This form is to be used to report the student learning outcomes developed by each department/program. The department/program outcomes asked for below will summarize the unit’s student learning expectations in the five areas indicated. The General Education skills outcomes to be reinforced at the department level are specified. Most departments will probably have outcomes in each of the five areas, but are not required to do so. Generally the total number of outcomes developed by the department should not exceed ten. Assessment of all outcomes must be completed within each three-year cycle.

Departments/programs will establish student learning outcomes that address the following:

1. Disciplinary Knowledge/Content Outcomes –

**SUNY General Education Knowledge Areas -- Prescribed Outcomes**
Each General Education Knowledge Area in the SUNY General Education Program has SUNY-defined student learning outcomes. The College is responsible for assessing these in the General Education courses. The list of SUNY General Education outcomes is appended. Periodic assessment data on outcomes of the College’s local requirements of Diversity, Contemporary Issues, and Perspectives on Gender will be asked for as well. Departments will be asked to provide assessment data from their General Education courses on a periodic basis. The assessments will be based on course-based, graded assignments and will require reporting of data, but will not usually require development of additional assessments.

**Definition for Departmental Learning Outcomes:** These outcomes refer to evaluation of the knowledge/content students are expected to acquire through the courses and other experiences as they participate in the major program. These outcomes assess the students’ comprehension of the knowledge base of the discipline, the grasp of essential concepts, major theories and/or organizing principles and the arguments or research findings that support these theories, an understanding of the overall methodological approach of the discipline. Nationally standardized test results can also serve as data. Some redundancy with General Education SLOs may be appropriate.

List departmental/program student learning outcomes in the space below. (next page)
Students will be able to apply the principles of
1. chemical nomenclature
2. atomic structure, quantum theory and periodicity.
3. molecular structure and reactivity.
4. stoichiometric calculations based upon chemical formulae and balanced chemical equations.
5. chemical energetics and thermodynamics.
6. reaction dynamics (kinetics and mechanisms).
7. the states of matter and solutions.
8. chemical equilibrium.
9. oxidation-reduction reactions and electrochemistry.
10. descriptive chemistry of the elements, compounds, and trends in the periodic table.

2. Applications and Skills Outcomes –

Continuing the development of lower-division General Education skills within the academic major programs, departments/programs will provide assessment data that address the following student learning outcomes for skills:

Students will demonstrate –

1. Written and Oral Communication Skills –
   a. the ability to express themselves clearly and correctly in both written and oral forms, including the effective use of visual displays such as graphs, charts, and the like.
   b. an understanding of formal writing as appropriate to the purposes and styles of writing in the discipline
   c. an understanding of the proper use of sources, bibliographic references, and citations as appropriate to the discipline
   d. an ability to speak effectively and appropriately before an audience to transmit information as appropriate to the discipline.

2. Quantitative thinking, the use of numerical data and mathematical problem-solving techniques – [as appropriate for the major discipline]
   a. an ability to use mathematical techniques to solve problems and analyze numerical data as appropriate for the discipline, employing and building on a basic understanding of arithmetic, statistics, algebra, and any higher level mathematical skills required by the discipline
   b. an ability to understand and construct graphical presentations of data
   c. an ability to use computer-based analytic tools such as spreadsheets, statistical programs, as required by the discipline.
3. **Critical Thinking Skills** – [These skills can be demonstrated in the context of the assessment of written and oral communication skills assignments as described above.]
   a. an ability to analyze and construct arguments in support of a position related to the discipline
   b. an ability to understand how arguments can be supported or refuted using data and logical analysis
   c. ability to examine a position from several points of view

**Definition for Departmental Learning Outcomes:** These outcomes refer to the skills that students are expected to acquire in their courses or other experiences as a major in this discipline. What are the most significant things the student should be able to do as a person educated in this discipline? These assessments would evaluate the ability to create artistic and scholarly products of any discipline in the arts, social sciences, and humanities, as well as demonstrate practical skills such as research design and procedures and laboratory techniques in the sciences and the professional competencies in any field. Redundancy with some General Education skills is appropriate.

List departmental/program student learning outcomes in the space below.

**Students will be able to –**

11. carry out basic and advanced laboratory manipulations and use common laboratory equipment and instruments.
12. apply the tenets and principles of safe laboratory practice and waste handling.
13. maintain a laboratory notebook thoroughly recording procedure and observations, tabulating data, and analyzing results.
14. present technical reports in writing, poster presentations or oral presentations.

3. **Professional and Personal Development** –
**Definition for Departmental Learning Outcomes:** These outcomes center around personal and professional attitudes/values that the student can be expected to have learned either in the classroom or through out-of-class experiences that will be of value as a professional in this discipline. Examples are assessments of – familiarity with standards of good practice and integrity in scholarship/research; understanding of professional conduct and ethical behavior; awareness of professional standards in a discipline; relationship of the discipline to cultural and societal issues at all levels, local, national, international; ability to function as a part of a team.

List departmental/program student learning outcomes in the space below. (next page)

Students will be able to –

15. describe the basic elements of professional and ethical conduct in the chemistry professions.

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**4. Student satisfaction and achievement measures**

Definition: These outcomes refer to departmental assessments of student attitudes related to their experience in the department/program – results of student surveys and questionnaires, student focus group reports, NSSE scores, can serve as data for these outcomes. Measures of preparation of students for graduate and professional schools and employment could be used.

List departmental/program student learning outcomes in the space below.

Measures are designed to demonstrate (attitudes/abilities) –

Student satisfaction survey
5. **Additional student learning outcomes not related to the four areas listed above**

Definition: Include in this section any student learning outcomes important to the department, but which cannot be placed in one of the four sections above.

| List departmental/program student learning outcomes in the space below. (next page) |
| Students will be able to – |

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