Internet Resource Guide
For Chemical Engineering Students
at The Pennsylvania State University

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1 Front Matter

1.1 What is in this Guide
This guide contains online resources that are useful to chemical engineering students at Penn State University. Within this guide are resources aimed to help students schedule classes for the next few semesters. After resources that are helpful for students in general, there is also a chemical database to aid in learning about new molecules. Additionally, there are resources particularly focused on research that will occur in chemistry labs. The chemistry lab courses require the most amount of research, which can be expedited with the correct use of good resources. The remaining resource provides an easy way to find research articles related to chemical engineering.

1.2 Who this Guide is For
This guide is geared towards chemical engineering students within their first two years at Penn State. A number of the resources in the guide are only available with a subscription, which students of Penn State can access for free. There are resources that are only helpful for chemical engineering students during college, but there are also resources that are helpful after graduation if they have access to them.

1.3 What this Guide Assumes
To use this guide most effectively, students need to understand basic chemistry, know the expectations for writing research papers, and attend Penn State University. Knowing the basic attributes of molecules is necessary to efficiently utilize some of the resources. It is necessary to know the definitions of what an organic molecule is and what MSDS (Material Safety Data Sheets) for a molecule contain, as well as simpler attributes such as density and boiling point. It is also important to know what is considered a good journal article and how to cite articles. Databases with thousands of articles and several different ways to search for articles are only helpful if students understand what articles are useful and how to properly cite them to avoid plagiarism. Resource availability regarding the sources within this guide is unique to Penn State students, so this guide is best used with a valid Penn State login.

1.4 How this Guide is Organized
The organization of this guide is based how specific the resource is to the curriculum. The resources that aid with class scheduling overall, the broadest resources, are first in the guide. A resource useful for courses that focus on molecules, such as all chemistry courses and some chemical engineering courses, is then listed in this guide. Finally, resources related to research within chemistry and chemical engineering primarily for chemistry labs are listed towards the end of this guide.
2 Class Scheduling Resources

This section provides two websites that should be referred to every semester during class scheduling. The first resource is a handbook to the class requirements for chemical engineering students at Penn State. The second resource is a review site for college professors around the nation written by students who have taken classes with them.
Penn State’s Department of Chemical Engineering Advising Handbook is an online accessible guide for looking at what is needed to successfully complete your chemical engineering degree without having to meet with your advisor. The handbook is written by chemical engineering professors at Penn State who are very knowledgeable with required classes, as well as elective courses. It is updated as changes to curriculum requirements changes; this handbook is from 2014, when the last major change to the curriculum occurred. A list of biographies of the faculty in the department is in the handbook so you can get to know the professors that you may have class with. Information on GPA, grade, and class requirements, as well as a recommended academic plan, are in the handbook to help you plan the next four years of college. The curriculum for this major is very strict, so it is imperative to schedule at least 2 years in advance to make sure you are taking all the classes in the correct order.

Tips:
- There is information about clubs that you can join that are related to chemical engineering
- The recommended academic plan is not a plan that needs to be followed as this is only for the general option, one of the five option routes available for this major. As long as the prerequisites for the classes are met, then you can complete them in any order.
- At the end of the handbook is a printable checklist of classes that are required that you can fill out as you finish each semester.
2.2 Rate My Professors
http://www.ratemyprofessors.com/
(Freely accessible to the public)

Rate My Professors is a review site for college professors all over the United States. Reviews of professors are made by students who have taken classes with him or her. You can see the reviewers’ ratings of helpfulness, clarity, and easiness on a scale of 1 (terrible) to 5 (excellent). These ratings are averaged amongst all reviews for the professor so you can get a general idea of what students have rated the professor. The reviewing student can also write his or her own comments. This information is very useful for deciding what professor is best for taking the class with, if your schedule allows for this variation, or deciding if you should take the class at all, which is more relevant for general education courses.

Tips:
• Not all professors are listed on the site nor do all professors have reviews.
• In addition to the name, use the college and courses taught (given by students) to verify that the listed professor is the correct person. There are a lot of professors with the same name.
• The Class Schedule on LionPATH has the list of courses with their times and professors that will be teaching the course.
• After you have taken a class, you can write a review of the professor to help others make their own decisions.
• Most reviews are from people who have strong opinions on the professor so take these reviews as guidelines
• There is a hotness rating, indicating whether or not the professor is attractive.
3 Chemical Databases

This section provides a source for general chemistry information. Having this knowledge is good for knowing how to use the chemicals before you have even seen them. The most important part is the safety data, which should be known before using it in lab. Of the similar sites that are out there, Sigma-Aldrich is the most constantly updated because it is a company that sells products.
3.1 Sigma-Aldrich
http://www.sigmaaldrich.com/united-states.html
(Freely accessible to the public)

Sigma-Aldrich is a chemical company whose extensive website provides information on materials for chemistry, life sciences, and biotechnology. Their website is very useful for obtaining general information for the chemicals that are used in laboratory settings. Chemical formulas; safety data (MSDS); and physical properties, such as color and odor, are all clearly defined on the page of the molecule you are looking for. There is even information on biological materials that may be used in lab, such as enzymes and cell growth media. You will need this information to safely use those materials in all your labs. Safety is very important in the engineering field, both on the undergraduate level to after you get a job, so it is imperative to be aware of the materials that you will be working with at any time.

Tips:
- This website is actually used to order chemicals, so it clarifies the purity and brand of the chemical, which can be confusing. A tip would be to click on the first result with the correct molecular formula (shown on the results page) after searching for the molecule.
- Prices that are stated for the molecule of interest are useful for economic analyses that might need to be done for a class.
4 Research Information

This section provides information on research databases related to classes that students will need to take as part of the chemical engineering curriculum. The first source is useful for when an article is already available. The second source is relevant for looking up a citation that is known. The third source is an example of a journal that has valuable information for one of the pervasive topics in the chemical engineering curriculum.
4.1 Web of Science
http://psu.libguides.com/chemengine
(Freely accessible under “Web of Science” from this page with a valid Penn State login)

Web of Science is an online database used to search for texts, such as journals and books, of scientific nature. Articles and books can be dated from 1864 to the present. It boasts an extensive citation index that can be used to find other articles that reference the article of interest, or vice versa. It states how many times an article has been cited, so the usefulness of an article can be determined. This is very useful when you already have a good article and want to find more related articles or if you want to look for articles that reference that article without having to search for each individual one. This database is very useful for classes in which research is needed, such as chemistry labs and CH E 100, your freshmen seminar class, in which you may need to do an assignment to get you acquainted with research methods available at Penn State.

Tips:
- Search refinements include by date, author, and journal published in, which can be changed via the drop-down menu above the search bar.
- Clicking on “+ Add another field” will add another search bar that you can choose to use to include (AND) or not include (NOT) additional keywords
4.2 ScienceDirect
http://psu.libguides.com/chemengin
(Freely accessible under “Science Direct” from this page with a valid Penn State login)

ScienceDirect is an online periodical index used to browse through over 3,500 research journals and 34,000 books in its database. Sources can range from the year 1823 to present. The book and journal sources are organized into four categories: Physical Sciences and Engineering, Life Sciences, Health Sciences, and Social Sciences and Humanities. As an aspiring chemical engineer, you will mainly be focusing on the first category. Resources ranging from chemical engineering to the general sciences, such as physics, can be found in this category. Throughout your chemical engineering education, you will be asked to write lab reports with references in courses such as CHEM 213 and 457. The lab manuals used those courses will have cited sources, which can be searched for here. You may also be prompted to find a topic in a particular field, such as polymers for CH E 443, and write about an article you found interesting.

Tips:
- You can browse by resource title and refine by subject, which can be helpful for finding an interesting topic to write about. In addition to browsing these resources, you can search for specific articles by author, journal, or volume.
- Unless you are looking for a specific article, it is not recommended to simply type a keyword into the search bar since articles from all subjects will be included. Instead, use the advanced search function to combine the keywords with a subject.
- You can refine your search, under “Advanced Search,” by reference type, subject, and/or year. More search tips can be found by clicking on “Search Tips” on the upper right part of the Advanced Search box.
4.3 Journal of Organic Chemistry
http://pubs.acs.org/journal/joceah
(Fully accessible with a valid Penn State login)

The *Journal of Organic Chemistry* (*J. Org. Chem.* ) is a biweekly peer-reviewed journal published by the American Chemical Society (ACS). *J. Org Chem.* was first published in 1936 and is now currently the most cited journal in the field of organic chemistry. The journal is known for its fast publishing, accepting articles as they are in the process of being published and then publishing it as soon as it finishes. This means that the most recent research is available to the reader. Articles that show the process of synthesizing molecules to the applications of those molecules are available in this journal. The subjects within organic chemistry range from air pollution to cosmetics to pharmaceuticals. This is useful particularly for CHEM 213, the organic chemistry lab, where credible articles need to be cited within the lab reports you will be required to write. It is also useful for CH E 443, a chemical engineering elective about polymers, because you will need to research about polymers for a group project.

Tips:
- These journals are downloadable via PDF so they can be accessed offline at a later date.
- Your search can be narrowed down further into sections such as carbohydrates and biochemistry.
- Be aware of what part of the process journal articles are posted here. Articles that are only part way through the publishing process can be found here (called Articles ASAP), with the author's permission, which means more fact checking could be required.
- Some journal articles are available without a Penn State login, but it is recommended to access this site through the Penn State libraries website to gain full access to all articles.