantitative Literacy Rubric	CST1201	Spring 2016	Doug Moody	Fall 2016	Spring 2017 to Fall 2018	Spring 2019	Fall 2019

*Adapted from the Computer Information Systems/AAS program*

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# General Education/Institutional Outcomes Assessment

General Education assessment is conducted at an institutional level and follows a similar process to program-level assessment; however, it is not program- or department-specific. City Tech's approved General Education is applicable to all City Tech students across all disciplines. In March 2013, City Tech's College Council – reflecting various stakeholders within City Tech, including faculty, administrators, and students – defined General Education as the knowledge, skills, and dispositions across the disciplines (see Appendix Table A1).

## Aligning Gen Ed CUNY Pathways and the AAC&U LEAP Learning Outcomes

During the Spring 2015 semester, the AIR Office staff met with a committee of faculty representatives from the three schools (Arts & Sciences, Technology & Design, and Professional Studies) to discuss formally adopting either the AAC&U VALUE rubrics or a modified version for the assessment of general education. The faculty affirmed that the AAC&U rubrics would continue to serve as a framework for general education/institutional outcomes assessment at the College.

The faculty co-chairs also aligned the College Council's Gen Ed goals to the LEAP Essential Learning Outcomes and CUNY Pathways outcomes (see Appendix Table E1).

## Steps for Gen Ed Assessment

City Tech's Gen Ed assessment is on a three-year cycle of continuous improvement. Prior to the full-scale data collection, AIR organized a pilot assessment. With careful consultation from the University Central Office of Institutional Research and Assessment's Director of Assessment, a target sample size was targeted as a minimum of 100 students selected from a generalizable sample. This sample target was confirmed by the Collegiate Learning Assessment (CLA) professionals who administered the CLA assessment for a trial period at the college. While the AIR office staff understand the minimum sample size for the Gen Ed assessment activities, AIR strives to sample at a higher rate and engage more faculty to participate in order to obtain results that may be generalizable to subgroups.

The steps of the assessment pilot and the full-scale administrations are outlined in the timeline below (Figure 13).

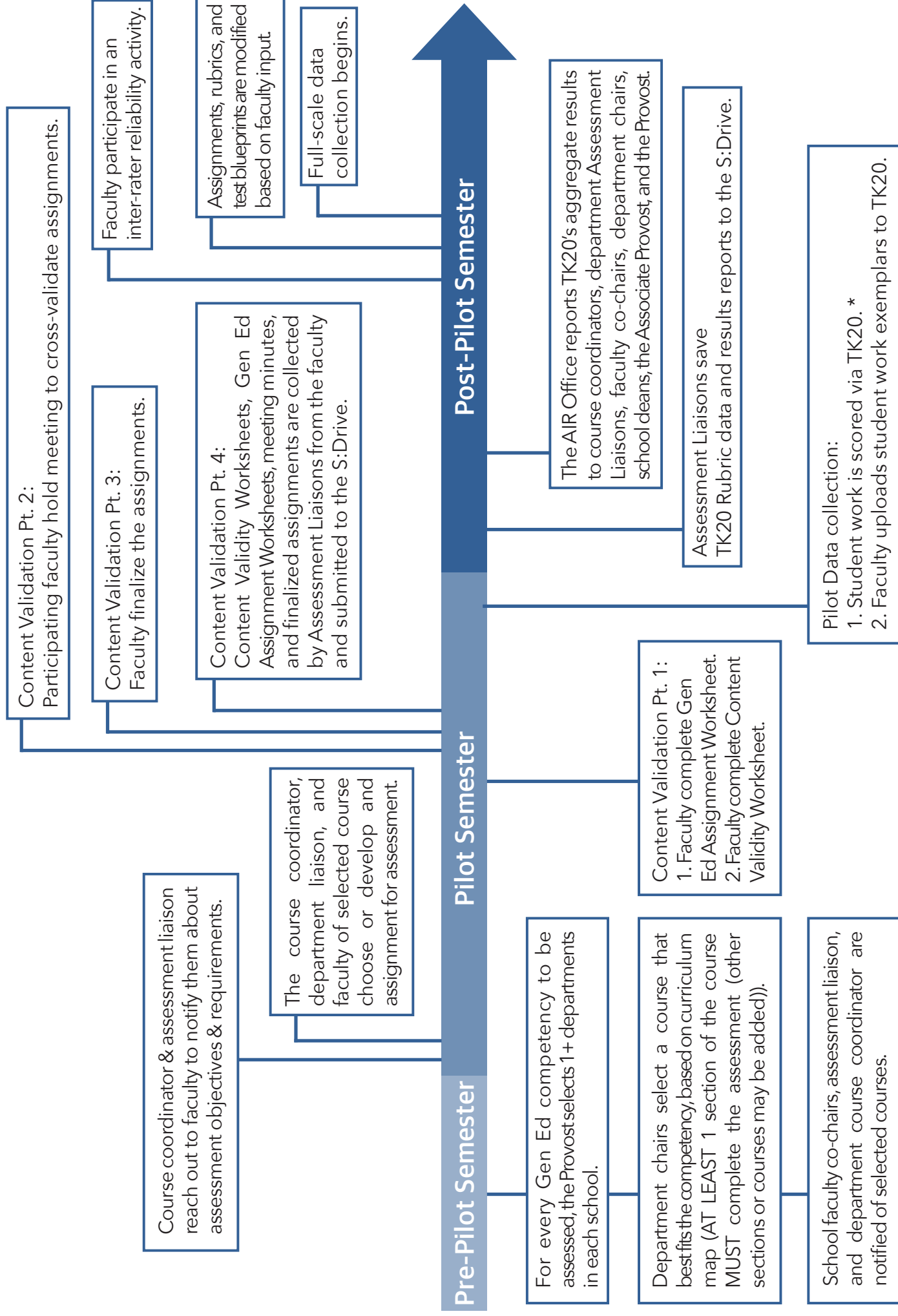


Figure 13. The timeline for General Education pilot assessment and full-scale administration.

\* TK20/Watermark training is available throughout the semester (<http://websupport1.citytech.cuny.edu/tk20.html>).

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City Tech faculty, along with the Office of Institutional Research and Assessment, planned the College's General Education Assessment Cycle through 2022. Each of the fourteen General Education/Institutional competencies is assessed on a staggered, three-year assessment cycle, as previously mentioned (See Table 8).

**Table 8. The NYCCT General Education Institutional Assessment Cycle Mapped Through Fall 2022**

General Education Learning Outcome	S16	F16	S17	F17	S18	F18	S19	F19	S20	F20	S21	F21	S22	F22
Creative thinking	CA	P	IRR	DC	AEI			II		DC	AEI		II	
Foundations and skills for lifelong learning	CA	P	IRR	DC	AEI			II		DC	AEI		II	
Inquiry and analysis	CA	P	IRR	DC	AEI			II		DC	AEI		II	
Integrative learning	CA	P	IRR	DC	AEI			II		DC	AEI		II	
Intercultural knowledge and competence	CA	P	IRR	DC	AEI			II		DC	AEI		II	
Information Literacy	AEI		II			DC	AEI		II			DC	AEI	II
Civic Engagement	P	DC	AEI	II		DC	AEI		II			DC	AEI	II
Critical thinking	P	DC	AEI	II		DC	AEI		II			DC	AEI	II
Ethical Reasoning	P	DC	AEI	II		DC	AEI		II			DC	AEI	II
Teamwork	P	DC	AEI	II		DC	AEI		II			DC	AEI	II
Oral Communication	IRR/DC	AEI		II			DC	AEI			II		DC	AEI
Quantitative Literacy	P	IRR/DC	AEI		II			DC	AEI			II		DC
Reading	CA	DC	AEI		II			DC	AEI			II		DC
Writing	CA	DC	AEI		II			DC	AEI			II		DC

Code for Abbreviations
DC = Data Collection
IRR/DC = inter-rater reliability and Data Collection
IRR= Inter-rater reliability
AEI = Analysis of data, evaluation of report, drafting of improvement plan
II = Implementation of improvement plan
CA = Communication about assessment and selection of assignment
P = Pilot data collection



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Once results are available, the senior administration and faculty are notified. Departments meet to review findings and draft an improvement plan to address them. On the College level, areas that were identified for intervention on a College-wide level are discussed among administration and staff, and a support system is identified to move forward with drafting, finalizing, disseminating, and implementing the improvement strategies. The College's L4 and Gen Ed fellows are a valuable resource in supporting faculty in identifying best practices and addressing Gen Ed areas of concern.

Implementation of the improvement plan is given sufficient time within the Continuous Improvement Model for approximately three semesters, at which point the Gen Ed competency is re-assessed to evaluate the outcomes .

## City Tech's Emphasis on Assessment for Learning

According to Ewell and Cumming (2017), faculty and administrators

*"must never forget that the foundational values of assessment lie in action and improvement. Every assessment approach is a means to an end, and each end is different. Returning to the basic question to be answered or pedagogical problem to be addressed is always a basic prerequisite to effective assessment (pg. 22-23).*

City Tech considers the use of the assessment data to improve student outcomes as the primary reason to engage in the assessment process. The mandatory regional and professional accreditation requirements are a secondary, although necessary, consideration. For more information on our assessment process' alignment to the College's mission, see Table 9.

**Table 9. The College's and AIR's Alignment of the City Tech Mission with its Educational Goals.**

MISSION ALIGNMENT	
Our Mission as an Institution is...	<p>New York City College of Technology is a baccalaureate and associate degree-granting institution committed to providing broad access to high quality technological and professional education for a diverse urban population. City Tech's distinctive emphasis on applied skills and place-based learning built upon a vibrant general education foundation equips students with both problem-solving skills and an understanding of the social contexts of technology that make its graduates competitive. A multi-disciplinary approach and creative collaboration are hallmarks of the academic programs. As a community City Tech nurtures an atmosphere of inclusion, respect, and open-mindedness in which all members can flourish.</p>
Our educational goals are focused on...	<ul style="list-style-type: none"> <li>• Developing knowledge from a range of disciplinary perspectives, and honing the ability to deepen and continue learning.</li> <li>• Acquiring and using the tools needed for communication, inquiry, analysis, and productive work.</li> <li>• Working productively within and across disciplines.</li> <li>• Understanding and applying values, ethics, and diverse perspectives in personal, professional, civic, and cultural/global domains.</li> </ul>
The Office of Assessment's mission is focused on...	<p>Supporting efforts to improve the quality of student learning outcomes through assessment, as well as collecting, analyzing, and interpreting and disseminating accurate and timely information on all aspects of the College's activities in support of institutional planning, decision-making and reporting.</p>
We assess our academic performances through...	<ul style="list-style-type: none"> <li>• Critical Course, Program, and General Education/Institutional Outcomes assessment</li> <li>• Placement Rates of City Tech Graduates</li> <li>• Professional Accreditation</li> <li>• Professional Certification Exam Outcomes</li> <li>• Retention and Graduation Rates at the program and institutional level</li> <li>• Self Studies and Comprehensive Program Reviews</li> <li>• Student, Faculty, Parent, and Alumni Survey results</li> </ul>

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## Resources for Improvement Strategies

### Living Lab Fellows

The College was granted a five-year \$3.1M grant award to develop a *Living Laboratory* funded by the U.S. Department of Education Strengthening Hispanic-Serving Institutions (Title V) program. As a result of institutionalizing the effective activities of the grant award, a community of faculty experts was created to support teaching, learning, and assessment best practices. The Living Lab fellowship program convenes every year to bring diverse groups of Faculty Fellows together to revitalize education through place-based learning and high-impact educational practices. Since they are charged with assisting the College in identifying Gen Ed improvement strategies, the fellows address various general education competencies and review the Gen Ed assessment results prior to drafting their seminar agenda. The Living Lab Fellows seminar includes important assessment curricula to ensure that faculty are familiar with psychometric concepts, including reliability and validity. According to Kuh, establishing the data integrity of the assessment is an important, high-impact practice (Cumming & Miller, 2017 endorsement).

### L4: Living Lab Learning Library

Launched in 2015, L4: Living Lab Learning Library is a faculty resource hosted on City Tech's OpenLab. It serves as a virtual faculty resource exchange of innovative teaching practices and improvement strategies. As an open site, L4 connects faculty from all departments, programs, and disciplines at City Tech and beyond, and offers a platform for sharing locally-developed instruments, as well as unique and creative projects and assignments that can be used with VALUE rubrics. Various student activities, ranging from short assignments (both given in class and as homework) to semester-long projects, are categorized in multiple ways: e.g., in relation to City Tech's Institutional/General Education learning outcomes and High Impact Educational Practices (Kuh, 2008; Cumming & Miller, 2017). This allows faculty to search for specific assignments or projects to achieve their goals and gain insight into strategies that are effective for improving student outcomes.

### Faculty Commons

The College's Faculty Commons serves as the City Tech Center for Teaching, Learning, Scholarship and Service nucleus, bringing together the City Tech faculty to capitalize on the synergy of the City Tech faculty assessment, pedagogy, and scholarship efforts. The Faculty Commons operates as a faculty resource and think tank where members can collaborate and find the necessary resources to help them with their various needs through workshops, the OpenLab Open Pedagogy workshops, and various others that are communicated through the Faculty Commons website.

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## General Education Improvement

For Gen Ed assessment, improvement plans are considered at the College level. A support system is identified to ensure faculty members have the tools they need to address any shortcoming. Communication is vetted widely among the senior administration, Assessment Committee leadership, General Education Committee leadership, Student Affairs staff, Student Government leadership, department chairs, and the various faculty support systems listed above. The improvement strategies are typically implemented over three semesters, so that there is time for the effects of the improvement strategies to take hold. After the improvement implementation phase of the Continuous Improvement Cycle is complete, there is a re-assessment. The College has supported the AIR General Education Assessment Brief series that documents the assessment process, sampling, and evaluation. The briefs are widely distributed to all senior administrators, faculty, and staff in the HEO and CLT series positions at the College.

## Program-Level and Course-Level Improvement

For program-level assessment and course-level assessment, the improvement plan drafting and implementation are determined and monitored by the department faculty. Department chairs and assessment liaisons provide the leadership for their respective departments, guiding faculty to the resources available that may help them in developing improvements for their respective courses or programs, such as learning about pedagogy best practices via professional development activities offered through Faculty Commons, OpenLab, and Faculty Fellows. Recommended assessment cycle lengths and available faculty resources are outlined in Table 10 on the next page.

Table 10. Recommended Assessment Cycle Lengths & List of Faculty Resources

Assessment Type	Cycle Length	Faculty Resources
<b>Critical Course</b>	1-2 years	Assessment Liaisons Course Coordination Liaisons First Year Experience Liaisons
<b>Program</b>	2-3 years	Gen Ed Liaisons Interdisciplinary Committee Living Lab Learning Library (L4) Fellows
<b>General Education</b>	3 years	Project Wayfinding Undergraduate Research Committee

Note: Faculty Resources are listed at <http://facultycommons.citytech.cuny.edu>

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## Examples of Large-Scale Improvement Strategies at City Tech

At City Tech, assessment results have been used to create positive change for both students and faculty. One example of a program that has been developed as a direct result of an assessment effort is the *Reading Effectively Across the Disciplines* program. In the Spring 2012 semester pilot of City Tech's Gen Ed assessment of reading skills comprehension, weaknesses in student reading skills were observed that confirmed the faculty assertion that our students struggled with reading materials assigned within the curriculum across the three schools. Given the preliminary pilot results, City Tech faculty and administrators decided to act upon the data – albeit pilot data – because they prioritized reading improvement strategies and did not think it was appropriate to wait for the full-scale results. The pilot results were used to apply for grant funding to launch a project originally called *Reading Across the Disciplines*, later re-named *Reading Effectively Across the Disciplines* (READ).

Reading Across the Disciplines redesigned three “gateway” courses selected because of their persistently high failure/withdrawal rate and because each course played a critical role in the curriculum across all three City Tech schools. The strategy to improve reading scores focused on training faculty to design course assignments at the appropriate reading level. Reading faculty from the English department worked closely with the faculty teaching these gateway courses to better understand readability and the factors that make reading a challenge for our students. Additionally, student peer leaders were selected and trained to facilitate group work in these courses. The READ program was successful and has since been institutionalized. The faculty who launched the READ initiative published their work in *InSight: A Journal of Scholarly Teaching* (But, et. al., 2017).

## Assessment Data Retention Policy

City Tech's Computing and Information Services provides faculty and staff with the ability to back up their assessment data to a centralized resource on the S-drive ("S:\Assessment") within their designated department folder. Assessment liaisons, department chairs, school deans, senior administrators, and other faculty with designated assessment responsibilities for their program/department should request access to this folder by contacting the Director of the Office of Assessment and Institutional Research; upon approval of the Director, a ticket will be submitted to the Helpdesk for access.

It is the responsibility of each department assessment liaison to ensure that all assessment files for their department are backed up. City Tech has established a Records/Data Retention Schedule. Assessment data should be maintained on the S-drive ("S:\Assessment") within the designated department folder for 7 years or

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the required time period given by the applicable accreditation governing body, whichever is greater. Program-level reports and self-study reports should be retained permanently. For reporting templates, contact the Office of Assessment and Institutional Research (AIR) or your department's Assessment Liaison.

Special project or program files, including official copy of publications, videotapes, or informational literature prepared for distribution, sign-in sheets, background materials, instructional materials, students exemplars, and supporting documentation should be maintained for 7 years or the required time period given by the applicable accreditation governing body, whichever is greater.

## Assessment Data for Research or Publication

According to the CUNY Assessment Council, assessment activities that are conducted for the purposes of assessment do not require CUNY Institutional Review Board review. CUNY's exemption policy is indicated in Appendix D1.

The assessment data may not be used for research purposes (e.g., conference presentations, publications) without contacting City Tech's Human Research Protection Program/Human Subjects Research (HRPP) coordinator for instructions for attaining the permission to utilize such data. The City Tech HRPP policies are indicated in Appendix D2.

Information regarding the Family Educational Rights and Privacy Act (sometimes referred to as the Buckley Amendment or FERPA) is in appendix D3.

## *7. Case Studies*

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The goal of assessment at City Tech is to improve student learning through collection and interpretation of valid and reliable data. The goal is simple, but attempts to achieve it generate many questions. What measurements should be used? How do we ensure valid and reliable data? Who should be involved in the assessment and who constructs meaning from the data? Answers to our questions have emerged through engagement in the assessment process. In this section, we provide several case studies of City Tech's assessment.

## CASE STUDY: Program-Level Assessment

**Background** The Department of Construction Management & Civil Engineering Technology (CMCE) is one of four engineering technology departments accredited by ABET. One of the Program Outcomes that the department faculty routinely assesses and evaluates is:

*"an ability to apply a knowledge of mathematics, science, engineering, and technology to engineering technology problems that require limited application of principles but extensive practical knowledge."*

This outcome is assessed in two courses, which were selected after reviewing the program's curriculum map indicating the alignment of courses to program outcomes. The two courses selected are part of the freshman year sequence, CMCE 1115 Statics and CMCE 1215 Strength of Materials. These courses were often referred to as "killer courses," since the retention rate had been as low as 50% in years past. The department decided to assess these courses as part of the continuous improvement process in order to make informed decisions for change based upon assessment data.

**Performance Indicators** Two performance indicators were developed to measure a student's ability with respect to this program outcome. One was developed for each course:

- CMCE 1115: Interpret and solve problems relating to statics: force, material/section properties, friction, etc.
- CMCE 1215: Interpret and solve problems relating to strength of materials: force, stress, material/section properties, and beam analysis and design.

**Assessment Method** For each course, a locally developed exam (LDE) with a test blueprint was developed for the final exams by the faculty teaching the courses. This also included input from the adjunct faculty.



### FACULTY PROFILE

Dr. Gerarda M. Shields, PhD, PE

**Department:** CMCE

**Role(s):** School of Technology & Design Assessment Co-Chair, CMCE Department Chair

### Assessment Reflection:

"The faculty in the CMCE department embraced assessment as part of our culture from the start. Assessment has enabled faculty to target topics that students struggle with, improve consistency among course sections and has, actually, made grading more efficient and standardized."

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**Evaluation Benchmark** The initial benchmark for both courses was that 60% of students could pass the final exam.

**Frequency of Data Collection & Evaluation** Initially, data was collected once a year and assessed in the winter or summer before the beginning of the following semester.

**Evaluation** In 2013, both courses met the benchmark of 60% passing. CMCE 1115 saw a 75% passing rate and CMCE 1215 saw a 65% passing rate for the final exam. When faculty evaluated the exams, it was noted that students appeared to struggle more with basic mathematics and physics than the actual theory taught in class

**Improvement Strategies** After a careful examination of the assessment results, the faculty identified a probable source of the student weaknesses resulting in a lower passing rate for these two critical courses, which was also affecting the attainment of the program-level outcome. The following curriculum and mentorship strategies were adopted:

- The mathematics requirement was modified so that the students must achieve a minimum grade of C in MAT 1275 for the CMCE 1115 course, since it was clear from the assessment diagnostic that mathematical deficiency was a shortfall.
- PHYS 1433 was changed from a co-requisite to a pre-requisite for CMCE 1115.
- For CMCE 1215, students were also required to pass CMCE 1115 with a minimum of a C grade.
- The department began a Peer Led Team Learning (PLTL) Program.

As a result, in a later assessment cycle the passing rates for the final exams were 95% and 92% for CMCE 1115 and CMCE 1215, respectively. The department will continue with these improvement strategies and will assess their continued effectiveness.

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# CASE STUDY: Program-Level Assessment

**Background** The Computer Engineering Technology Department (CET) is one of the largest departments at City Tech. The two programs, an AAS and a BTech degree, serve more than 1100 students. Assessment is key to understanding our students' knowledge and skills and to understanding the academic barriers to the attainment of program outcomes.

During their professional life, our graduates might be responsible for evaluating decisions that could have a negative effect on others, so one of our program outcomes is articulated as:

*"An understanding of and a commitment to address professional and ethical responsibilities including a respect for diversity."*

In our programs, ethics and professional behavior are embedded across the curriculum. That is, there is no one course dedicated specifically to these topics; they are introduced, reinforced, and emphasized in several different courses. For assessment of this program-level outcome, each program relies on its capstone course as it is not only the culminating experience designed to provide opportunities for students to integrate knowledge from their core and general education courses, but also a chance to gain insight into the meanings of professionalism and professional practice, and to reflect on the norms of a discipline or profession. This is evidenced by our program's curriculum map.

**Assessment Method** Rubrics are scoring instruments used to assess students' knowledge and skills for a particular assignment or performance task. They specify three elements: i) the performance indicators (the dimensions or component parts of an assignment), ii) the scale (the levels of achievement in the form of grades), and iii) the descriptions of what constitutes each level of performance (for each performance indicator and each level of achievement on the scale). We designed an assignment and rubric to assess this program outcome. The rubric provides the instructor with the tool necessary to measure the students' understanding of professionalism and ethics based on the assignment and class behavior.

**Performance Indicators** To develop the performance indicators, faculty separated the description of the program outcome into three parts; thus, we defined our performance indicators as follows:



## FACULTY PROFILE

Dr. Benito Mendoza, PhD

**Department:** CET

**Role(s):** School of Technology and Design Committee Co-Chair & CET-EMT ABET Coordinator

### Assessment Reflection:

"Comprehensive program assessment gives a complete picture of the students' skills and performance. A key aspect for the assessment application and success is the willingness of instructors to collaborate during the whole assessment process. Faculty in the CET department have found that assessment can also help teachers to create meaningful learning experiences for the students."

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1. Students understand and demonstrate professional responsibility.
    - The student will provide their own definition and an indication of their level of understanding of the concepts of ethical, moral, and professional behavior.
    - Instructor's records of attendance, lab reports, and assignments.
  2. Students understand and demonstrate ethical responsibility.
    - The student will read, understand, and analyze the codes of ethics of professional organizations, and provide justification for the promotion of codes of ethics by the organizations.
    - The student will recognize and describe the ethical issues involved in a case study of unethical business practices followed by a company.
    - Instructor's records of reports and assignments.
  3. Students demonstrate respect for diversity and tolerance.
    - The student will answer questions about applying the codes of ethics promoted by the professional organizations with regard to situations including race, gender, or religious discrimination, or lack of respect to diversity.
    - Instructor's records of diversity among teams/groups formed for the final project.

**Evaluation Benchmark** The rubric's scale consisted of the three sets of scores (above) assigned according to the instructor's appraisal of the students performance, (1) Below criterion, (2) Approaching criterion, (3) Meets criterion, and (4) Exceeds criterion. During the previous assessment cycle, the benchmark or target established for this outcome was that 80% of the students should attain a score of 3 (meets criterion) or 4 (exceeds criterion) for each performance indicator. That is, at least 80% of the students should meet or exceed the criterion.

**Frequency of Data Collection & Evaluation** Our assessment calendar spans 6 years. Each Program Outcome is assessed every two years. The assessment is cyclical, so faculty engage in assessment each semester. The revision, analysis, and evaluation of the assessment results is typically conducted during the following semester after data collection.

**Evaluation** The assessment has helped the faculty identify some areas that needed improvement in our programs. For example, while assessing the program outcome identified above, 3.(i) in the AAS in Electromechanical Engineering Technology, we found that only 40% of the students met or exceeded faculty criteria for Performance Indicator 3(i).1.

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**Continuous Improvement** Based on the initial analysis of the results, the department chair directed faculty teaching EMT 2461 and faculty teaching pre-requisite courses to emphasize and apply more effort toward teaching students how to apply professional standards in obtaining, reporting, and analyzing data and system design. Several courses were identified using the program curriculum map aligning course to program outcomes, and the corresponding course coordinators took action to reinforce this improvement strategy. The course outlines were updated and additional learning opportunities in this area were provided. The revised course outlines were also updated on the Department's website.

Thanks to the efforts of our faculty members, the results of the second assessment cycle indicated a considerable improvement. The percentage of students demonstrating competency across all performance indicators for this program outcome was above the target benchmark of 80%.

**Conclusions** The CET Department has established a sustainable model for program level assessment. The collaboration of faculty, the College's ABET Council, School of Technology and Design Assessment committee, and the AIR office has enabled faculty to recognize the value of assessment in improving our students' success. The assessments have enabled us to focus on the areas of improvement including lab facilities, courses, and learning experiences. Most importantly, assessment has provided a mechanism for our department to evaluate our effectiveness and emphasize a culture of continuous improvement.

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## CASE STUDY: Course-Level Assessment

**Background** The Department of Dental Hygiene is an accredited program, which, upon completion, awards an Associate of Applied Science degree (AAS). The accrediting body is the Commission on Dental Accreditation (CODA). Every seven years the program must demonstrate the compliance with each CODA core competency.

Since assessment is recognized as a very important tool in helping our students successfully complete the program, the department chair formed a department-level assessment committee. In compliance with the College's directive to select a critical course that is monitored and tracked on a department level, the assessment committee selected DEN 1100, Principles of Dental Hygiene Care I, as the first critical course to assess. This course is the first of four core courses in the program and the only one, if failed, that prevents the student from continuing in the program. The faculty selected two CODA core competencies that aligned with course learning objectives:

*Patient Care (PC2) Assessment: Systematically collect, analyze, and record data on the general, oral, and psychosocial health status of a variety of patients/clients using methods consistent with medico legal principle. This competency includes performing extra-oral and intra-oral examinations of hard and soft tissues and accurately recording and interpreting the findings.*

*Patient Care (PC5) Implementation: Provide specialized treatment that includes educational, preventive, and therapeutic services designed to achieve and maintain oral health. This competency includes: efficiently delivering effective preventive and therapeutic dental hygiene care.*

**Assessment Method** Each competency was assessed using two direct measures: a locally developed exam (LDE) that was accompanied with a test blueprint, and a performance appraisal with a clinical scoring sheet (rubric).

**Performance Indicators** Department faculty articulated two measureable performance indicators to assess each CODA core competency:

1. Students will perform an extra-oral and intra-oral examination and accurately record the findings. (PC2)
2. Students will demonstrate proficiency in the use of the sickle scaler. (PC 5)



### FACULTY PROFILE

Associate Professor Susan  
Nilsen-Kupsch, MPA

**Department:** Dental Hygiene

**Role(s):** School of Professional  
Studies Assessment Committee  
Co-Chair

### Assessment Reflection:

"Assessment allows faculty to measure to what end stated course and program outcomes are being met. With these results, discussion can center on whether modifications are needed and can be implemented for the following cycle, the goal being continual improvement."

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**Evaluation Benchmark** Faculty determined that a target of 75% of the students should meet or exceed criteria for these CODA competencies.

**Frequency of Data Collection & Evaluation** Due to the critical nature of this course, it has continued to be assessed and evaluated. The above performance indicators were tracked for three years, at which time additional CODA competencies have been added to the critical course assessment cycles. Performance indicators were developed and tracked for an additional two years.

**Evaluation** For the initial data collection of this critical course, two sections of DEN 1100 (n=60) were sampled for assessment purposes. Both sections implemented the same clinical measures. The results from the locally-developed exam resulted in different outcomes than the performance appraisal:

Performance indicator 1- 71% of students met the target/standard of 75% on the clinical check sheet (rubric).

Performance indicator 2- 58% of students met the target/standard of 75% on the clinical check sheet (rubric).

Due to the different results, the faculty reviewed their assessment methods. Subsequently, they drafted an improvement strategy to identify the shortcomings from both assessment methods.

**Continuous Improvement** After evaluating the results, an action plan was generated which included the following:

- Adoption of new textbooks
- Adoption of a typodont model
- Redesign of every seminar, including all new power points & competencies
- Elmo-overhead digital projectors for use in instrument demonstration
- Change in lead faculty
- Creation of a clinical tutoring program

In subsequent assessment initiatives, significant improvements have been realized, with more than 90% of the students meeting or exceeding faculty criteria.

**Conclusions** The Dental Hygiene Department has established a sustainable model for course-level and program-level assessment that is in compliance with the CODA accreditation requirements. Due to the importance of this course identified as a critical course, it will continue to be assessed. The success of the Dental Hygiene students in this course has been a contributing factor to the department's increased retention rate from 74% (2009 cohort) to 91% (2015 cohort).



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## CASE STUDY: Course-Level Assessment

**Background** The Department of Hospitality Management offers the Associate in Applied Science (AAS) and the Bachelor of Technology (B-Tech) in Hospitality Management. Both internationally recognized degree programs prepare students for entry into the Hospitality Industry in the areas of Culinary and Pastry Arts, Hotel and Resort Sales, Travel and Tourism, Food and Beverage Management and Career and Technology Teacher Education.

The Accreditation Commission for Programs in Hospitality Administration (ACHPA) accredits the B-Tech degree in Hospitality Management, which builds on the AAS foundation. Since 2009, HMGT 3502 Hospitality Management Research Seminar and HMGT 2305 Dining Room Operations, both writing intensive courses, have been continuously assessed at the critical course and program levels.

HMGT faculty chose one course in each program that would be assessed on both the critical course and program levels, identifying key learning outcomes either introduced or reinforced. The execution of high service standards, the ability to research, analyze and evaluate information – and by extension industry issues and trends – and to demonstrate enhanced technical and managerial skills have been the rationale for choosing the specific courses for critical and program level course assessment.

Two learning outcomes and two performance indicators for each outcome were assessed for the courses below since 2009. The HMGT assessment liaison, working with the course coordinators and the AIR, developed rubrics for both courses.

The HMGT 2305 Dining Room Operations (AAS Program) Student Learning Outcomes assessed were:

1. Students will be able to demonstrate and practice rotation through dining room service jobs.
2. Students will be able to compare and contrast service through analysis of a designated NYC restaurant.

The HMGT 3502 Hospitality Management Research Seminar (BTech Program) Student Learning Outcomes assessed were:

1. Students will be able to analyze and synthesize a body of scholarly and popular literature
2. Students will be able to formulate an investigative report



### FACULTY PROFILE

Associate Professor Susan  
Phillip, MS

**Department:**  
Hospitality Management

**Role(s):** School of Professional  
Studies Co-Chair

**Assessment Reflection:**  
“The assessment process  
requires commitment and  
meaningful effort. The Department  
of Hospitality Management is  
committed to building a  
faculty-driven sustainable  
culture of assessment that  
strengthens pedagogy and  
student learning.”



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**Assessment Method** Each student learning outcome was assessed using two performance appraisals with a scoring rubric.

**Performance Indicators** Department faculty articulated two performance indicators to assess each student learning outcome as follows:

- Execution of various dining room service. (AAS 1)
- Application of menu and operational terminology (AAS 1)
- A written descriptive analysis containing a narrative, data collection and evaluation, and diagrams, students will compare and contrast service of a designated NYC restaurant (AAS 2)
- Application of successful training techniques (AAS 2)
- Share evidence of an organized and comprehensive review of topic specific literature through written presentation [annotated bibliography] (BT 1)
- Share evidence of research findings through oral presentation (BT 1)
- Convey comprehension of the subject matter by writing an outline (BT 2)
- Convey comprehension of the research process, demonstrated by completing a written report (BT 2)

**Evaluation Benchmark** Faculty determined that a target of 75% of the students should meet or exceed the criteria.

**Frequency of Data Collection & Evaluation** At the onset of the assessment activities in 2009, the courses were monitored on an annual basis. However, the cycle has been changing throughout the years. The Hospitality Management department is currently on a two-year cycle for critical course assessment and three-year cycle for program-level assessment, in accordance with the College's recommended assessment cycle length.

**Continuous Improvement** After evaluating the longitudinal results for the AAS program, the following improvement strategies were implemented:

- Replacing the rubric for the service analysis with the writing rubric used in HMGT 3502 research, which better addressed course content and learning outcomes. In addition, using the rubric developed for HMGT 3502 research aids students in making connections to earlier research when the higher-level class is taken later.
- Placing the memo writing assignment later in the semester, after students have served in the dining room at least once and better comprehended the operation. A second writing memo-writing assignment (employee to manager) about social media was added for later in the semester. Placement of the first memo writing assignment later in the semester and the requirement of a second memo writing assignment was data driven and the goals were to introduce and re-enforce writing and selling skills.

- 
- Revising the Standard of Performance Manual and distributing to all instructors and students.
  - Reducing the class size from 60 to 30 students in order to improve delivery of material and to facilitate assessment (effective Spring 2018).
  - Improving course coordination communication between lecture and lab instructors via email and in at least one formal meeting each semester and the sharing of teaching resources.

In subsequent assessment initiatives, significant improvements have been realized, with more than 90% of the AAS students meeting or exceeding faculty criteria.

After evaluating the longitudinal results for the BTech program, the improvement strategies implemented include the following:

- Strengthening course coordination to ensure uniform content and the sharing of resources and techniques among all instructors and
- Engaging the course coordinator as a fellow in A Living Laboratory: Revitalizing General Education for a 21st-Century College of Technology Fifth Year Fellows as a course change leader, which resulted in the following changes in the course:
  - o Scaffolding assignments;
  - o Increasing the number of in-class assignments;
  - o Including research themes based on student concentration in the Hospitality Management Department (culinary and pastry arts, hotel and resort management, travel and tourism, food and beverage management), enabled students to build on their prior knowledge and to create expertise on topics of their choice; and
  - o Developing an OpenLab site for faculty and student resources and content (in progress).

An unanticipated benefit of the implementation of the BA improvement strategies was that the course coordinator became certified in Writing Intensive course instruction through the Writing Across the Curriculum (WAC) program and has shared new approaches with department instructors that have been adopted.

**Conclusions** The Hospitality Management Department has established a sustainable model for course-level and program-level assessment that is in compliance with the Middle States Commission on Higher Education and the Accreditation Commission for Programs in Hospitality Administration accreditation requirements. Due to the importance of the critical courses within the department curriculum, they will continue to be assessed in a systematic manner. Upon further evaluation, the BA program has realized an increased retention rate from 54.5% (2013 cohort) to 78.6% (2016 cohort).

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## CASE STUDY: Department Leadership for General Education Assessment

In Spring 2012, the three school assessment committee faculty liaisons began working with a group of professors from various disciplines to discuss the use of the AAC&U LEAP VALUE rubrics as a framework to assess General Education at City Tech. After the initial pilot of Oral Communication, the Humanities Department, which houses City Tech's Communication faculty, was identified as the lead department for the College's full-scale Oral Communication assessment effort. In 2013, the AAC&U VALUE Oral Communication rubric was reviewed by the Communications faculty, since its faculty members are the oral communication experts at City Tech and have the most experience assessing oral communication at the college.

Oral Communication is one of the fourteen General Education/Institutional Outcomes articulated by City Tech's College Council. Communication faculty members worked closely with the three schools' (Arts & Sciences, Professional Studies, and Technology & Design) assessment committees to create a rubric for Oral Communication. Faculty worked to bridge the Communication discipline with work on the General Education rubric. The input of the Communications faculty was paramount to creating a comprehensive rubric that could be used by faculty throughout City Tech.

The City Tech Oral Communications rubric went through several review processes from 2013 to 2015. After initially reviewing the AAC&U VALUE Oral Communication rubric, the Communications faculty suggested tailoring the rubric to better fit City Tech's student population, as the AAC&U rubric was too broad and lacked specificity. Several major changes took place during these reviews. For instance, in consideration of City Tech's diverse student population, faculty noted that the performance indicator "appearance" may cause confusion, as "professional attire" could mean different things to different cultures. Additionally, the Communication faculty examined AAC&U's evaluation categories, which were then changed to a more straightforward scoring scheme of "Excellent (4), Good (3), Acceptable (2), and Unacceptable (1)."



### FACULTY PROFILE

Dr. Sarah Standing, PhD

**Department:** Humanities

**Role(s):** School of Arts & Sciences Assessment Committee Faculty Co-Chair

### Assessment Reflection:

"The reason to conduct assessment is, quite simply, to make teaching more effective. This can be challenging when working to assess qualitative data. City Tech's faculty-driven assessment process requires faculty to create instruments and protocol useful for their own courses and for general education across the college. Ultimately, it is incumbent upon all faculty members to invest in implementing assessment results to improve our own teaching."

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Several other changes were made to the rubrics during this time period. "Volume," as a specific criteria, was added to the performance indicator "Verbal Delivery." Additionally, the AAC&U performance indicator of "Supporting Material" was broken up into two separate categories: "Quality of Supporting Material" and "Presentation of Supporting Material." Under "Quality of Supporting Material," knowledge of the difference between primary and secondary sources was articulated, as well as "the significance of the currency of cited material, and of the difference between fact and opinion."

Furthermore, AAC&U's category of "Central Message" was amended to "Central Thesis," and two categories were created: one for Persuasive Speeches, and one for Informative Speeches. The primary distinction in the evaluation criteria for each was that in the Informative category there was a call for "a clear distinction between fact and opinion." The rubric was again reviewed by faculty assessment liaisons from different disciplines throughout City Tech, as well as the Communication faculty who wanted an assessment tool that would best serve the college and the City Tech's general education assessment efforts.

Throughout these review sessions, faculty continued to pilot-test the revised rubric in various sections of COM 1330, and made further modifications based on faculty feedback. In Spring 2013, faculty across the college conducted an inter-rater reliability activity to understand the consistency of the raters' scoring throughout the process, as well as to identify any problems with the rubric.

Based on the inter-rater reliability results, the Oral Communication rubric went through another round of modifications. In Spring 2015, after Communication faculty feedback, the rubric was further revamped into its most current version. In order to simplify the rubric, detailed descriptions for each performance indicator were provided on a separate page, along with instructions for using the rubric. This new rubric was used to collect data in 35 sections of COM 1330 for the 2016 assessment cycle.

After the assessment results were available, the Communication Curriculum Committee conducted an inter-rater reliability assessment of the rubric, using sample student presentations. This activity included all full-time members of the Communication faculty reviewing eight speeches, using the rubric to score the work. These scores from the different raters were analyzed for consistency and resulted in a very high inter-rater reliability coefficient (Cronbach's  $\alpha_{\text{propto}} = .92$ ). As a result of this effort, the College has a rubric that is tailored to take into account the student population at City Tech, with its extremely diverse student body. Additionally, the new rubric includes more specificity for performance indicators, and more detailed definitions for faculty. City Tech faculty are encouraged to use either City Tech's Oral Communication rubric, or the AAC&U VALUE rubric to assess Oral Communication for City Tech's General Education assessments.

Faculty who need assistance developing a rubric for their course or program are welcome to contact AIR for assistance. Assessment workshops are also provided by AIR to assist faculty with their assessment responsibilities. These workshops are posted on the Faculty Commons and AIR webpages and announced through the College-wide announcement system.



# *Appendix*

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# Appendix Table A1. General Education Learning Outcomes Adopted by the College Council in 2013

## Important General Education Learning Outcomes- adopted by College Council March 2013

### New York City College of Technology aspires to be a living laboratory where General Education

- is represented by a mutually accepted core of knowledge, skills and values that permeate all courses, not only in the liberal arts and sciences, but across the majors.
- makes rich use of the physical, historical, economic, and cultural aspects of our location in a diverse urban community.
- stresses active learning and creative problem solving
- encourages engagement in personal, professional, and civic communities.
- integrates theory/ knowledge and hand-on/ application.
- maintains a global focus/ perspective.
- is communications intensive.

<b>KNOWLEDGE</b> Develop knowledge from a range of disciplinary perspectives, and develop the ability to deepen and continue learning	<b>Breadth of Knowledge</b> <ul style="list-style-type: none"> <li>• Value knowledge and learning</li> <li>• Understand and appreciate the range of academic disciplines and their relationship to the fields of professional and applied study.</li> <li>• Use the arts, sciences and humanities as a forum for the study of values, ethical principles, and the physical world.</li> </ul>
	<b>Depth of Knowledge</b> <ul style="list-style-type: none"> <li>• Engage in an in-depth, focused and sustained program of study</li> <li>• Pursue disciplined, Inquiry-based learning in the major.</li> </ul>
	<b>Lifelong learning</b> <ul style="list-style-type: none"> <li>• Show curiosity and the desire to learn.</li> <li>• Acquire tools for lifelong learning- how to learn, how they learn, knowledge of resources.</li> </ul>
	<b>Communication</b> <ul style="list-style-type: none"> <li>• Communicate in diverse settings and groups, using written (both reading and writing), oral (both speaking and listening), and visual means, and in more than one language.</li> </ul>
<b>SKILLS</b> Acquire and use the tools needed for communication, inquiry, analysis and productive work.	<b>Inquiry/ Analysis</b> <ul style="list-style-type: none"> <li>• Derive meaning from experience, as well as gather information from observation.</li> <li>• Understand and employ both quantitative and qualitative analysis to describe and solve problems, both independently and cooperatively.</li> <li>• Employ scientific reasoning and logical thinking.</li> <li>• Use creativity to solve problems.</li> </ul>

<b>INTEGRATION</b> <b>Work productively within and across disciplines.</b>	<b>Information Literacies</b> <ul style="list-style-type: none"> <li>Gather, interpret, evaluate, and apply information discerningly from a variety of sources.</li> </ul>
	<b>Systems</b> <ul style="list-style-type: none"> <li>Understand and navigate systems</li> </ul>
	<b>Integrate Learning</b> <ul style="list-style-type: none"> <li>Resolve difficult issues creatively by employing multiple system tools.</li> <li>Make meaningful and multiple connections among the liberal arts and between the liberal arts and the areas of study leading to a major or profession.</li> </ul>
	<b>Professional/ Personal Development</b> <ul style="list-style-type: none"> <li>Demonstrate intellectual honesty and personal responsibility.</li> <li>Discern consequences of decisions and actions.</li> <li>Demonstrate intellectual agility and ability to manage change.</li> <li>Work with teams, including those of diverse composition. Build consensus.</li> <li>Respect and use creativity.</li> </ul>
<b>VALUES, ETHICS AND RELATIONSHIPS</b> <b>Understanding and apply values, ethics and diverse perspectives in personal, professional, civic and cultural/ global domains</b>	<b>Ethics/ Values</b> <ul style="list-style-type: none"> <li>Transform information into knowledge, and knowledge into judgement and actions.</li> <li>Assume responsibility for social justice</li> </ul>
	<b>Community/ Civic Engagement</b> <ul style="list-style-type: none"> <li>Demonstrate social and civic knowledge (regarding social, political, economical, and historical issues)</li> <li>Understand organizations and histories underlying government in global context.</li> <li>Apply knowledge and analyze social, political, economic and historical issues</li> <li>Show ability to contribute actively by applying knowledge to the identification and analysis of societal and professional problems to enact solutions.</li> </ul>
	<b>Global/ Multicultural Orientation</b> <ul style="list-style-type: none"> <li>Demonstrate expanded cultural and global awareness and sensitivity.</li> <li>Discern multiple perspective.</li> <li>Use awareness of cultural differences to bridge cultural and linguistic barriers.</li> <li>Demonstrate proficiencies and capacities in dealing with diverse society.</li> <li>Communicate across cultural and linguistic barriers.</li> </ul>



Appendix Table B1. The City Tech Program Review Schedule

Program	School	Department	Degree Program (P) or Discipline/ Department (D)	Type of Degree (if applicable)	Type of Review	Last Review Date	Updated Cycle Length (years)	Next Review Date	Accreditation Agency
Arts and Sciences									
African American Studies	AS	African American Studies Department	D		Program Review	2012	7	2019	
Liberal Arts & Sciences (Associate) in Arts	AS	AS	P	AA	Program Review	2006	7	2018	
Liberal Arts & Sciences (Associate) in Science	AS	AS	P	AS	Program Review	2006	7	2018	
Biological Sciences	AS	Biology	D		Program Review	2013	7	2020	
Biomedical Informatics	AS	Biology	P	BS	Program Review	New Program	7	2020	
Chemical Technology	AS	Chemistry	P	AS	Program Review	2011	7	2018	
Applied Chemistry	AS	Chemistry	P	BS	Program Review	New Program	7	2018	
English	AS	English	D		Program Review	2017	7	2024	

<b>Professional and Technical Writing</b>	AS	English	P	BS		New Program	7	2020	
<b>English as a Second Language (ESOL)</b>	AS	English			Program Review	2011	7	2018	
<b>Foreign Languages</b>	AS	Humanities	D		Program Review	2015	7	2022	
<b>Humanities</b>	AS	Humanities	D		Program Review	2015	7	2022	
<b>Applied Mathematics/ Mathematics Dept.</b>	AS	Mathematics	P	BS	Program Review	2007	7	2019	
<b>Computer Science</b>	AS	Mathematics	P	AS	Program Review	2013	7	2020	
<b>Mathematics Education</b>	AS	Mathematics	P	BS	Accreditation – (NCATE)	2018	8	2026	Council for the Accreditation of Educator Preparation (CAEP)
<b>Applied Computational Physics BS</b>	AS	Physics	D	BS	Program Review	New Program	7	2023	
<b>Social Sciences</b>	AS	Social Sciences	D		Program Review		7	2018	
<b>Professional Studies</b>									
<b>Accounting</b>	PS	Business	P	AAS	Program Review	2016	7	2023	

<b>Business and Technology of Fashion AAS</b>	PS	Business	P	AAS	Program Review	New Program	7	2024	
<b>Business and Technology of Fashion BS</b>	PS	Business	P	BS	Program Review	New Program	7	2024	
<b>Marketing Management and Sales</b>	PS	Business	P	AAS	Program Review	2016	7	2023	
<b>Career and Technology Teacher Education</b>	PS	Career and Technology Teacher Education	P	BS in Ed	Accreditation - (NCATE)	2017	8	2025	Council for the Accreditation of Educator Preparation (CAEP)
<b>Technology Teacher Education</b>	PS	Career and Technology Teacher Education	P	BS in Ed	Accreditation	2017	8	2025	Council for the Accreditation of Educator Preparation (CAEP)
<b>Dental Hygiene</b>	PS	Dental Hygiene	P	AAS	Accreditation- ADA/CODA	2017	7	2024	Commission on Dental Accreditation of the American Dental Association
<b>Hospitality Management (Bachelor's)</b>	PS	Hospitality Management	P	BTech	Accreditation	2017	7	2024	Accreditation Commission for Programs in Hospitality Administration (ACPHA)
<b>Hospitality Management (Associate)</b>	PS	Hospitality Management	P	AAS	Accreditation (Initial)	2017	7	2024	Accreditation Commission for Programs in Hospitality Administration (ACPHA)
<b>Health Services Administration (Bachelor's)</b>	PS	Human Services	P	BS	Program Review	2012	7	2019	

<b>Human Services (Associate)</b>	PS	Human Services	P	AAS	Accreditation	2014	6	2020	Council of Standards for Human Services Education (CSHSE)
<b>Human Services (Bachelor's)</b>	PS	Human Services	P	BS	Accreditation	2014	6	2020	Council of Standards for Human Services Education (CSHSE)
<b>Legal Assistant Studies (Associate)</b>	PS	Law & Paralegal Studies	P	AAS	Accreditation	2014	7	2021	American Bar Association's Standing Committee on Legal Assistants (ABA)
<b>Legal Assistant Studies (Bachelor's)</b>	PS	Law & Paralegal Studies	P	BS	Accreditation	2014	7	2021	American Bar Association's Standing Committee on Legal Assistants (ABA)
<b>Nursing (Associate)</b>	PS	Nursing	P	AAS	Accreditation	2017	8	2025	Accrediting Commission for Education in Nursing (ACEN)
<b>Nursing Bachelor's</b>	PS	Nursing	P	BS	Accreditation	2015	5	2020	Accrediting Commission for Education in Nursing (ACEN)
<b>Radiological Technology &amp; Medical Imaging (Associate)</b>	PS	Radiological Technology & Medical Imaging	P	AAS	Accreditation	2015	7	2022	Joint Review Committee on Education in Radiologic Technology (JRCERT)
<b>Radiological Technology &amp; Medical Imaging (Bachelor's)</b>	PS	Radiological Technology & Medical Imaging	P	BS	Program Review	New Program	10	2022	

<b>Dental Laboratory Technology</b>	PS	Restorative Dentistry	P	AAS	Accreditation	2017	7	2024	Commission on Dental Accreditation of the American Dental Association
<b>Ophthalmic Dispensing</b>	PS	Vision Care Technology	P	AAS	Accreditation	2012	6	2018	Commission on Opticianry Accreditation
<b>Technology and Design</b>									
<b>Communication Design, AAS (formerly Art &amp; Advertising)</b>	TD	Advertising Design and Graphic Arts	P	AAS		2014	7	2021	National Association of Schools of Art and Design (NASAD)
<b>Communication Design, BTech, (formerly Art and Design)</b>	TD	Advertising Design and Graphic Arts	P	BTech		2014	7	2021	National Association of Schools of Art and Design (NASAD)
<b>Communication Design Management, formerly Graphic Arts Advertising Production Management (Associate)</b>	TD	Advertising Design and Graphic Arts	P	AAS	Accreditation	2016	4	2020	Accrediting Council for Collegiate Graphic Communications
<b>Communication Design Management, formerly Graphic Arts Advertising Production Management (Bachelor's)</b>	TD	Advertising Design and Graphic Arts	P	BTech	Accreditation	2016	4	2020	Accrediting Council for Collegiate Graphic Communications
<b>Architectural Technology (Associate)</b>	TD	Architectural Technology	P	AAS	Program Review	2015	7	2022	

<b>Architectural Technology Bachelor's</b>	TD	Architectural Technology	P	BTech	Program Review	2015	7	2022	
<b>Computer Engineering Technology</b>	TD	Computer Engineering Technology	P	BTech	Accreditation -TAC/ABET	2014	6	2020	Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ABET)
<b>Electromechanical Engineering Technology</b>	TD	Computer Engineering Technology	P	AAS	Accreditation -TAC/ABET	2014	6	2020	Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ABET)
<b>Computer Information Systems (Associate)</b>	TD	Computer Systems Technology	P	AAS	Program Review	2013	7	2020	
<b>Computer Systems Bachelor's</b>	TD	Computer Systems Technology	P	BTech	Program Review	2013	7	2020	
<b>Civil Engineering Technology (Associate)</b>	TD	Construction Management and Civil Engineering Technology	P	AAS	Accreditation -TAC/ABET	2014	6	2020	Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ABET)
<b>Construction Management &amp; Civil Engineering Technology</b>	TD	Construction Management and Civil Engineering Technology	P	AAS	Accreditation (Initial)	2014	6	2020	Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ABET)

<b>Construction Technology</b>	TD	Construction Management and Civil Engineering Technology	P	BTech		2014	6	2020	
<b>Electrical Engineering Technology</b>	TD	Electrical and Telecommunications Engineering Technology	P	AAS	Accreditation -TAC/ABET	2014	6	2020	Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ ABET)
<b>Electrical Technology</b>	TD	Electrical and Telecommunications Engineering Technology	P	BTech	Accreditation -TAC/ABET	2014	6	2020	Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ ABET)
<b>Telecommunication Engineering Technology (Associate)</b>	TD	Electrical and Telecommunications Engineering Technology	P	AAS	Accreditation -TAC/ABET	2014	6	2020	Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ ABET)
<b>Telecommunication Engineering Technology (Bachelor's)</b>	TD	Electrical and Telecommunications Engineering Technology	P	BTech	Accreditation -TAC/ABET	2014	6	2020	Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ ABET)
<b>Emerging Media Technologies</b>	TD	Entertainment Technology	P	BTech	Program Review	New Program	7	2018	
<b>Entertainment Technology</b>	TD	Entertainment Technology	P	BTech	Program Review	2016	7	2023	
<b>Environmental Control Technology</b>	TD	Environmental Control Technology	P	AAS	Program Review	2012	7	2019	

<b>Facilities Management</b>	TD	Environmental Control Technology	P	BTech	Program Review	2015	7	2022	
<b>Industrial Design Technology</b>	TD	Mechanical Engineering Technology	P	AAS	Program Review	2008	7	2018	
<b>Mechanical Engineering Technology</b>	TD	Mechanical Engineering Technology	P	AAS	Accreditation	2014	6	2020	Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ABET)
<b>Mechanical Engineering Technology</b>	TD	Mechanical Engineering Technology	P	BTech	Accreditation	2014	6	2020	Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ABET)
<b>Mechanical Engineering Technology</b>	TD	Mechanical Engineering Technology	P	AAS	Accreditation -TAC/ABET	2014	6	2020	Technology Accreditation Commission of the Accreditation Board for Engineering Technology (TAC/ABET)



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## Appendix C1: MSCHE Educational Standards I-VII

# Standard I

### Mission and Goals

The institution's mission defines its purpose within the context of higher education, the students it serves, and what it intends to accomplish. The institution's stated goals are clearly linked to its mission and specify how the institution fulfills its mission.

### Criteria

An accredited institution possesses and demonstrates the following attributes or activities:

1. clearly defined mission and goals that:
  - a. are developed through appropriate collaborative participation by all who facilitate or are otherwise responsible for institutional development and improvement;
  - b. address external as well as internal contexts and constituencies;
  - c. are approved and supported by the governing body;
  - d. guide faculty, administration, staff, and governing structures in making decisions related to planning, resource allocation, program and curricular development, and the definition of institutional and educational outcomes;
  - e. include support of scholarly inquiry and creative activity, at levels and of the type appropriate to the institution;
  - f. are publicized and widely known by the institution's internal stakeholders;
  - g. are periodically evaluated;
2. institutional goals that are realistic, appropriate to higher education, and consistent with mission;
3. goals that focus on student learning and related outcomes and on institutional improvement; are supported by administrative, educational, and student support programs and services; and are consistent with institutional mission; and
4. periodic assessment of mission and goals to ensure they are relevant and achievable.

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# Standard II

## Ethics and Integrity

Ethics and integrity are central, indispensable, and defining hallmarks of effective higher education institutions. In all activities, whether internal or external, an institution must be faithful to its mission, honor its contracts and commitments, adhere to its policies, and represent itself truthfully.

## Criteria

An accredited institution possesses and demonstrates the following attributes or activities:

1. a commitment to academic freedom, intellectual freedom, freedom of expression, and respect for intellectual property rights;
2. a climate that fosters respect among students, faculty, staff, and administration from a range of diverse backgrounds, ideas, and perspectives;
3. a grievance policy that is documented and disseminated to address complaints or grievances raised by students, faculty, or staff. The institution's policies and procedures are fair and impartial, and assure that grievances are addressed promptly, appropriately, and equitably;
4. the avoidance of conflict of interest or the appearance of such conflict in all activities and among all constituents;
5. fair and impartial practices in the hiring, evaluation, promotion, discipline, and separation of employees;
6. honesty and truthfulness in public relations announcements, advertisements, recruiting and admissions materials and practices, as well as in internal communications;
7. as appropriate to its mission, services or programs in place:
  - a. to promote affordability and accessibility;
  - b. to enable students to understand funding sources and options, value received for cost, and methods to make informed decisions about incurring debt;
8. compliance with all applicable federal, state, and Commission reporting policies, regulations, and requirements to include reporting regarding:
  - a. the full disclosure of information on institution-wide assessments, graduation, retention, certification and licensure or licensing board pass rates;
  - b. the institution's compliance with the Commission's Requirements of Affiliation;
  - c. substantive changes affecting institutional mission, goals, programs, operations, sites, and other material issues which must be disclosed in a timely and accurate fashion;
  - d. the institution's compliance with the Commission's policies; and
9. periodic assessment of ethics and integrity as evidenced in institutional policies, processes, practices, and the manner in which these are implemented.

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## Standard III

### Design and Delivery of the Student Learning Experience

An institution provides students with learning experiences that are characterized by rigor and coherence at all program, certificate, and degree levels, regardless of instructional modality. All learning experiences, regardless of modality, program pace/schedule, level, and setting are consistent with higher education expectations.

### Criteria

An accredited institution possesses and demonstrates the following attributes or activities:

1. certificate, undergraduate, graduate, and/or professional programs leading to a degree or other recognized higher education credential, of a length appropriate to the objectives of the degree or other credential, designed to foster a coherent student learning experience and to promote synthesis of learning;
2. student learning experiences that are designed, delivered, and assessed by faculty (full-time or part-time) and/or other appropriate professionals who are:
  - a. rigorous and effective in teaching, assessment of student learning, scholarly inquiry, and service, as appropriate to the institution's mission, goals, and policies;
  - b. qualified for the positions they hold and the work they do;
  - c. sufficient in number;
  - d. provided with and utilize sufficient opportunities, resources, and support for professional growth and innovation;
  - e. reviewed regularly and equitably based on written, disseminated, clear, and fair criteria, expectations, policies, and procedures;
3. academic programs of study that are clearly and accurately described in official publications of the institution in a way that students are able to understand and follow degree and program requirements and expected time to completion;
4. sufficient learning opportunities and resources to support both the institution's programs of study and students' academic progress;
5. at institutions that offer undergraduate education, a general education program, free standing or integrated into academic disciplines, that:
  - a. offers a sufficient scope to draw students into new areas of intellectual experience, expanding their cultural and global awareness and cultural sensitivity, and preparing them to make well-reasoned judgments outside as well as within their academic field;

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b. offers a curriculum designed so that students acquire and demonstrate essential skills including at least oral and written communication, scientific and quantitative reasoning, critical analysis and reasoning, technological competency, and information literacy. Consistent with mission, the general education program also includes the study of values, ethics, and diverse perspectives; and

c. in non-US institutions that do not include general education, provides evidence that students can demonstrate general education skills;

6. in institutions that offer graduate and professional education, opportunities for the development of research, scholarship, and independent thinking, provided by faculty and/or other professionals with credentials appropriate to graduate-level curricula;

7. adequate and appropriate institutional review and approval on any student learning opportunities designed, delivered, or assessed by third-party providers; and

8. periodic assessment of the effectiveness of programs providing student learning opportunities.

## Standard IV

### Support of the Student Experience

Across all educational experiences, settings, levels, and instructional modalities, the institution recruits and admits students whose interests, abilities, experiences, and goals are congruent with its mission and educational offerings. The institution commits to student retention, persistence, completion, and success through a coherent and effective support system sustained by qualified professionals, which enhances the quality of the learning environment, contributes to the educational experience, and fosters student success.

### Criteria

**An accredited institution possesses and demonstrates the following attributes or activities:**

1. clearly stated, ethical policies and processes to admit, retain, and facilitate the success of students whose interests, abilities, experiences, and goals provide a reasonable expectation for success and are compatible with institutional mission, including:

a. accurate and comprehensive information regarding expenses, financial aid,

scholarships, grants, loans, repayment, and refunds;

b. a process by which students who are not adequately prepared for study at the level for which they have been admitted are identified, placed, and supported in attaining appropriate educational goals;

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- c. orientation, advisement, and counseling programs to enhance retention and guide students throughout their educational experience;
  - d. processes designed to enhance the successful achievement of students' educational goals including certificate and degree completion, transfer to other institutions, and post-completion placement;
2. policies and procedures regarding evaluation and acceptance of transfer credits, and credits awarded through experiential learning, prior non-academic learning, competency-based assessment, and other alternative learning approaches;

- 3. policies and procedures for the safe and secure maintenance and appropriate release of student information and records;
- 4. if offered, athletic, student life, and other extracurricular activities that are regulated by the same academic, fiscal, and administrative principles and procedures that govern all other programs;
- 5. if applicable, adequate and appropriate institutional review and approval of student support services designed, delivered, or assessed by third-party providers; and
- 6. periodic assessment of the effectiveness of programs supporting the student experience.

## Standard V

### Educational Effectiveness Assessment

**Assessment of student learning and achievement demonstrates that the institution's students have accomplished educational goals consistent with their program of study, degree level, the institution's mission, and appropriate expectations for institutions of higher education.**

### Criteria

**An accredited institution possesses and demonstrates the following attributes or activities:**

- 1. clearly stated educational goals at the institution and degree/program levels, which are interrelated with one another, with relevant educational experiences, and with the institution's mission;
- 2. organized and systematic assessments, conducted by faculty and/or appropriate professionals, evaluating the extent of student achievement of

institutional and degree/program goals. Institutions should:

- a. define meaningful curricular goals with defensible standards for evaluating whether students are achieving those goals;
- b. articulate how they prepare students in a manner consistent with their mission for successful careers, meaningful lives, and, where appropriate, further

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education. They should collect and provide data on the extent to which they are meeting these goals;

c. support and sustain assessment of student achievement and communicate the results of this assessment to stakeholders;

3. consideration and use of assessment results for the improvement of educational effectiveness. Consistent with the institution's mission, such uses include some combination of the following:

a. assisting students in improving their learning;

b. improving pedagogy and curriculum;

c. reviewing and revising academic programs and support services;

d. planning, conducting, and supporting a range of professional development activities;

e. planning and budgeting for the provision of academic programs and services;

f. informing appropriate constituents about the institution and its programs;

g. improving key indicators of student success, such as retention, graduation, transfer, and placement rates;

h. implementing other processes and procedures designed to improve educational programs and services;

4. if applicable, adequate and appropriate institutional review and approval of assessment services designed, delivered, or assessed by third-party providers; and

5. periodic assessment of the effectiveness of assessment processes utilized by the institution for the improvement of educational effectiveness.

6. periodic assessment of the effectiveness of programs supporting the student experience.

## Standard VI

### Planning, Resources, and Institutional Improvement

The institution's planning processes, resources, and structures are aligned with each other and are sufficient to fulfill its mission and goals, to continuously assess and improve its programs and services, and to respond effectively to opportunities and challenges.

### Criteria

An accredited institution possesses and demonstrates the following attributes or activities:

1. institutional objectives, both institution-wide and for individual units, that are clearly stated, assessed appropriately, linked to mission and goal achievement, reflect conclusions drawn from assessment results, and are used for

planning and resource allocation;

2. clearly documented and communicated planning and improvement processes that provide for constituent participation, and incorporate the use of assessment results;

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3. a financial planning and budgeting process that is aligned with the institution's mission and goals, evidence-based, and clearly linked to the institution's and units' strategic plans/objectives;
  4. fiscal and human resources as well as the physical and technical infrastructure adequate to support its operations wherever and however programs are delivered;
  5. well-defined decision-making processes and clear assignment of responsibility and accountability,
  6. comprehensive planning for facilities, infrastructure, and technology that includes consideration of sustainability and deferred

maintenance and is linked to the institution's strategic and financial planning processes;

7. an annual independent audit confirming financial viability with evidence of follow-up on any concerns cited in the audit's accompanying management letter;

8. strategies to measure and assess the adequacy and efficient utilization of institutional resources required to support the institution's mission and goals; and

9. periodic assessment of the effectiveness of planning, resource allocation, institutional renewal processes, and availability of resources.

## Standard VII

### Governance, Leadership, and Administration

The institution is governed and administered in a manner that allows it to realize its stated mission and goals in a way that effectively benefits the institution, its students, and the other constituencies it serves. Even when supported by or affiliated with governmental, corporate, religious, educational system, or other unaccredited organizations, the institution has education as its primary purpose, and it operates as an academic institution with appropriate autonomy.

### Criteria

**An accredited institution possesses and demonstrates the following attributes or activities:**

1. a clearly articulated and transparent governance structure that outlines roles, responsibilities, and accountability for decision making by each constituency, including governing body, administration, faculty, staff and students;
2. a legally constituted governing body that:
  - a. serves the public interest, ensures that the institution clearly states and fulfills its mission and goals, has fiduciary responsibility for the institution, and is

ultimately accountable for the academic quality, planning, and fiscal well-being of the institution;

b. has sufficient independence and expertise to ensure the integrity of the institution. Members must have primary responsibility to the accredited institution and not allow political, financial, or other influences to interfere with their governing responsibilities;

c. ensures that neither the governing



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body nor its individual members interferes in the day-to-day operations of the institution;

d. oversees at the policy level the quality of teaching and learning, the approval of degree programs and the awarding of degrees, the establishment of personnel policies and procedures, the approval of policies and by-laws, and the assurance of strong fiscal management;

e. plays a basic policy-making role in financial affairs to ensure integrity and strong financial management. This may include a timely review of audited financial statements and/or other documents related to the fiscal viability of the institution;

f. appoints and regularly evaluates the performance of the Chief Executive Officer;

g. is informed in all its operations by principles of good practice in board governance;

h. establishes and complies with a written conflict of interest policy designed to ensure the impartiality of the governing body by addressing matters such as payment for services, contractual relationships, employment, and family, financial or other interests that could pose or be perceived as conflicts of interest;

i. supports the Chief Executive Officer in maintaining the autonomy of the institution;

3. a Chief Executive Officer who:

a. is appointed by, evaluated by, and reports to the governing body and shall not chair the governing body;

b. has appropriate credentials and professional experience consistent

with the mission of the organization;

c. has the authority and autonomy required to fulfill the responsibilities of the position, including developing and implementing institutional plans, staffing the organization, identifying and allocating resources, and directing the institution toward attaining the goals and objectives set forth in its mission;

d. has the assistance of qualified administrators, sufficient in number, to enable the Chief Executive Officer to discharge his/her duties effectively; and is responsible for establishing procedures for assessing the organization's efficiency and effectiveness;

4. an administration possessing or demonstrating:

a. an organizational structure that is clearly documented and that clearly defines reporting relationships;

b. an appropriate size and with relevant experience to assist the Chief Executive Officer in fulfilling his/her roles and responsibilities;

c. members with credentials and professional experience consistent with the mission of the organization and their functional roles;

d. skills, time, assistance, technology, and information systems expertise required to perform their duties;

e. regular engagement with faculty and students in advancing the institution's goals and objectives;

f. systematic procedures for evaluating administrative units and for using assessment data to enhance operations; and

5. periodic assessment of the effectiveness of governance, leadership, and administration

*Retrieved on March 15th, 2018 from:*  
<https://www.msche.org/documents/RevisedStandardsFINAL.pdf>



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## Appendix D1: CUNY HRPP Procedures: Human Subjects Research Exempt from IRB Review

### 1. Applicability

These procedures apply to CUNY research involving human subjects that meets the criteria for exemption from IRB review, as outlined in the federal regulations at 45 CFR 46.101(b).

### 2. Determination of Exemption

The HRPP Coordinator, not the Principal Investigator (PI), determines whether a research study meets the criteria for exemption from IRB review. Please refer to Section 7 below for submission and review procedures. Researchers may not initiate exempt research until and unless they have received a determination of exemption from the local HRPP Office.

### 3. Exemption Criteria

Research that falls within one of the following categories may qualify for exemption from IRB review:

(1) Research conducted in established or commonly accepted educational settings, involving normal educational practices, such as (i) research on regular and special education instructional strategies, or (ii) research on the effectiveness of or the comparison among instructional techniques, curricula, or classroom management methods.

(2) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures or observation of public behavior, unless: (i) information obtained is recorded in such a manner that human subjects can be identified, directly or through identifiers linked to the subjects; and (ii) any disclosure of the human subjects' responses outside the research could reasonably place the subjects at risk of criminal or civil liability or be damaging to the subjects' financial standing, employability, or reputation. [NOTE: See Section 4.1 for limitations on this exemption category for research involving children.]

(3) Research involving the use of educational tests (cognitive, diagnostic, aptitude, achievement), survey procedures, interview procedures, or observation of public behavior that is not exempt under paragraph (2), if: (i) the human subjects are elected or appointed public officials or candidates for public office; or (ii) federal statute(s) require(s) without exception that the confidentiality of the personally identifiable information will be maintained throughout the research and thereafter.

(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. [NOTE: In order to be eligible for this exemption, all of the materials have to exist at the time the research is proposed.]

(5) Research and demonstration projects which are conducted by or subject to the approval of federal department or agency heads, and which are designed to study, evaluate, or otherwise examine: (i) Public benefit or service programs; (ii) procedures for obtaining benefits or services under those programs; (iii) possible changes in or alternatives to those programs or procedures; or (iv) possible changes in methods or levels of payment for benefits or services under those programs.

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(6) Taste and food quality evaluation and consumer acceptance studies, (i) if wholesome foods without additives are consumed; or (ii) if a food is consumed that contains a food ingredient at or below the level and for a use found to be safe, or agricultural chemical or environmental contaminant at or below the level found to be safe, by the Food and Drug Administration or approved by the Environmental Protection Agency or the Food Safety and Inspection Service of the U.S. Department of Agriculture.

#### 4. Limitations on Exemptions

##### 4.1. Children.

Under exemption #2, research involving survey or interview procedures or observations of public behavior with children does not qualify for exemption, except for research involving observations of public behavior when the investigator does not participate in the activities being observed. The other five exemptions apply to research involving children as human subjects in the same way that they apply to research involving adults.

##### 4.2. Prisoners.

Research involving prisoners does not qualify for exemption.

##### 4.3. FDA.

Exemption Criteria Category 6 (Taste and food quality evaluation as described in section 3 above) is the only allowable category that is exempt from the requirements of FDA regulations for IRB review. For research that falls within FDA's oversight, if category 6 does not apply, the study cannot be considered as exempt from IRB review.

##### 4.4. Belmont Report Applies.

Although exempt research does not require IRB review, this research is not exempt from the ethical guidelines of the Belmont Report. The individual making the determination of exemption has the authority to require additional protections for subjects in keeping with the guidelines of the Belmont Report, even though the research falls within an exempt category.

#### 5. Validity of the Determination of Exemption

Determinations of exemptions are valid until the expiration date noted on the Exempt Determination Letter, up to a maximum of three years from the decision date. Investigators wishing to continue exempt research beyond the period specified on the determination of exemption must submit a Request for Extension of Exemption Determination.

#### 6. Amendments to Exempt Research

6.1. Investigators shall not implement any changes to the exempt protocol without prior review and new determination of exemption from the local HRPP Office, even if the changes are planned for the period for which approval has already been given.

6.2. If the HRPP Office determines that, with the proposed changes, the research continues to meet the criteria for exemption from IRB review, the HRPP Office shall issue an Exemption Determination Letter for the amendment.

6.3. If the HRPP Office determines that the research no longer meets the criteria for exemption from IRB review, the submission shall be forwarded to the IRB for expedited or convened IRB review, as appropriate.

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## 7. Process for Submission and Determination of Exempt status

7.1. Researchers shall submit a Request for Exemption in IRB Net. Detailed instructions for registering and submitting in IRB Net are available in the Researcher Manual for Using IRB Net available at

<http://www.cuny.edu/research/compliance/human-subjects-research-1.html>

7.2. The HRPP Coordinator of the PI's primary campus reviews the submission for completion and determines whether the research qualifies for exemption from IRB review.

7.3. The HRPP Office issues an Exempt Determination Letter to the PI, which conveys whether the research qualifies for exemption from IRB review.

7.4. If the research does not qualify for exemption from IRB review, the PI must re-submit the research using the Initial Application Submission form.

*Retrieved on March 1st, 2018 from:*  
<http://www2.cuny.edu/wp-content/uploads/sites/4/page-assets/research/research-compliance/human-research-protection-program-hrpp/hrpp-policies-procedures/Exempt-Review-2012-09-052.pdf>

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## Appendix D2: The City Tech HRPP Policies

The Provost's Office at City Tech receives annual reports regarding all human subjects research conducted at the college from City Tech's HRPP Office and maintains the right to approve or disallow any research project occurring at City Tech.

Outside (non-City Tech or non-CUNY) researchers must receive permission from the Provost's Office to conduct human subjects research at City Tech. If you are an outside researcher who would like to conduct research either at City Tech or with City Tech students, faculty or staff, please contact City Tech's HRPP Office regarding the initial steps to obtaining the necessary permission from the Provost's Office.

CUNY requires that all researchers at the college, regardless of whether or not they are conducting human subjects or any other type of research, must maintain an up-to-date Responsible Conduct of Research (RCR) form on file with the college's Research Compliance Officer. The college's current Research Compliance Officer is Professor Roman Kezerashvili from the Physics Department. Please contact Professor Kezerashvili directly ([rkezerashvili@citytech.cuny.edu](mailto:rkezerashvili@citytech.cuny.edu)) with any questions regarding the RCR as this form is not required by City Tech's HRPP Office and should not be included in your IRB application. For more information regarding CUNY's RCR requirement, please click here: <http://www.cuny.edu/research/compliance/Responsible-Conduct-of-Research.html>

*Retrieved on March 1st, 2018 from:  
<http://facultycommons.citytech.cuny.edu/hrpp/hrpp-policies.html>*

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## Appendix D3: Guidance and Procedures for Requesting and Using Data from CUNY Educational Records for Research Purposes in Compliance with FERPA

### I. Background and Purpose

The Family Educational Rights and Privacy Act (FERPA) 20 U.S.C. § 1232(g) is a federal law that aims to keep student educational records private and accessible only by the student or their designee. This guidance and procedures document is designed to ensure compliance with FERPA when using educational records for research purposes, and sets forth the procedures to be followed by CUNY faculty, staff, post-doctoral associates, students and non-CUNY researchers who seek to obtain data from CUNY educational records for research purposes (“researchers”).

### II. Entities Authorized to Release Data from Educational Records for Research Purposes

A. Data from educational records (whether identifiable or de-identified) may be released for research purposes by the following entities only:

- CUNY Office of Institutional Research (OIR) at the CUNY Central Office
- Office of Institutional Research at a CUNY college or school

B. Researchers who have access to educational records in their capacity as a CUNY faculty or staff member are not authorized to extract data from such records for research purposes.

### III. Personally-Identifiable Student Information (PII)

Federal regulations consider data to be personally identifiable if it contains the student’s name, address, social security number, date or place of birth, mother’s maiden name or any other information that would allow a reasonable person in the school community to identify the student with reasonable certainty.

### IV. Use Of PII For Research Purposes

There are two ways that a researcher can use PII for research purposes:

1. For any type of research with a FERPA Release (or consent) signed by the student(s) – refer to Section V below.
2. For specific types of research without a FERPA Release (or consent) – refer to Section VI below.

### V. Obtaining PII For Research Purposes Through FERPA Release

The best practice with respect to obtaining PII from CUNY student records is to have such students execute a FERPA release that details the information to be accessed by the researcher and the purposes of the research. Researchers should use the CUNY FERPA Release Forms for this purpose.

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## VI. Obtaining PII For Research Purposes Without Consent (Studies Exception)

A researcher may request PII without student consent from the OIR at a CUNY campus or at the Central Office under certain limited circumstances pursuant to the “studies exception” to FERPA.

The OIR may approve a request to provide PII if the study is meant to develop predictive tests, help administer student aid programs, or improve instruction, and it is primarily for CUNY’s benefit rather than the researchers’ benefit.

### A. Types of Research that Qualify for the Studies Exception

Researchers may obtain PII if they are conducting a study for the purpose of developing, validating, or administering predictive tests; administering student aid programs; or improving instruction. A study designed to “improve instruction” has been broadly defined as a study done to ascertain the effectiveness of educational activities and subsequently refine programs and practices to improve outcomes for students.

### B. Conditions for Release

Federal regulations establish certain conditions to the release of PII under this FERPA exception: The study must be conducted in a manner that does not permit personal identification of parents and students by individuals other than the researcher and the research team, and the information must be destroyed when no longer needed for the purposes for which the study was conducted.

### C. Requirement of a Written Agreement Before Release

Researchers (both internal and external to CUNY) who wish to use data from student records under this exception must enter into a written agreement with CUNY that includes the following elements: the agreement must specify the purpose, scope and duration of the study and the information to be disclosed; require the researcher to use PII only to meet the purposes of the study; require the researcher to conduct the study in a manner that does not permit personal identification of parents and students by anyone other than the researcher or people working with the researcher with legitimate interests; and require the researcher to destroy all PII when the information is no longer needed.

## VII. Procedural Steps to Follow

1. If you are a CUNY researcher seeking student PII, ask students to sign a FERPA Release Form.
2. If obtaining a FERPA Release Form is not feasible, or if you are an external researcher, contact the Office of Institutional Research (OIR) at the CUNY campus or at the Central Office to discuss obtaining PII.
3. After you receive approval from the OIR, execute the written Data Transfer and Non-Disclosure Agreement provided by the OIR.

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4. If CUNY is engaged in human subject research activities related to the use of requested data, provide a copy of the executed Agreement to the Human Research Protection Program (HRPP) with your HRPP/IRB application.
  5. Abide by all conditions of the Agreement.
  6. Destroy all PII as soon as practicable after the completion of the study or return to CUNY for destruction.

*Retrieved on March 1st, 2018 from:*  
<http://air.citytech.cuny.edu/wp-content/uploads/2016/03/2017-08-FERPA-Procedures-FINAL.pdf>

# Appendix Table E1: Gen Ed to Pathways Alignment

## Pathways Outcomes and City Tech General Education Outcomes

EC= English Composition; MQR= Mathematical & Quantitative Reasoning; LPS= Live and Physical Sciences; WCGI=World Cultures & Global Issues; USED=US Experience in its Diversity; IS=Individual & Society; CE=Creative Expression; SW= Scientific World

Pathways Outcomes	Core	Category	City Tech Gen Ed Outcomes Potential Alignment	Courses to assess
<ul style="list-style-type: none"> <li>Read and listen critically and analytically, including identifying an argument's major assumptions and assertions and evaluating its supporting evidence.</li> </ul>	Required	EC	Critical Thinking, Inquiry and Analysis	Assess in all courses
<ul style="list-style-type: none"> <li>Write clearly and coherently in varied, academic formats (such as formal essays, research papers, and reports) using standard English and appropriate technology to critique and improve one's own and others' texts.</li> </ul>	Required	EC	Written Communication	Assess in all courses
<ul style="list-style-type: none"> <li>Demonstrate research skills using appropriate technology, including gathering, evaluating, and synthesizing primary and secondary sources.</li> </ul>	Required	EC	Inquiry and Analysis	Assess in all courses
<ul style="list-style-type: none"> <li>Support a thesis with well-reasoned arguments, and communicate persuasively across a variety of contexts, purposes, audiences, and media.</li> </ul>	Required	EC	Written Communication/ Oral Communication	Assess in all courses
<ul style="list-style-type: none"> <li>Formulate original ideas and relate them to the ideas of others by employing the conventions of ethical attribution and citation.</li> </ul>	Required	EC	Creative Thinking	Assess in all courses
<ul style="list-style-type: none"> <li>Interpret and draw appropriate inferences from quantitative representations, such as formulas, graphs, or tables.</li> </ul>	Required	MQR	Quantitative Literacy	Assess in all courses
<ul style="list-style-type: none"> <li>Use algebraic, numerical, graphical, or statistical methods to draw accurate conclusions and solve mathematical problems.</li> </ul>	Required	MQR	Scientific Reasoning/Quantitative Literacy	Assess in all courses
<ul style="list-style-type: none"> <li>Represent quantitative problems expressed in natural language in a suitable mathematical format.</li> </ul>	Required	MQR	Quantitative Literacy	Assess in all courses



Pathways Outcomes and City Tech General Education Outcomes				
	Required	MQR	Quantitative Literacy	Assess in all courses
<ul style="list-style-type: none"><li>Effectively communicate quantitative analysis or solutions to mathematical problems in written or oral form.</li></ul>	Required	MQR	Quantitative Literacy/Scientific Reasoning	Assess in all courses
<ul style="list-style-type: none"><li>Evaluate solutions to problems for reasonableness using a variety of means, including informed estimation.</li></ul>	Required	MQR	Integrative Learning	Assess in all courses
<ul style="list-style-type: none"><li>Apply mathematical methods to problems in other fields of study.</li></ul>	Required	LPS	Scientific Reasoning	Assess in all courses
<ul style="list-style-type: none"><li>Identify and apply the fundamental concepts and methods of a life or physical science.</li></ul>	Required	LPS	Scientific Reasoning	Assess in all courses
<ul style="list-style-type: none"><li>Apply the scientific method to explore natural phenomena, including hypothesis development, observation, experimentation, measurement, data analysis, and data presentation.</li></ul>	Required	LPS	Scientific Reasoning	Assess in all courses
<ul style="list-style-type: none"><li>Use the tools of a scientific discipline to carry out collaborative laboratory investigations.</li></ul>	Required	LPS	Scientific Reasoning	Assess in all courses
<ul style="list-style-type: none"><li>Gather, analyze, and interpret data and present it in an effective written laboratory or fieldwork report.</li></ul>	Required	LPS	Written Communication	Assess in all courses
<ul style="list-style-type: none"><li>Identify and apply research ethics and unbiased assessment in gathering and reporting scientific data.</li></ul>	Required	LPS	Ethical Reasoning	Assess in all courses
<ul style="list-style-type: none"><li>Gather, interpret, and assess information from a variety of sources and points of view.</li></ul>	Flexible	WCGI	Inquiry and Analysis	Assess in all courses
<ul style="list-style-type: none"><li>Evaluate evidence and arguments critically or analytically.</li></ul>	Flexible	WCGI	Critical Thinking	Assess in all courses
<ul style="list-style-type: none"><li>Produce well-reasoned written or oral arguments using evidence to support conclusions.</li></ul>	Flexible	WCGI	Oral Communication; Written Communication	Assess in all courses

## Pathways Outcomes and City Tech General Education Outcomes

<ul style="list-style-type: none"> <li>Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring world cultures or global issues, including, but not limited to, anthropology, communications, cultural studies, economics, ethnic studies, foreign languages (building upon previous language acquisition), geography, history, political science, sociology, and world literature.</li> </ul>	Flexible	WCGI	Intercultural knowledge; Critical Thinking; Oral Communication	Assess in selected courses
<ul style="list-style-type: none"> <li>Analyze culture, globalization, or global cultural diversity, and describe an event or process from more than one point of view.</li> </ul>	Flexible	WCGI	Critical Thinking; Inquiry and Analysis; Written Communication	Assess in selected courses
<ul style="list-style-type: none"> <li>Analyze the historical development of one or more non-U.S. societies.</li> </ul>	Flexible	WCGI	Reading; Inquiry and Analysis; Written Communication	Assess in selected courses
<ul style="list-style-type: none"> <li>Gather, interpret, and assess information from a variety of sources and points of view.</li> </ul>	Flexible	USED	Inquiry and Analysis	Assess in all courses
<ul style="list-style-type: none"> <li>Evaluate evidence and arguments critically or analytically.</li> </ul>	Flexible	USED	Critical Thinking	Assess in all courses
<ul style="list-style-type: none"> <li>Produce well-reasoned written or oral arguments using evidence to support conclusions.</li> </ul>	Flexible	USED	Oral communication/ Written Communication	Assess in all courses
<ul style="list-style-type: none"> <li>Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the U.S. experience in its diversity, including, but not limited to, anthropology, communications, cultural studies, economics, history, political science, psychology, public affairs, sociology, and U.S. literature.</li> </ul>	Flexible	USED	Quantitative Literacy; Integrative Learning; Reading	Assess in selected courses
<ul style="list-style-type: none"> <li>Analyze and explain one or more major themes of U.S. history from more than one informed perspective.</li> </ul>	Flexible	USED	Inquiry and Analysis	Assess in selected courses

Pathways Outcomes and City Tech General Education Outcomes					
<ul style="list-style-type: none"><li>Evaluate how indigenous populations, slavery, or immigration have shaped the development of the United States.</li></ul>	Flexible	USED	Critical Thinking	Assess in selected courses	
<ul style="list-style-type: none"><li>Explain and evaluate the role of the United States in international relations.</li></ul>	Flexible	USED	Intercultural Knowledge; Written Communication	Assess in selected courses	
<ul style="list-style-type: none"><li>Identify and differentiate among the legislative, judicial, and executive branches of government and analyze their influence on the development of U.S. democracy.</li></ul>	Flexible	USED	Teamwork; Information Literacy; Written Communication	Assess in selected courses	
<ul style="list-style-type: none"><li>Analyze and discuss common institutions or patterns of life in contemporary U.S. society and how they influence, or are influenced by, race, ethnicity, class, gender, sexual orientation, belief, or other forms of social differentiation.</li></ul>	Flexible	USED	Lifelong Learning; Civic Engagement; Ethical Reasoning	Assess in selected courses	
<ul style="list-style-type: none"><li>Gather, interpret, and assess information from a variety of sources and points of view.</li></ul>	Flexible	CE	Reading; Information Literacy; Critical Thinking	Assess in all courses	
<ul style="list-style-type: none"><li>Evaluate evidence and arguments critically or analytically.</li></ul>	Flexible	CE	Scientific Reasoning	Assess in all courses	
<ul style="list-style-type: none"><li>Produce well-reasoned written or oral arguments using evidence to support conclusions.</li></ul>	Flexible	CE	Critical Thinking	Assess in all courses	
<ul style="list-style-type: none"><li>Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring creative expression, including, but not limited to, arts, communications, creative writing, media arts, music, and theater.</li></ul>	Flexible	CE	Creative Thinking; Integrative Learning; Oral Communication; Writing Communication	Assess in selected courses	

## Pathways Outcomes and City Tech General Education Outcomes

<ul style="list-style-type: none"> <li>Analyze how arts from diverse cultures of the past serve as a foundation for those of the present, and describe the significance of works of art in the societies that created them.</li> </ul>	Flexible	CE	Civic Engagement; Critical Thinking; Integrative Learning; Intercultural Knowledge	Assess in selected courses
<ul style="list-style-type: none"> <li>Articulate how meaning is created in the arts or communications and how experience is interpreted and conveyed.</li> </ul>	Flexible	CE	Creative Thinking; Integrative Learning; Oral Communication; Writing Communication	Assess in selected courses
<ul style="list-style-type: none"> <li>Demonstrate knowledge of the skills involved in the creative process.</li> </ul>	Flexible	CE	Creative Thinking	Assess in selected courses
<ul style="list-style-type: none"> <li>Use appropriate technologies to conduct research and to communicate.</li> </ul>	Flexible	CE	Information Literacy; Oral Communication; Writing Communication; Creative Thinking; Foundations and Skills for Lifelong Learning	Assess in selected courses
<ul style="list-style-type: none"> <li>Gather, interpret, and assess information from a variety of sources and points of view.</li> </ul>	Flexible	IS	Inquiry and Analysis	Assess in all courses
<ul style="list-style-type: none"> <li>Evaluate evidence and arguments critically or analytically.</li> </ul>	Flexible	IS	Critical Thinking	Assess in all courses
<ul style="list-style-type: none"> <li>Produce well-reasoned written or oral arguments using evidence to support conclusions.</li> </ul>	Flexible	IS	Oral communication; Written Communication	Assess in all courses
<ul style="list-style-type: none"> <li>Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the relationship between the individual and society, including, but not limited to, anthropology, communications, cultural studies, history, journalism, philosophy, political science, psychology, public affairs, religion, and sociology.</li> </ul>	Flexible	IS	Reading; Intercultural Knowledge; Ethical Reasoning; Civic Engagement	Assess in selected courses
<ul style="list-style-type: none"> <li>Examine how an individual's place in society affects experiences, values, or choices.</li> </ul>	Flexible	IS	Civic Engagement; Integrative Learning	Assess in selected courses

Pathways Outcomes and City Tech General Education Outcomes				
<ul style="list-style-type: none"><li>· Articulate and assess ethical views and their underlying premises.</li></ul>	Flexible	IS	Ethical Reasoning	Assess in selected courses
<ul style="list-style-type: none"><li>· Articulate ethical uses of data and other information resources to respond to problems and questions.</li></ul>	Flexible	IS	Ethical Reasoning; Creative Thinking	Assess in selected courses
<ul style="list-style-type: none"><li>· Identify and engage with local, national, or global trends or ideologies, and analyze their impact on individual or collective decision-making.</li></ul>	Flexible	IS	Intercultural Knowledge	Assess in selected courses
<ul style="list-style-type: none"><li>· Gather, interpret, and assess information from a variety of sources and points of view.</li></ul>	Flexible	SW	Inquiry and Analysis	Assess in all courses
<ul style="list-style-type: none"><li>· Evaluate evidence and arguments critically or analytically.</li></ul>	Flexible	SW	Critical Thinking	Assess in all courses
<ul style="list-style-type: none"><li>· Produce well-reasoned written or oral arguments using evidence to support conclusions.</li></ul>	Flexible	SW	Oral communication/ Written Communication?	Assess in all courses
<ul style="list-style-type: none"><li>· Identify and apply the fundamental concepts and methods of a discipline or interdisciplinary field exploring the scientific world, including, but not limited to: computer science, history of science, life and physical sciences, linguistics, logic, mathematics, psychology, statistics, and technology-related studies.</li></ul>	Flexible	SW	Ethical Reasoning; Reading; Information Literacy; Integrative Learning	Assess in selected courses
<ul style="list-style-type: none"><li>· Demonstrate how tools of science, mathematics, technology, or formal analysis can be used to analyze problems and develop solutions.</li></ul>	Flexible	SW	Scientific Reasoning; Creative Thinking	Assess in selected courses
<ul style="list-style-type: none"><li>· Articulate and evaluate the empirical evidence supporting a scientific or formal theory.</li></ul>	Flexible	SW	Information Literacy; Scientific Reasoning	Assess in selected courses

Pathways Outcomes and City Tech General Education Outcomes					
· Articulate and evaluate the impact of technologies and scientific discoveries on the contemporary world, such as issues of personal privacy, security, or ethical responsibilities.	Flexible	SW	Ethical Reasoning; Civic Engagement	Assess in selected courses	
· Understand the scientific principles underlying matters of policy or public concern in which science plays a role.	Flexible	SW	Civic Engagement; Reading	Assess in selected courses	

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## GLOSSARY

*Accountability* is a relationship where one party is responsible to another party for achieving and assessing agreed upon goals.

*Assessment* is a term that is sometimes distinct from testing, but can be broader. It is a process that integrates test information with information from other sources, but it can be as narrow as a single test (AERA, APA & NCME, 2014).

*Construct Validity* is the broadest form of validity; refers to the "concept or characteristic that an assessment is designed to measure" (AERA, APA & NCME, 2014).

*Direct Assessment* is the measurement of student knowledge, behaviors and learning and linked to specified student learning outcomes.

*Evaluation* is the process of assessing the value, worth or effectiveness of an educational program, process or curriculum; evidence-gathering processes that are designed to examine program or institution-level effectiveness.

*Goals* are the general aims or purposes of an educational system, often at the program level, that are broadly defined and include intended outcomes.

*Indirect Assessment* is the measurement of student learning experiences often linked to direct assessments but not measuring student learning outcomes. Consequently, indirect assessments can include opinions or thoughts about student knowledge, values, beliefs and attitudes about educational programs, processes and curriculum. They may also include measures of student outcomes like retention rate, course grades or GPA that are not direct assessments of the student learning outcomes.

*Objectives* are brief clear statements of the expected learning outcomes of instruction typically at the course or program level.

*Outcomes* are the student results of programs including behaviors, knowledge, skills and level of functioning. They are usually measured as a test or assessment.

*Outputs* are the results of program participation that specify types, levels and targets of service. They are often measured as a count (e.g., number of students participating in a program).

*Reliability* is the consistency of scores across replications of a testing procedure (AERA, APA & NCME, 2014).

*Student Learning Outcomes* (SLOs) are behavioral statements that specify what students will learn or can do as a result of a learning program, process or curriculum.

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*Test* is a device or procedure in which a sample of an examinee's behavior in a specified domain is obtained and subsequently evaluated and scored using a standardized process (AERA, APA, NCME, 2014).

*Validity* is the degree to which evidence and theory support the interpretations of test scores or assessment results for proposed uses. (AERA, APA & NCME). There are many types of validity and sources of evidence discussed.



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