To perform competitively as an engineer or scientist and engage in life-long learning, the Mines graduate should have skills in finding, using, and producing information.

*Early competencies* focus on becoming familiar with general information tools, developing skills in finding information, and making basic critical judgments to evaluate information. *Later competencies* focus on the application of skills to meet more complex needs, acquiring knowledge of a discipline’s literature, and contributing to the body of published information.

**By the end of the sophomore year:**

1.) **Understand How Information is Packaged**
   1.1) Demonstrate an understanding of basic differences in content and timeliness between books, journal articles, and websites.
   1.2) Demonstrate an understanding of basic differences between publications containing original information and those that summarize or interpret information (derivative publications).
   1.4) Demonstrate an understanding of basic differences between search tools such as library catalogs, databases, and Web browsers in terms of their contents.

2.) **Know the Basics of Scholarly Communication**
   2.1) Identify the components that make up a citation from the following sources:
       - Bibliography
       - Library catalog record
       - Record from a database
       - Item from a Web search
   2.2) Compose a citation by using information from the following publications:
       - Journal article
       - Book
       - Website
   2.3) In writing a paper, cite publications according to an accepted standard.
       - Incorporate references to cited publications in the paper.
       - Compile a properly formatted bibliography.
   2.4) Demonstrate a basic understanding of plagiarism.
       - Define plagiarism.
       - Identify examples of plagiarism in a sample work.
       - Explain why an author should cite others’ publications in his or her own paper.

3.) **Develop a Search Strategy**
   3.1) For a research topic, identify the main concept and supporting concepts.
   3.2) Identify keywords that characterize the topic, including synonyms and related terms.
   3.3) Identify keywords to expand or narrow the scope of the topic.
   3.4) Select search tools (library catalog, database, Web browser, etc.) that are appropriate for research on a topic by:
       - Subject and date coverage
       - Coverage by publication format, for example journal articles, books

4.) **Identify & Get Publications**
   4.1) Use a search tool (library catalog, database, Web browser) to identify known publications by author and title.
4.2) Use subject keywords in a search tool to identify publications.
   - Evaluate the results of a search to determine relevance:
     o By subject coverage
     o By date and format of publications represented
   - Refine the search to improve relevance:
     o Use iterative steps to adjust search results and improve relevance.
     o Use database features that manipulate results (limiting, sorting, etc.).

4.3) Get content:
   - Use a library catalog to locate books and journals (print and electronic).
   - Use database links to find journal articles (print and electronic).
   - Use interlibrary loan services to get publications that are not available on site.

4.4) Work with library staff to identify and locate information.

5.) Make Choices & Evaluate Information
5.1) Evaluate whether a publication is appropriate for your needs by:
   - Date of the information
   - Breadth and depth of subject coverage
   - Bias and purpose
5.2) Evaluate how authoritative a publication is:
   - Consider information that reflects on the author’s and publisher’s credibility.
5.3) Differentiate between scholarly and non-scholarly publications.
   - Identify the basic characteristics of a scholarly publication.

By the end of the senior year:

6.) Know the Discipline’s Literature
6.1) Identify core information sources in the subject area, including:
   - Books and reference works
   - Serial publications such as journals and conference proceedings
   - Indexes and databases
   - Specialized technical publications—standards, patents, etc.
   - Producers of information—professional societies, publishers, government agencies, etc.
6.2) Demonstrate an understanding of the information “life cycle” of the discipline, including:
   - The time needed to publish and distribute information
   - The obsolescence of information within the discipline
6.3) Demonstrate an awareness of information’s cost in terms of both creation and publication in the discipline, including:
   - Cost range of core journals, books and databases.

7.) Communicate in a Scholarly Environment
7.1) In writing a paper, cite publications according to a discipline standard:
   - Cite different types of publications common to the discipline (journal articles, conference papers, patents, government reports, etc.).
   - Compile a bibliography formatted according to the discipline’s standard.
7.2) Construct a professional abstract for a paper:
   - Follow the discipline’s protocols for abstract content.
   - Incorporate keywords that represent significant concepts into the abstract.
7.3) Demonstrate an awareness of publishing processes in the discipline, including:
   - The author’s procedures and costs
   - Results of publishing in different venues (commercial, open access, etc.)
7.4) Demonstrate a basic understanding of copyright.
   - Understand the purpose of copyright for both creator and user of a publication.
Know how copyright is acquired.
Identify the general criteria used to evaluate “fair use” of another’s information under copyright guidelines.

8. Plan Search Strategies for In-Depth Research
8.1) Define the scope and time line necessary to perform an in-depth research project.
8.2) Identify technical keywords from the discipline that characterize the topic:
- Use discipline-specific reference works, including thesauri, websites, technical handbooks, and codes (CAS registry numbers, alloy numbers, etc.).
- Group technical keywords into relationships to expand, narrow, or change the direction of the search.
8.3) Identify primary, secondary (less significant), and interdisciplinary search tools appropriate to the search topic:
- Identify specialized characteristics of a technical database to improve the search strategy.

9. Identify & Get Specialized Information
9.1) In search tools, use advanced and discipline-specific search features.
9.2) Refine the search strategy to improve relevance in different aspects of the research topic.
9.3) Trace information through the citations in a publication:
- Trace a concept back to its original documentation in the literature.
- Trace a concept forward in time through those later publications citing the work.
9.4) Maintain effective documentation of the search process.
9.5) Get content:
- Retrieve specialized publications using on-site, Web, or interlibrary loan resources.
9.6) Identify discipline-specific collections of resources available on- or off-site:
- Characterize the content and scope of the collections.
- Identify factors impacting access—indexing, costs, use restrictions, etc.

10. Evaluate Information Within the Discipline
10.1) Evaluate the scholarly level of a publication using indicators such as quality of citations, peer review, author credentials, data presentation, etc.
10.2) Trace an author’s publication record to determine his or her authority and scope of research:
- Within the discipline
- In interdisciplinary or cross disciplinary literature
10.3) Evaluate the significance of a publication or a line of research by using the cited literature.
Bibliography

