ENGLISH 202C: TECHNICAL WRITING

Internet Resource Guide

A Collection of Online Resources
Penn State Chemistry Majors

Name

Date

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Preface

Contents: This guide is a compilation of invaluable online resources for chemistry majors. Undergraduate students can use the resources for a variety of reasons, most commonly to access specific technical information. In certain required chemistry classes (especially labs), use of these sources is vital to achieving a decent grade. A couple of the resources offer professional information about the field of chemistry. Featured resources include technical databases, scholarly journals, government resources, professional organizations, and resource directories.

Audience: This internet resource guide was created to aid junior- and senior-level chemistry majors at Penn State University. Since many of the resources contain technical scientific information, an underclassman may not have the capacity to understand the extent of the documents or it might not be relevant to the student's current studies. Students taking chemistry classes, such as CHEM 213H, CHEM 430, or CHEM 431W, will find this guide practical because several classes necessitate the use of the featured resources.

Assumptions: This guide was created under the assumption that the reader has a fundamental understanding of chemistry and its applications. The reader should be moderately computer savvy and have access to an internet connection, either on campus or elsewhere. If the reader if uses the internet elsewhere, they must connect to Penn State University through the VPN Client, since many of the resources require a subscription.

Organization: This internet resource guide provides information about eight different resources, which are organized into five broader categories: technical databases, scholarly journals, government resources, professional organizations, and resource directories. A URL, short description, how-to section, and list of tips accompany each specific internet resource. The technical databases, scholarly journals, and government resources can all be used to retrieve detailed and technical information. To access employment information and current event topics, students could browse though government resources or professional organizations. The final category, resources directories, provides readers with a record of science-related websites that may help students locate information faster.

Tips: Readers can use the table of contents and page numbers to easily navigate through the document. Access to Microsoft Word, Microsoft Excel, and Adobe Reader are beneficial because many articles within the resources open in .doc, .xls, and .pdf formats.

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Technical Databases

SciFinder Scholar

Location: This software is available for download to Mac and PC users as well as on all the computers in the Physical and Mathematical Sciences Library, Earth and Mineral Sciences Library, and Laptop Libraries.

Description: Created by the Chemical Abstract Service (CAS), SciFinder Scholar is an essential research tool for chemistry majors and faculty alike. Basically, this computer program operates like an advanced search function. SciFinder Scholar quickly searches through 5 different databases: Chemical Abstracts, Medline, the CA Registry File, CAS Reacts, and ChemCats. Not only can you browse through articles, but you can also search through millions of chemical reactions, chemical structures, and patents. Chemical undergraduates will primarily use this software to locate journal articles. However, students may also search by chemical structure or formula in some classes (CHEM 431W). The program also has a built-in filter that allows you to distinguish between relevant and unrelated results. For instance, if a student needed to find a journal article detailing the process of synthesizing benzoic acid, the following steps could be taken:

1. Open SciFinder Scholar on the computer being used. On library computers, double click the icon on the desktop for the program. If there is not an icon on the desktop, follow these steps:
    a. Click “Start.”
    b. Click “All Programs.”
    c. Click “Library Applications.”
    d. Click “SciFinder Scholar.”
2. Click “Accept” in the SciFinder Scholar License Agreement window after you read the document.
3. Click “OK” to exit the Message of the Day window.
4. Click on the icon next to “Explore.”
5. Under the heading “Explore Literature,” click on the icon next to “Research Topic.”
6. In the search bar, type “synthesis of benzoic acid” and click “OK.”
7. Check the first available box to include the most relevant abstracts on the results page. Click on “Get References.”
8. Since there are many references, you will need to filter the results to find exactly what you are looking for. Click on the “Analyze/Refine” box at the bottom of the window.
9. Next, click on the “Refine” icon. This new window contains various filter options.

10. To refine by document type, click on the corresponding icon in the refine window. Then select the box for “journal” and click “OK.”
11. To refine by language, click on the corresponding icon the refine window. Select the box for “English” and click “OK.” Now that the results are filtered, it is easy for one to sort through the relevant results.
12. Click on the document icon to the right of the article’s bibliographic information. This will take you to article through the open internet browser (i.e. Internet Explorer, Mozilla Firefox).

Tips:

1. Since some searches can return thousands of results, use the filter tools to narrow your window.

2. Use the help feature if you do not know how to search for something or efficiently filter your results.

3. To return to a previous window, click the “Back” button. It is located in both the main toolbar and in each window.

4. Use the “Locate” function if you already have the bibliographic information for the reference.

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Technical Databases

CRC Handbook of Chemistry and Physics

Location: http://www.hbcpnetbase.com/

Description: The CRC Handbook of Chemistry and Physics consolidates essential information for the chemistry major. The handbook contains almost every measured constant of the elements and common compounds. Some of these include melting points, bond lengths, and ^{1}H-NMR chemical shifts. For those involved in physical chemistry, the handbook also contains radioactive decay constants and subatomic particle charges. One interesting section of the publication illustrates the discovery and unique properties of each individual element. Students studying chemistry frequently use this handbook to obtain the physical constants of the materials they are using in calculations. To find the boiling point of ethanol at standard pressure, use the following instructions:

1. On the CRC Handbook of Chemistry and Physics homepage, expand the "Physical Constants of Organic Compounds" section by clicking on the plus sign next to "Section 3." The section headings are located in the Table of Contents in the left column.
2. Under the subheading "Physical Constants of Organic Compounds," click on "Interactive Table." The table will open in the main window.
3. In the main window, click on the filter icon. A small window will pop up.
4. In the new window, type "ethanol" in the box labeled "Name." Click on "Apply Filter." This will narrow the search to organic molecules that have "ethanol" in the name.
5. Since the list is sorted alphabetically, you can scroll down to the entry for ethanol.
6. Finally, scroll to the right to see the boiling point, which happens to be 78.29°C.

Tips:

1. When available, use the interactive tables. The interactive tables allow for efficient use of time because you can search through the hundreds of compounds by using the filter tools to narrow your search.

2. The handbook contains useful health and safety information, especially about chemical handling and waste disposal. But before you follow its recommendations in a lab setting, make sure you consult a qualified representative of the Penn State Environment Health & Safety office.

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Spectral Database for Organic Compounds

Location: http://riodb01.ibase.aist.go.jp/sdbs/cgi-bin/cre_index.cgi?lang=eng

Description: The Spectral Database for Organic Compounds is an excellent technical database for organic spectroscopy methods. The resource, which is compiled by the National Institute of Advanced Industrial Science and Technology in Japan, contains spectral data for various common organic compounds. The database includes the spectral information from several experiments. For example, mass spectrometry, ^{1}H-NMR spectroscopy, ^{13}C-NMR spectroscopy, IR spectroscopy, Raman spectroscopy, and ESR spectroscopy are all featured. The site does not contain two- or three-dimensional NMR data. You can search for data by compound name, molecular formula, molecular weight, or CAS registry number. Those in chemistry lectures or labs will find this the Spectral Database for Organic Compounds especially useful. An example of how to find the ^{1}H-NMR spectrum of benzoic acid is detailed in the following instructions:

1. On the Spectral Database for Organic Compounds homepage, read through the disclaimer and click on the appropriate link to agree to this disclaimer. This will transport you to the search page.
2. On the search page, type “benzoic acid” in the box labeled “Compound Name” and click on “Search.”
3. Click on the “Y” in the column titled “HNMR.” This brings you directly to the spectrum in question. By scrolling down in the main window, you can see the chemical’s structure and peak data.

Tips:

1. Sometimes a search does not return any results because many compounds are known by more common names than their IUPAC name. If your search comes up empty, try using the molecular formula or CAS registry number.

2. If you are trying to determine a chemical unknown in a lab setting, you can compare your spectral data to the standards offered on this site.

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Scholarly Journals

Journal of the American Chemical Society

Location: http://pubs.acs.org/journals/jacsat/index.html

Description: The Journal of the American Chemical Society (JACS) is the most prestigious scholarly journal in the field of chemistry and it is produced by the American Chemical Society (ACS). It is the most cited journal in the field of Chemistry and its publications reach 83 countries. Its topics include, but are not limited to, organic chemistry, inorganic chemistry, physical chemistry, biological chemistry, nanotechnology, and chemical engineering. On the JACS website, you can access journal articles, supporting information, and editorials, as well as navigate to other ACS websites. Unfortunately, no search tool exists for this website because professionals primarily use it access supporting information or to submit a manuscript. However, if you know the bibliographic information of a specific article, you can use the browse tool to locate a specific article. As an undergraduate chemistry major at Penn State University, this journal's website would be most useful for lectures or labs that require you to design and prepare your own reactions from an article's supporting information. An example of how to access a journal article's supporting information is shown below:

1. Obtain the bibliographic information of the article in question. For example: Adi Dahan and Moshe Portnoy. J. Am. Chem. Soc.; **2007;** *129*(18) pp 5860 – 5869
2. On the JACS homepage, click on "Supporting Information." It is located in the left column.
3. Click on the volume (year) number that corresponds to the journal article in question. In this case, select "Volume 129: (2007)."
4. Click on the number that corresponds to the first page of the article. Click on "5860" under the heading "Page Range: 5001–6000"
5. In the section "Available Supporting Information," click on the file you wish to download. In this case, click on the link: ja065265dsi20061217_042011.pdf (430 K)

Tips:

1. Know the bibliographic information of the article you want to access.

2. Do not use the website to research a specific topic. SciFinder Scholar (page 4) is a more comprehensive compilation of technical information, because it searches through five different databases, as opposed to just the one journal on the JACS website.

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Government Resources

Catalog of U.S. Government Publications

Location: http://catalog.gpo.gov/F?RN=20444824

Description: The Catalog of U.S. Government Publications is a valuable resource for those wishing to access federal government documents. It houses a database of documents from large organizations such as the Environmental Protection Agency (EPA) and small committees such as the U.S. House of Representatives Permanent Select Committee on Intelligence. For the chemistry major, specific information about chemical mishaps is readily available. For instance, if you wanted to find general information about the nuclear radiation incident at Three Mile Island Nuclear Power Plant in Pennsylvania, you could access the abstract and bibliographic information of the book Three Mile Island: A Nuclear Crisis in Historical Perspective, by J. Samuel Walker. To obtain information available online about the Nuclear Regulatory Commission (NRC), you could access the hyperlink and bibliographic information of the NRC website as shown in the following instructions:

1. On the Catalog of U.S. Government Publications homepage, type "Nuclear Regulatory Commission" in the search box and click "Go."
2. Click on the title that you are interested in. In this case, click on "NRC--regulator of nuclear safety." By clicking on the name of the article, the Catalog will respond with more bibliographic information.
3. Click on the box label "Internet Access." You will be taken directly to the document. You will see that the webpage discusses the purpose and responsibilities of the NRC, as well as technical information about the operation of nuclear power plants.

Tips:

1. Unfortunately, simple searches can yield thousands of publications. An easy way to solve this problem is to narrow your search parameters by using the advanced search feature.

2. If you know exactly what you are looking for, use the menu on the homepage to specifically search for an author or title, rather than a keyword.

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Government Resources

Statistical Abstract of the United States

Location: http://www.census.gov/compendia/statab/

Description: Published by the U.S. Census Bureau, the Statistical Abstract of the United States is a database of census information. The database contains a variety of information about the "social, political, and economic organizations of the United States." As an undergraduate student at Penn State University, you might use this website to find job-outlook data, college degree statistics, or R&D expenditure information. All of the data is available in .xls (Excel) and/or .pdf (Adobe Acrobat) format. For example, to compare the amount of money the federal government spent on R&D in 1985 to the amount spent in 2005, you could use the following instructions:

1. On the Statistical Abstract of the Unites States homepage, click on "Science and Technology" in the left column.
2. Under the "Expenditures" heading, click on the PDF (or Excel File) link for "Research and Development (R&D) Expenditures by Source and Objective: 1970 to 2006." Doing this will take you directly to the numbers in question, which happens to be 114,671 million dollars in 1985 and 323,546 million dollars in 2005

Tips:

1. To access background information about the sources of the statistics, you can access the PDF version of the report and browse through the appendices.

2. Don't forget to check the scale when looking at numbers in the different article. For example, the R&D expenditure article reports in millions of dollars.

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Professional Organizations

American Chemical Society

Location: http://portal.acs.org/portal/acs/corg/content

Description: The American Chemical Society (ACS) is the leading professional organization of chemists and chemical educators in the world. In addition to publishing 35 scholarly journals and its weekly newsmagazine (Chemical and Engineering News), the American Chemical Society runs the Chemical Abstract Service (CAS) and manages a network of more than 160,000 members. The ACS website offers many tools for its members, but it also houses a large amount of information for students. Students majoring in chemistry (or even just interested in chemistry) may apply for membership at a discounted rate. Membership entitles undergraduates to journal subscription discounts, free subscription to Chemical and Engineering News, and a variety of scholarships. Also, students who want to present their research at the ACS National Meeting can submit abstracts here. The website also has an area dedicated to job and resume posting, which would be useful for senior chemistry majors. To post a resume on the site, use the following instructions:

1. On the ACS homepage, click on the tab labeled “Careers” at the top of the page.
2. Click on the link: “Post Your Resume.”
3. On this page, fill out the form by following the provided instructions.
4. Once the form is completed, click on “Post Resume” at the bottom of the page.

Tips:

1. Use the search bar on the top of the homepage to locate information quickly.

2. Use the tabs at the very top of the page to navigate to the websites of organizations within ACS. The tabs can take you to the homepages of ACS Publications, Chemical and Engineering News, and the Chemical Abstract Service.

3. For undergraduates, information about student development at the ACS National Meeting is readily available from the homepage.

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Resource Directories

Physical and Mathematical Sciences Library: Chemistry

Location: http://www.libraries.psu.edu/pams/chemistry/index.html

Description: The Physical and Mathematical Sciences (PAMS) library website at Penn State University has a section dedicated to chemistry resources. While chemistry majors may take the one-credit course CHEM 400 to learn about all of the library's resources, this website also provides detailed instructions for accessing library materials, as well as an index of chemistry-related websites. Some of the featured websites and databases include the Access Science Encyclopedia, the CRC Handbook of Chemistry and Physics (page 5), and SciFinder Scholar (page 4). The chemistry section of the PAMS library website also has links to other library resources such as the CAT, library hours, and the Penn State library homepage. Chemistry majors can use this site to find links to the various websites and instructions for downloading database software. For instance, you can find the instructions for downloading SciFinder Scholar (page 4) by following these steps:

1. On the chemistry page of the PAMS library website, click on the link for SciFinder download instructions under the heading "Quick Links."
2. Scroll down to the instruction section and read the text. Also read the section detailing common download problems.

Tips:

1. The PAMS library website is extremely helpful. However, many of the websites listed require a subscription and can only be accessed through the library system, either on campus or through the VPN Client.

2. Since some of the chemistry-related databases contain several different types of information, certain websites may be listed in more than one category.

3. The link "Getting Started in Chemical Literature" in the Tutorial section of the homepage directs students to other pages that can help them find specific information.