E. Library Services

The USMA Library has been an integral part of the United States Military Academy since its founding in 1802; the original library at West Point dates to the Revolutionary War era. The Library's mission: "To empower our cadets, faculty, and staff to be leaders of distinction in scholarship and research by providing teaching and expertise in the discovery and application of scholarly information; access to information supporting the curriculum and independent research; and a place to engage with knowledge, ideas, and one another," complements the mission of the Academy.

The USMA Library occupies Jefferson Hall, which opened in August of 2008. In the 2019 Princeton Review College Rankings, the USMA Library was #1 on the list of Best College Libraries, based on student ratings of their library facilities. USMA Library was also named FEDLINK's Federal Library of the Year for Fiscal Year 2018 (for large libraries with 11 or more staff). This award recognizes the "outstanding, innovative, and sustained achievements and services provided by the library and its staff" to the West Point community.

From the hours of operation to the management of the collection, the USMA Library supports students and faculty. During the academic year, the library is open over 103 hours per week; hours occasionally vary due to cadet activities. In order to support the growing academic program of USMA, the collection has significantly expanded over time and continues to develop in relevant areas. Currently, the USMA Library print collection includes over 432,000 books, and approximately 160 journals and newspapers. The library also subscribes to over 230 online databases, which provide over 118,000 titles in full text, and many hundreds more at abstract or citation level. The library's digital collection includes over 850,000 electronic books through a variety of providers.

Comprehensive access to library holdings is provided through the USMA Library's webpage that features the discovery tool Scout, which enables searching of physical and electronic library collections, including subscribed databases of scholarly journals, reference and design handbooks, and codes and standards.

Resources not available in full text at the USMA Library can be obtained through several different inter-library loan (ILL) services. In 2006, the USMA Library became a member of a statewide university library consortium known as ConnectNY. This consortium includes 15 academic institutions across New York state (including Rensselaer Polytechnic Institute and Rochester Institute of Technology) which share their resources on an on-demand basis, through inter-library loan. ConnectNY provides access to 7 million titles in the collections of the participating libraries. On 18 September 2017, the USMA Library (with the other service academy libraries) entered into an agreement with the Library of Congress for them to provide enhanced services to the Academies, including expedited interlibrary loan of materials held by the Library of Congress.

In addition to a robust collection designed to support current curricular needs, the library incorporates resources that have been used from the earliest days of the Academy, including the

Thayer Collection, consisting of books obtained in France from 1815-1817 for the teaching of military arts and engineering, mathematics, and physics. The library also has extensive historical materials within its Archives and Special Collections that reflect the Academy's history and teaching focus since its founding, including manuscript and personal paper collections received from notable graduates and others associated with the Academy over time.

The staff of 43 professional, technical, clerical, and other support personnel provides reference, research, and instructional services to cadets, faculty, and external researchers, and performs the cataloging, systems, and acquisitions operations required to support the collections and services offered to patrons. Library staff at all levels participate in information literacy programs for cadets conducted by various academic and support departments at West Point, in which class sessions provide an overview of library resources and services, and instructions in basic and advanced research, and the use of the library catalog, subscription databases, and special collections. Within the last five years the USMA Library implemented a First Year Experience program which forms the foundation of the library's instruction efforts; it introduces the plebe class to fundamental information literacy concepts, and library resources and services. This program includes a personal librarian program and library instruction through plebe core courses. Professional development is a key responsibility of all library staff; librarians conduct periodic training sessions for their colleagues according to their personal areas of expertise and share knowledge obtained through attendance at conferences, workshops, or professional development courses.

All academic departments are assigned a liaison librarian to serve as their primary library contact; departmental liaisons conduct library tours for newly-arriving faculty members, assist cadets taking classes in their departments with research through consultation and teaching, and support faculty in locating items needed for their classes and for their own research. Liaisons often attend their Department's faculty onboarding workshops, to develop relationships with new faculty members. Selection of materials for the library collection is a cooperative endeavor between faculty members and their departmental liaison; instructors frequently recommend or request new resources that will contribute to cadet learning and project completion, and liaisons are charged with selecting materials appropriate to the curricular needs of their departments.

With specific importance to the engineering and computing programs at USMA (Chemical Engineering, Civil Engineering, Computer Science, Electrical Engineering, Engineering Management, Environmental Engineering, Information Technology, Mechanical Engineering, Nuclear Engineering, Systems Engineering), the USMA Library maintains an extensive collection of print and electronic resources targeted at the curricular requirements of the engineering courses taught at West Point. Of significance with respect to current scholarship and research, the online engineering-related databases in the USMA library collection include the following platforms and collections:

- AccessEngineering – Content from a broad range of essential engineering publications, including the latest editions of classic handbooks and design manuals, and problem-solving interactive tools. Covers bioengineering, chemical, energy, civil, environmental, industrial, and materials engineering.

- ACS Journals A-Z – American Chemical Society publications.

- ARC – ARC Aerospace Research Center contains full-text articles and conference papers published by the American Institute of Aeronautics and Astronautics (AIAA), the premier provider of information on aerospace technology, engineering, and science.

- Association for Computing Machinery – ACM Digital Library – Includes journals/transactions, Conference Proceedings and Technical Reports from 1969-present.

- American Society of Civil Engineers (1999-present) – Portal to ASCE's publications, including 38 online journals and Conference Proceedings.

- American Society of Mechanical Engineers (ASME) Journals – Portal to ASME publications. USMA Library provides full-text access to select high-use titles only: Journal of Heat Transfer; Journal of Engineering for Gas Turbines and Power; Journal of Solar Energy Engineering; Journal of Mechanical Design; Journal of Biomechanical Engineering; Journal of Applied Mechanics; Journal of Engineering Materials and Technology; Journal of Energy Resources Technology; and Journal of Turbomachinery. Requests for articles in other ASME publications are fulfilled through inter-library loan.

- APS Journals – Portal to American Physical Society publications.

- ASTM – Individual standards ordered upon request.

- Compendex (1970-present) – An engineering database that includes over 18 million records and abstracts. Indexes 5,000 international engineering sources including journal, conference, and trade publications.

- Computer Database – Provides access to leading business and technical publications in the computer, telecommunications, and electronics industries. The database includes computer-related product introductions, news and reviews in areas such as hardware, software, electronics, engineering, communications, and the application of technology.

- Computers & Applied Sciences Complete – Indexing and some full text of periodicals in computer and other applied sciences.

- CRCnetBase – Science, Technology, Engineering and Medicine eBook platform from CRC Press.

- DTIC Online (Defense Technical Information Center) – Citations to unclassified documents in DTIC's Technical Reports Collection, many with full text.

- e-EROS – Encyclopedia of Reagents for Organic Synthesis - Database of about 70,000 reactions and 4500 of the most frequently consulted reagents.

- Environment Complete – Citations and abstracts for publications in a wide range of environmental sciences, many with full text.

- ICE – The ICE Virtual Library contains every peer-reviewed paper produced by the Institution of Civil Engineers since its first meeting in 1836.

- IEEE Xplore (Release 2.3) – Journals, magazines, transactions, letters and proceedings online (1988-present); standards (1948-present); IET journals, letters, magazines, and conference proceedings (1988-present); IEEE books since 1974.

- OSTI.gov – Energy-related research results and citations collected by the Office of Scientific and Technical Information, including journal articles/accepted manuscripts and related metadata, technical reports, scientific research datasets and collections, scientific software, patents, conference and workshop papers, books and theses, and multimedia funded by the U.S. Dept of Energy through grants, contracts, cooperative agreements, or similar type of funding mechanisms from the 1940s to today.

- Information Science and Library Issues – Provides access to scholarly journals and trade publications essential for information professionals and other knowledge workers. The database offers coverage of topics including information infrastructure, metadata architecture, publishing.

- Janes – Source for information on defense, geopolitics, weapons systems, and security.

- JoVE (Journal of Visualized Experiments) – publishes leading peer-reviewed articles consisting of high-quality video demonstrations and detailed text protocols which facilitate scientific reproducibility and productivity. Facilitates teaching and learning of key concepts and fundamental techniques at the undergraduate course level.

- Knovel Library – Reference materials in various fields of engineering and applied sciences, including chemistry and chemical engineering, civil and mechanical engineering, plastics and rubbers, semiconductors, advanced materials, and safety, health and hygiene.

- MathNetBase – Handbooks and books covering a wide range of topics in applied mathematics.

- MathSciNet – Reviews and citations to the world's research literature in mathematics and related areas, compiled from Mathematical Reviews and other current mathematical publications.

- NASA Technical Reports Server (NTRS) – Database of NASA and NACA conference papers, journal articles, meeting papers, patents, research reports, images, movies, and technical videos.

- NTIS (National Technical Information Service) – Summaries of scientific, technical, engineering, and business publications from 1964 to the present.

- Optics InfoBase – Portal to Optical Society of America publications.

- Science in Context – Draws students into the subject matter by integrating pure information with today's headlines and videos – showing how scientific disciplines relate to real-world issues.

- Scitation – Portal to journals published and distributed by the American Institute of Physics and its member societies

- ScienceDirect – A leading full-text scientific database offering all of Elsevier's more than 4,000 peer-reviewed journals and more than 28,000 books, covering the physical and social sciences, technology and medicine.

- SPIE Digital Library – Portal to Society of Photo-Optical Instrumentation Engineers journals and proceedings.

- U.S. Chemical Safety and Hazard Investigation Board Website – Includes accident reports and videos and recommendations for preventing future accidents.

- Van Nostrand's Scientific Encyclopedia – Scientific resource covering all scientific disciplines, as well as many areas of engineering and technology; articles are contributed by industry experts and scholars worldwide.

The library is critical to the chemical engineering program, particularly the process design course. In addition to the ACS and Elsevier journals mentioned above, the library also provides online access to:

- Kirk-Othmer Encyclopedia of Chemical Technology

- Encyclopedia of Chemical Processing

- Encyclopedia of Industrial Biotechnology

- Ullmann's Encyclopedia of Industrial Chemistry

- SciFinder (Chemical Abstracts Service)

- CRC Handbook of Chemistry and Physics

- Bretherick's Handbook of Reactive Chemical Hazards eBook through Knovel

- Van Nostrand's Scientific Encyclopedia

- Encyclopedia of Computational Chemistry
- Numerous chemical engineering eBooks through Knovel AccessEngineering and Wiley

Some key chemical engineering print references available in the library include:

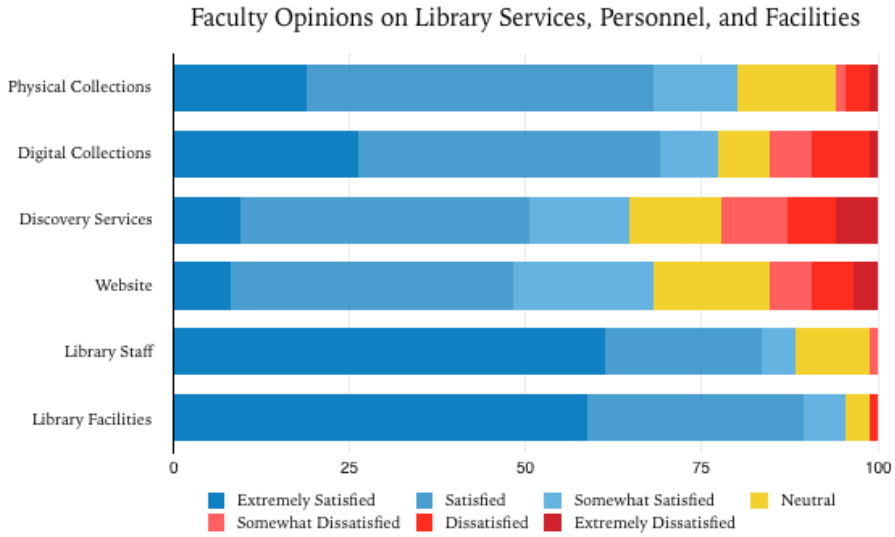
- *Ullmann's Encyclopedia of Industrial Chemistry* TP9.U57 2003
- *Riegel's Handbook of Industrial Chemistry* 10th ed, TP145.R53 2003
- *Bretherick's Handbook of Reactive Chemical Hazards* T55.3.H3.B73 1999
- *Chemical Processing Handbook* by John J. McKetta TP151.C573 1993
- *Standard Handbook of Hazardous Waste Treatment and Disposal* by Harry M. Freeman, TD1032.S73 1998.
- *Perry's Chemical Engineer's Handbook* TP151.P45 2008 (also available electronically through AccessEngineering).
- *The Yaws Handbook of Thermodynamic Properties for Hydrocarbons and Chemicals*, by Carl L. Yaws, QD305.H5 Y39 2006. Also available as eBook through Knovel
- *The Yaws Handbook of Vapor Pressure, by Carl L. Yaws*, QD533.Y39 2007. Also available as eBook through Knovel
- *The Yaws Handbook of Properties for Environmental and Green Engineering: Absorption Capacity, Water Solubility, Henry's Law Constants*, by Carl L. Yaws, TP200.Y394 2008.
- *The Yaws Handbook of Physical Properties for Hydrocarbons and Chemicals*, by Carl L. Yaws, QD65.Y39 2015 Also available as eBook through Knovel
- *Handbook of Thermodynamic Diagrams*, by Carl L. Yaws, QD504.Y36 1996
- *Handbook of Transport Property Data*, by Carl L. Yaws, TP156.T7 Y39 1995

The chemical engineering program works closely with the library to ensure that the library knows which services are required. A library work statement was created in 2012 to address these concerns, and the statement contains a list of specific services that are required. This document is available at the request of the ABET visit team.

In addition to external resources, there is also a wealth of information produced here at USMA, through work performed by the academic departments and their research centers. The Library has introduced USMA Digital Commons, an online institutional repository system, to collect, organize, preserve, and disseminate the intellectual output of cadets, faculty, and staff. USMA Digital Commons creates institutionally unique collections made openly accessible to the world to support Academy research, teaching, and learning. Sharing USMA's unique and valuable

intellectual products with the world supports the Academy's efforts to train warrior scholars, manage local talent, and attract future high-caliber cadets, faculty, and staff.

To ensure that the library is providing services, support, and a collection that is in line with the curricular and research needs of USMA cadets and faculty, the library conducts periodic assessments, and is currently engaged in a comprehensive self-study. Graduating cadets are surveyed annually and faculty are surveyed every 4 years. The most current faculty survey was conducted in 2017. The survey contained questions designed to assess the adequacy of the library's technical collection relative to the needs of the programs and the faculty, and the library's systems for locating and obtaining electronic information. There were 84 faculty responses, 57 of whom identified themselves as either faculty in an ABET-accredited program, or faculty who teach courses required by an ABET-accredited program. Of these responses, 36.9% were instructors, 38.1% were Assistant Professors, 13.1% were Associate Professors, 10.7% were Professors, and 1 person did not teach.

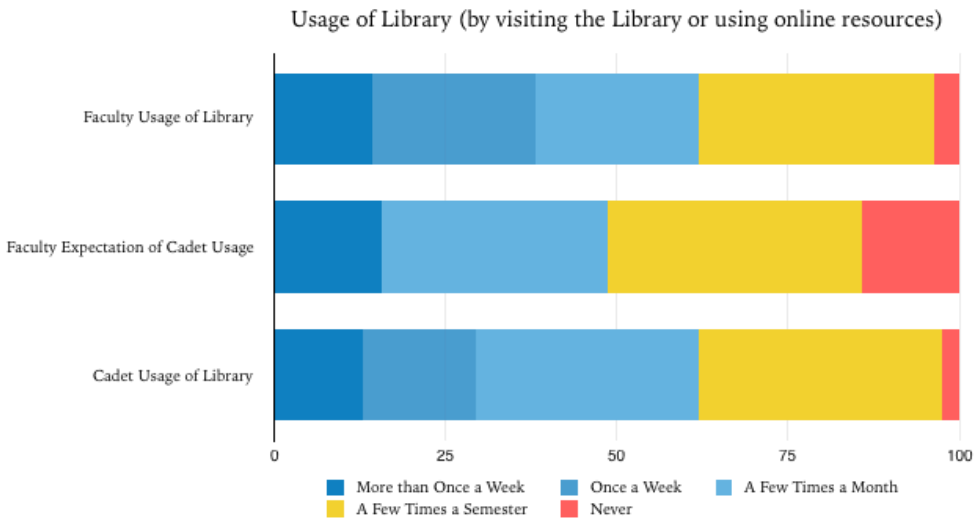


Faculty are most satisfied with Library Facilities (95.3% positive) and Staff (88.2% positive). Faculty are least satisfied with Library Discovery Services (64.7% positive) and the Library Website (68.2% positive). Since this survey was given in 2017, the USMA Library has completed an upgrade of the systems that are used to search online for books, articles, and other resources, as well as a complete redesign of the website. This upgrade occurred during summer 2019, and improvements to functionality continue to occur as feedback from students and faculty is received.

Faculty comments on the survey reflect the frustration with our previous discovery system and website and were taken into account during the upgrade process. Issues that are being addressed with the new system include easier searching, the ability to create and manage research alerts, create and save research lists, and the ability to discover information on-the-go from any device. Faculty and students can now access licensed information through a single sign on, which should increase accessibility of licensed materials.

There were also several comments from faculty suggesting the USMA Library increase the digital collection. One faculty member summed up the sentiment by stating, “Expand your digital journal access…more journals is always better…getting access to all of the papers is critical to a lot of research.” The USMA Library added 42,923 digital items during the 2018-2019 academic year. For the last several years, well over 90% of new acquisitions have been digital. There were more positive (n=25) comments about the collection than negative (n=21). Positive comments centered around the library continuing to maintain access to electronic journals and databases that are critical for research. Faculty also commented positively on the study areas and environment in the library (n=13), and the helpful staff (n=20). A faculty member said, “The librarians are great resources for faculty and students, helping to teach classes on information literacy and research, and helping cadets prepare for research assignments. The staff make this a usable library; whether you need help finding information, help with a meeting place, or help getting a specific resource here to USMA this staff make this happen.”

The reported usage of the USMA Library is shown below. Faculty usage (Q: How often do you use library resources or services by visiting the library or using online library resources?) and the faculty expectation of cadet usage (Q: How often do you expect your students to use library resources or services by visiting the library or using online library resources?) is based on this survey. Cadet actual usage comes from the survey of 856 members of the USMA class of 2019 (Q: On average, how often did you use library services as a cadet?). Interestingly, actual cadet usage of the library and its resources is higher than the faculty expectation.



The USMA Library strives to support the engineering specialties by providing the technical materials needed as part of the collection, the discovery tools to locate and access these specialized items (whether physical or electronic), and by processing faculty requests for acquiring new books or subscriptions, and providing librarian support to the classes and research for these programs. Through continued interaction and surveys of cadets and faculty in the engineering programs, the library adjusts resources and services as needed to provide the highest level of support possible.