Collection Building
Electrical engineering reference resources: a survey from LibGuides
Nestor L Osorio

Electrical engineering reference resources: a survey from LibGuides

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Abstract

Purpose – The purpose of this survey is to find a significant sample of reference resources for electrical engineering as they are presented in subject-specific LibGuides.

Design/methodology/approach – The survey is based on a detailed observation and collection of sources designated as Reference Resources in LibGuides, titles found were compiled and organized.

Findings – The results are substantial; they offered a body of specialized resources, which includes e-book collections, dictionaries, handbooks, encyclopedias and other resources that are important to electrical engineering students and researchers.

Research limitations/implications – A considerable amount of resources were found; nevertheless, they represent the resources found in a randomly selected sample of LibGuides; therefore, the result is limited to the group of libraries selected.

Practical implications – The results of this survey are valuable to subject librarians interested in comparing resources with a pool of libraries and to discover titles that can be of interest to their collections.

Originality/value – The work is original, as this is the first paper publishing the results of a survey of electrical engineering guides.

Keywords Electrical engineering, LibGuides, E-book collections, Reference resources

Paper type Case study

Introduction

LibGuides is the name of a well-known content management system provided by Springshare – its multiple design options allow for the creation of subject-specific guides. The value of this product has been discussed in several works such as the book by Dobbs *et al.* (2013) which provides an extensive discussion of its use, characteristics and assessments; at least three subject related papers have been published: Stankus and Parkera (2112) study nursing LibGuides; Dougherty (2013) surveys geology guides; and Osorio (2014) studies engineering guides. One noticeable advantage of having digital subject guides is their portability and the ways they can be incorporated into library instruction (Bielat *et al.*, 2013).

The purpose of this paper is to survey and obtain a significant sample of reference resources for electrical engineering, as they are presented in subject-specific guides; therefore, the titles were taken directly from the survey. It is not a comprehensive list, rather a representative sample of titles selected by librarians. There have been several notable comprehensive annotated bibliographies for engineering subjects; one recent publication is the book by Osif (2011) which includes specialized subject chapters.

Methodology

This work is based on the Osorio (2014) content analysis of engineering LibGuides. In that study, a method for the selection guides was adopted. The reason for adopting a selection method was due to the large number of guides produced; by July of 2014 over 65,000 guides have been published. To find a credible and manageable sample, it was necessary to identify engineering programs from the Accreditation Body for Engineering and Technology programs (ABET). A list of accredited programs for electrical engineering was obtained from the ABET website <www.abet.org/>. The resulting list was then searched for in the LibGuides Community site of Springshare <http://libguides.com/community.php>. Further, only electrical engineering ABET programs with at least a master's degree offering were selected; this produced 310 guides. A scientific random sample was applied which limited the number of guides to 48.

The original work of Osorio (2014) generated a significant amount of data, which was obtained by scrutinizing every LibGuide selected. Some of the two most common elements of a LibGuide are tabs and boxes. Reference resources were found in groups of tabs that were defined as "Reference resources" and "Books", and under groups of boxes listed as "Books". All the tiles retrieved from these tabs and boxes were collected, and the bibliographic information of most of them was obtained from the WorldCat database.

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There is strong evidence in the literature demonstrating that citation counts and other types of surveys are credible tools incorporated into collection analysis and collection building (Enger, 2009). Similarly, this paper is based on the assumption that the cumulative selection made by subject librarians is a good parameter for collection building.

This paper is therefore an extension of the original work; the authors have conserved the terminology used in LibGuides. Resources found under other tabs and boxes such as "Core databases", "Patents" and "Standards", which are typically included as part of the information resources for engineering are not included in this article, they are found in the original work. Finally, there is strong evidence in the literature demonstrating that citation counts and other types of surveys are credible tools incorporated into collection analysis and collection building (Enger, 2009). Similarly, this paper is based on the assumption that the cumulative selection made by subject librarians is a good parameter for collection building.

Results

The results are presented in five sections: collections of digital sources, dictionaries, encyclopedias, handbooks and others. Because the main purpose of this work is to create awareness about the reference sources being selected by subject specialist, not all titles contain a descriptive annotation of all the sources found in this survey. Therefore, short bibliographical information added to each entry includes author, edition, place of publication, publisher, year and the ISSN or the OCLC accession number. The list of these resources is in alphabetical order by title and in bolded text for easy recognition by the reader. In addition, for consistency, these data were obtained primarily from the WorldCat database, as a title often has multiple ISSN numbers, the one representing an electronic edition was chosen unless only a paper edition was found. This short bibliographic information will allow the reader to find more information about a resource in other databases, publishers' catalog and book vendor's platforms.

Items listed in Table I correspond to collections or packages of books and documents. As mentioned before, the entries reflect the titles of the resources found as they were listed. This is important because, in some cases, sub-collections of a larger package are listed, and in some instances, the same collection is listed with two slightly different titles. The description annotation added to items in Table I serve to clarify those issues.

Digital collections of books and documents

In this section, the author uses the term *documents* with the purpose of indicating that the products listed in Table I might include reports, conference proceedings, patents and other documents in addition to books.

Dictionaries

Comprehensive Dictionary of Electrical Engineering, Laplante, Phillip A., 2nd ed., Boca Raton, FL: Taylor and Francis, 2005, ISBN: 9781420037807. More than 100 experts provide practical information about 8,000 terms for students of electrical, electronic and computer engineering and for researchers in other fields. *Dictionary of Acronyms and Technical Abbreviations: for Information and Communication Technologies and Related Areas*, Vlietstra, Jakob, 2nd ed., London: Springer, 2001, ISBN: 9781447102632. It contains 35,000 entries of acronyms and abbreviations covering the field of information and communication technologies, as well as of conferences and organizations associated to this field. *Dictionary of Communications Technology Terms, Definitions, and Abbreviations*, Held, Gilbert, 3rd ed., Chichester, UK: Wiley, 1998, ISBN: 184972069X. Written by an award-winning author, the 18,000 plus entries of this reference book cover definitions and abbreviations on communication technologies and more than 1,000 trade names. *Dictionary of Engineering Acronyms and Abbreviations*, Keller, Harald; Erb, Uwe, 2nd ed., New York: Neal-Schuman Publishers, 1994, ISBN: 1555701299. This one-volume work contains over 70,000 entries covering the fields of engineering and technology. *Dictionary of Multimedia and Internet Applications a Guide for Developers and Users*, Botto, Francis, Chichester, UK: Wiley, 2012, ISBN: 9781849720816. It includes definitions of technical terms, abbreviations of organizations and trade names and technical processes. It also includes short articles about additional technical procedures. *Dictionary of PC Hardware and Data Communications Terms*, Shnier, Mitchell, Cambridge, MA: O'Reilly and Associates, 1999, ISBN: 1565921585. It presents terminology in the areas of personal computers and networks. Each entry includes the acronym, its meaning and a definition. Some definitions are small articles about the topic. *Fiber Optics Illustrated Dictionary*, Petersen, Julie K., Boca Raton, FL: CRC Press, 2003, ISBN: 084931349X. This is a comprehensive dictionary containing more than 5,000 entries in the field of fiber optics; it provides technical information, and charts and diagrams are included. *Glossary of Electrical Engineering Terms*, San Jose, CA: Maxim Integrated, retrieved July 10, 2014, from www.maximintegrated.com/en/glossary/index.mvp It is a web-based glossary provided by a tech company with a range of products including cars' electronic devices, energy controllers and mobile technology. *Hargrave's Communications Dictionary*, Hargrave, Frank, New York: IEEE Press, 2012, ISBN: 1849720738. Written by an experienced engineer, this reference book offers basic technical information on communication technology to entry level students. *IEEE 100: the Authoritative Dictionary of IEEE Standards Term*, 7th ed., New York: Institute of Electrical and Electronics Engineers, 2001, ISBN: 0738126012. This reference book represents a cumulative lexicon of the terminology on electrical engineering and related fields that have been defined and incorporated in the IEEE Standards. *IEEE Standard Dictionary of Electrical and Electronics Terms*, see IEEE 100, the Authoritative Dictionary of IEEE Standards Terms. *Illustrated Dictionary of Electronics*, Gibilisco, Stan, 8th ed., New York: McGraw-Hill, 2001, ISBN: 0071389660. It is a basic dictionary with more than 28,000 entries and over 1,000 illustrations. *Illustrated Engineering Dictionary, Bildwörterbuch Maschinenbau und Elektrotechnik*, Flack, Heinz K.; Möllerke, Georg, Berlin, Heidelberg: Springer Berlin Heidelberg, 1999, ISBN: 9783642585081. This German–English dictionary offers a basic terminology of mechanical engineering with some entries related to production and process engineering

Table I Digital collections of books and documents

Collections	Description
***AccessEngineering*, Columbus, OH: McGraw-Hill Global Education Holdings, 2009, OCLC: 314188711**	http://accessengineeringlibrary.com/, it includes a collection of important handbooks and technical monographs. It is continually updated
***ASM Handbooks*, Materials Park, OH: American Society for Metals, ASM International 2013, OCLC: 367690522**	http://products.asminternational.org/hbk/index.jsp, is a collection of 23 handbooks and supplements
***Books 24x7*, Norwood, MA: Books24x7, Inc., 1999, OCLC: 45689590**	http://help.books24x7.com/bkb/#30369.htm, it covers science and engineering reference sources and books of business skills and practices
***CRCnetBASE*, Boca Raton, FL: CRC Press, 2000s, OCLC: 271553823**	www.crcnetbase.com/, supported now by the Taylor & Francis group, it contains an extensive collection of technical books in 39 subject areas
***Ebrary*, Mountain View, CA: Ebrary, Inc., 1999**	http://site.ebrary.com/lib/engineeringtitles/home.action, the science & engineering portion of this collection contains several thousand books from academic publishers. It is a ProQuest product
***Ebsco eBooks Collection*, Ipswich, MA: EBSCO Pub**	www.ebscohost.com/ebooks/academic, the Academic Collection of EBSCO has a section of science & technology books
***eFunda the Ultimate Online Reference for Engineers*, Sunnyvale, CA: Efunda, 1999-2014, OCLC: 299636091**	www.efunda.com/home.cfm, this is an open source collection with information about: materials, design, unit conversions, processes, mathematics, and calculators
***Electrical Engineering, Newnes Know it all*, Amsterdam; Boston: Elsevier/Newnes, 2008**	www.elsevier.com/books/book-series/newnes-know-it-all, it is a series of books of practical applications in electrical engineering
***ElectricalEngineerinGnetBASE*, Boca Raton, FL: CRC Press, 1990s, OCLC: 182723720**	It is a subset of electrical and electronic engineering reference sources online of CRCnetBASE
***ENGnetBASE*, Boca Raton, FL: CRC Press, 1999, OCLC: 41956611**	It is a subset of the engineering reference sources online of CRCnetBASE
***IEEE Real World Engineering Projects (RWEP)*, Piscataway, NJ: IEEE**	www.realworldengineering.org, this is an open-source library of high-quality projects for first-year students with complete documentation
***IEEE-Wiley eBooks Library*, Piscataway, NJ: IEEE-Wiley Press, 2000**	This collection included the entire library of IEEE Press published monographs since 1974 and selected titles from Wiley
IEEEXplore E-books	See IEEE-Wiley eBooks, this collection is included in the IEEEXplore database
***IET digital library, IET eBooks*, Stevenage, UK: Institution of Engineering and Technology, 2000s, OCLC: 777471896**	A collection of several hundred books covering key areas of engineering, this collection is included in the IEEEXplore database
***Knovel Library*, Norwich, NY: Knovel, 2002, OCLC: 301077030**	It is a library of technical reference resources from several prominent academic publishers
***Lecture Notes in Computer Science*, Berlin: Springer-Verlag, 1973, ISSN: 1611-3349**	A multi-volume set of mainly proceedings of scientific and technical conferences related to computer science
Referex Engineering, Materials & Mechanical Collection	Prior to 2014, the Referex engineering reference collection was hosted on Elsevier's Engineering Village platform; all Referex titles have been migrated to ScienceDirect, the platform for Elsevier's complete electronic book and journal collections
***Momentum Press eBooks*, New York: Momentum Press**	www.momentumpress.net/library/plans, this collection includes advanced engineering topics in controls and sensors, sustainable energy, mechanical engineering, civil and structural engineering and other technical areas
***ProQuest Safari Technical Books Online*, ProQuest, Ann Arbor, Michigan**	www.proquest.com/products-services/safari_tech_books.html, Safari Books Online available since 2001 originated with the merge of two technology publishers, O'Reilly Media, Inc. and Pearson Education. It covers technical topics with practical applications
***SPIE eBooks*, Bellingham, WA: SPIE Press, 2000s, OCLC: 654124444**	It corresponds to the SPIE Digital Library collection of Proceedings of SPIE–the International Society for Optical Engineering
***Springer eBooks*, New York: Springer Science and Business Media, 2005, OCLC: 291143419**	http://link.springer.com/search?facet-content-type=%22Book%22&from=SL, an extensive collection of science, technology and medical books accessed through SpringerLink
***Springer Tracts in Advanced Robotics*, Springer, 2003, ISSN: 1610-742X**	A specialized series of monographs containing lecture notes, proceedings of selected conferences and workshops and some doctoral dissertations
***SpringerLink Books on Electronic & Computer Engineering*, New York: Springer Science and Business Media**	This is a subset of Springer eBooks available in SpringerLink
***Studies in Computational Intelligence*, Heidelberg, Berling: Springer, 2005, ISSN: 1860-9503**	It contains monographs, lecture notes and edited volumes from proceedings of conferences related to areas of computational intelligence

(*continued*)

Table I

Collections	Description
***Studies in Fuzziness and Soft Computing*, Physica Verlag, 2005, ISSN: 1860-0808**	This series is primarily composed of monographs and edited conference proceedings
***Synthesis Digital Library of Engineering and Computer Science*, San Rafael, CA: Morgan and Claypool, 2005**	www.morganclaypool.com/page/synthesis.jsp, is a collection of short contained topic specific monographs referred as *Lectures* written by experts. The series is divided into several subject technical areas
***Wiley Interscience Electronic Books*, Hoboken, NJ: Wiley, 1997**	http://onlinelibrary.wiley.com/ It is part of the Wiley Online Library (OCLC: 43474482), it is an extensive collection of monographs in many areas including science, engineering and technology

and electrical engineering. For practitioners, the appendix section provides examples of common technical phrases. *McGraw-Hill Electronics Dictionary*, Sclater, Neil; Markus, John, 6th ed., New York: McGraw-Hill, 1997, ISBN: 9781601192714. Known for years as a reliable source for students, it contains over 14,000 entries of technical terms in the field of electronics. The many illustrations included enhanced the clarity of the terms. *McGraw-Hill Illustrated Telecom Dictionary*, Clayton, Jade, 2nd ed., New York: McGraw-Hill, 2000, ISBN: 9780071360371. The unique feature of this dictionary is its focus on significant areas of telecom, including the business and economic aspects. It contains over 2,000 terms with many illustrations and graphs. *Modern Dictionary of Electronics*, Graf, Rudolf F., 7th ed., Boston: Newnes, 1999, ISBN: 9780750698665. It provides good coverage of terminology related to consumer electronics, optics, microelectronics, computers, communications and medical electronics. *Newnes Dictionary of Electronics*, Amos, S. W.; Dummer, G.W.A.; Amos, R.S., 4th ed., Oxford, UK: Newnes, 2012, ISBN: 9781601192851. It is a usable source for finding definitions on electronics, radio and television technology and computing engineering. *Newton's Telecom Dictionary, Covering Telecommunications, Networking, Information Technology, the Internet, the Web, Computing, Wireless, and Fiber: More than 21,900 Terms Defined*, Newton, Harry, 20th ed., San Francisco: CMP Books, 2004, ISBN: 1578203090. Newton's dictionary is recognized as a good source for the terminology used in telecommunications, networking, information technology, the Internet, the web, computing, wireless and fiber technologies. Insightful details about how technology is used also included in this work. *Telecommunications Illustrated Dictionary*, Petersen, Julie K., 2nd ed., Boca Raton, FL: CRC Press, 2002, ISBN: 9781420040678. Although illustrated, the good points of this one-volume dictionary is the coverage of over 10,000 terms in telecommunications technology and a significant presence of historical facts from this field. *Wiley Electrical and Electronics Engineering Dictionary*, Kaplan, Steven M., IEEE Press; Hoboken, NJ: Wiley-Interscience, 2004, ISBN: 978161583854. The 35,000-plus terms of this extensive dictionary cover all areas of electrical engineering and is published by the prestigious IEEE Press.

Encyclopedias

Dekker Encyclopedia of Nanoscience and Nanotechnology, Contescu, Cristian I.; Putyera, Karol, 2nd ed., Boca Raton: CRC Press, 2009, ISBN: 9780849396380. In this six-volume encyclopedia, each article is written by an expert from different scientific backgrounds. It offers comprehensive coverage of these entire new fields. *Design for Electrical and Computer Engineers*, Ford, Ralph M.; Coulston, Chris S., International ed., Boston: McGraw-Hill, 2008, ISBN: 9780071263474. Written for students at the senior level, this work guides them through all the steps of creating and developing a successful design project. *Desktop Encyclopedia of Telecommunications*, Muller, Nathan J., 2nd ed., New York: McGraw-Hill, 2000, ISBN: 0071369244. In this one-volume encyclopedia, the reader finds over 300 detailed articles with diagrams and illustrations of critical topics in the field of telecommunications. *Desktop Encyclopedia of the Internet*, Muller, Nathan J., Boston: Artech House, 1999, ISBN: 1580532179. It covers Internet technologies such as: Acronyms, Address Resolution Protocol, Handheld Device Markup, intercast, Internet agents, Internet backup services, Internet outsourcing, manual methods, optimization techniques, security, synchronous optical network, telecommuting, telnet, transmission control protocol, vCalendar, videoconferencing over IP, virtual reality modeling language and wimage file formats. *Encyclopedia of Aerospace Engineering*, Blockley, Richard; Shyy, W., Chichester, UK; Hoboken, NJ: Wiley, 2010, 9 ISBN: 9780470686652. This is a nine-volume encyclopedia covering all aspects of aerospace engineering: fluid dynamics and aerothermodynamics, propulsion and power, structural technology, materials technology, dynamics and control, environmental impact and manufacturing, vehicle design and system engineering. *Encyclopedia of Computer Science*, Reilly, Edwin D.; Ralston, Anthony, 4th ed., Chichester, UK: Wiley, 2003, ISBN: 9780470864128. A one-volume resource, it contains over 600 articles covering: hardware, software, computer systems, information and data, mathematics of computing, theory of computation, methodologies, applications and computing milieu. *Encyclopedia of Optical Engineering*, Driggers, Ronald G., New York: Marcel Dekker, 2003, ISBN: 9780824709396. This is a three-volume encyclopedia containing 230 main topics on optical engineering. It is the product of contributions of experts from this multidisciplinary field. *Encyclopedia of Physical Science and Technology*, Meyers, Robert A., 3rd ed., Amsterdam: Elsevier, 2004, ISBN: 9780122274107. The 18 volumes of this comprehensive encyclopedia is the product of 1,000 contributors; it covers all areas of the physical sciences: astronomy, astrophysics and space technology; chemistry; computers and telecommunications; earth sciences; electronics, optics and lasers; energy and power; engineering, aerospace and transportation; environment and atmospheric sciences; materials; mathematics; molecular biology and biotechnology; and physics. *McGraw-Hill Encyclopedia of Science & Technology*, 11th ed., New York: McGraw-Hill,

2012, ISBN: 9780071778343. Written by experts, the 20 volumes of this encyclopedia represent a compendium of all areas of science and technology. Its online version is AceessScience. *Wiley Encyclopedia of Electrical and Electronics Engineering*, Webster, John G., editor, New York: Wiley-Interscience, 2008, ISBN: 9780471346081. It is the most comprehensive encyclopedic work in electrical and electronics engineering; the 24 volumes include more than 1,400 articles. Besides the technical aspects of the subject, it also covers related ones such as education, patents and social issues.

Handbooks

American Electricians' Handbook, Croft, Terrell, Hartwell, Frederic P.; Summers, Wilford I., 16th ed., McGraw-Hill Education, 2013, ISBN: 9780071798815. This handbook has been, for years, a standard source for practical information. Its content is based on current electrical and safety codes. *ASM Handbooks Online*, Materials Park, OH: ASM International, 2002, OCLC: 642879699. It corresponds to the complete set – 23 volumes, supplements and other materials – produced by ASM International one of the largest metals and materials societies. This handbook is an indispensable resource for engineering. *Circuits and Filters Handbook*, Chen, Wai-Kai, editor, 5 vols., 3rd ed., Boca Raton, FL: CRC Press, 2009, ISBN: 9781420055276. This five-volume set provides comprehensive coverage of circuits and filters. It is the product of contributions written by over 150 experts about practices and techniques of these emerging fields. *Communications Facility Design Handbook*, Whitaker, Jerry C., Boca Raton, FL: CRC Press, 2000, ISBN: 9781420041446. It presents standards, methods and practices used by systems engineering in the construction and design of facilities. It uses a step-by-step approach in formulating the processes involved. *Computer Engineering Handbook*, Oklobdzija, Vojin G., 2nd ed., Boca Raton, FL; London: CRC Press, 2008, ISBN: 9780849386008. With the contributions of an outstanding list of collaborators, the editor has assembled a computer design and engineering handbook that features the current status of the field and explores future directions. *CRC Handbook of Chemistry & Physics*, Haynes, William M., 95th ed., Boca Raton, FL: CRC Press, 2014, ISBN: 9781482208672. This handbook is considered to be an essential reference source for students of science and engineering. Tables contained are routinely used in lab work. *CRC Handbook of Engineering Tables*, Dorf, Richard C., Boca Raton, FL: CRC Press, 2004, ISBN: 9780203009222. This handbook provides students, researchers and engineers with hundreds of tables and technical information in most areas of engineering, including a section on engineering mathematics. *Electric Power Distribution Handbooks*, Short, T. A., 2nd ed., Boca Raton, FL: CRC Press, 2014, ISBN: 9781466598652. It covers all practical information about distribution systems such as fundamentals of distribution systems, capacitor applications, distributed generation, faults, grounding and safety, lightning protection, overhead lines, transformers, underground distribution and voltage regulation. *Electrical Engineering Handbook*, Chen, Wai-Kai, Boston: Elsevier Academic Press, 2005, ISBN: 0121709604. Written for students and electrical engineers, this handbook covers: circuit theory; electronics, VLSI systems; digital systems and computer engineering; electromagnetics; electric power systems; signal processing; digital communication and communication networks; and controls and systems. *Electrical Engineer's Reference Book*, Laughton, M. A.; Warne, D. F., Oxford, England; Boston: Newnes, 2003, ISBN: 1601194528. Written for the practicing engineer, this handbook includes the following sections: general principles; materials and processes; control; power electronics and drivers; environment; power generation; transmission and distribution; power systems; and sectors of electricity use. *Electrical Pal*, Rosenberg, Paul, 5th ed., Pottstown, PA: Pal Publications, 2005, ISBN: 0975970909. This is a handy basic pocket reference source for electrical engineers. *Electromagnetic Compatibility Handbook*, Kaiser, Kenneth L., Boca Raton, FL: CRC Press, 2005, ISBN: 0849320879. Having control of the environment where electronic equipment operates is an important task for engineers. This handbook, written for upper-level and graduate students, provides many sources of calculations and approximations. *Electronic Filter Design Handbook*, Williams, Arthur Bernard, Taylor, Fred J., 4th ed., New York; London: McGraw-Hill, 2006, ISBN: 0071490140. This handbook has been recognized as a standard source for locating practical information on filter design, both analog and electronic. *Electronic Materials and Processes Handbook*, Harper, Charles A., 3rd ed., New York: McGraw-Hill, 2004, ISBN: 9780071433464. Electronic materials comprise the group of ceramics, metals, plastics and semiconductors from which the designers depend on. This handbook covers all the basics of the subject and is a good reference for students and researchers involved in the design and fabrication of electronic devices. *Electronics Engineers' Handbook*, see Standard Handbook of Electronic Engineering. *Electronics Handbook*, Whitaker, Jerry C., 2nd ed., Boca Raton, FL: CRC Press, 2005, ISBN: 9781420036664. Written by an experienced engineer and writer, this handbook features 23 sections that cover the most critical aspects of electronics engineering. It is a good reference for students and researchers. *Handbook for Sound Engineers*, Ballou, Glen, 4th ed., Oxford: Focal, 2008, ISBN: 0240809696. It is considered one of the most comprehensive reference books for sound engineering. Its seven parts include: acoustics, electronic components, electroacoustic devices, electronic audio circuits and equipment, recording and playback, design applications and measurements. *Handbook of Electric Power Calculations*, Beaty, H. Wayne., 3rd ed., New York: McGraw-Hill, 2006, ISBN: 9780071449403. Conforming to the standards of the National Electric Code, this handbook is an excellent resource for students, practicing engineers and technicians. *Handbook of Electrical Design Details*, Sclater, Neil; Traister, John E., New York: McGraw-Hill, 2003, ISBN: 9780071425797. A 12-chapter reference book contains technical details that can make a project succeed or fail. With over 300 illustrations, an extensive bibliography and NEC referrals, this is a good resource for students and researchers. *Handbook of Fuel Cells Fundamentals, Technology, and Applications*, Vielstich, Wolf., Hoboken, NJ: Wiley-Interscience, ISBN: 9780470974001. This four-volume handbook covers these three major topics: fundamentals and survey of systems, fuel cell electrocatalysis and fuel cell technology and applications. The contributing authors are experts in fuel technology, making this a valuable

tool for scientists and engineers. *Handbook of International Electrical Safety Practices*, Princeton Energy Resources International, Hoboken, NJ: Wiley; S alem, Mass: Scrivener, ISBN: 9780470893227. It contains safety measures and regulations that need to be in place in laboratories and industry. It is a good resource for maintaining a safe work environment. *Handbook of Lasers*, Weber, Marvin J., Boca Raton, FL: CRC Press, 2001, ISBN: 1420050176. This handbook offers an array of technical information about all kinds of lasers, their applications and provides a link to the literature of the field. *Handbook of Nanostructured Materials and Nanotechnology*, Nalwa, Hari Singh., San Diego, CA: Academic Press, 2002, ISBN: 0080537278. This is a five-volume set with comprehensive coverage of one of the most interesting areas of scientific and engineering endeavors. It covers synthesis and processing, spectroscopy and theory; electrical properties; optical properties; and organics, polymers and biological materials. *Handbook of Sensor Networks, Algorithms and Architectures*, Stojmenovic, Ivan, Hoboken, NJ: Wiley, 2005, ISBN: 0471744131. Sensor networks are complex technological structures requiring significant effort for building their architectures. This handbook is a guide for students in the sciences, electrical engineering and telecommunications. *Handbook of Sensor Networks, Compact Wireless and Wired Sensing Systems*, Ilyas, Mohammad; Mahgoub, Imad., Boca Raton, FL: CRC Press, 2005, ISBN: 9780203489635. The 40 chapters of this handbook, written by a selective group of contributors, are written for design engineers, academic researchers and graduate students. It includes applications, architecture; data gathering and processing; energy management; performance and design aspects; security, reliability and fault tolerance; and tracking technologies. *Handbook of Thin Film Devices*, Francombe, Maurice H., San Diego: Academic Press, 2000, ISBN: 0122653203. A major compilation of the subject is written by experts and is divided into six volumes, covering hetero-structures for high performance devices; semiconductor optical and electro-optical devices; superconducting film devices; magnetic thin film devices; and ferroelectric film devices. *Handbook of Thin Film Materials*, Nalwa, Hari Singh, San Diego, CA: Academic Press, 2002, ISBN: 0125129084. In addition to its extensive coverage on materials, this five-volume resource dedicates a volume on processing techniques and one on characterization methods. It is a good tool for researchers. *Linden's Handbook of Batteries*, Reddy, Thomas B.; Linden, David, 4th ed., New York: McGraw-Hill, 2011, ISBN: 9780071624190. A valuable resource for graduate students and researchers, this handbook provides them with all kinds of batteries and their applications. It divided into four components: principles of operation; primary and secondary batteries; specialized battery systems; and fuel cells and electrochemical capacitors. *Linear Circuit Design Handbook*, Zumbahlen, Hank, Amsterdam; Boston: Elsevier/Newnes Press, 2008, ISBN: 9780080559155. This handbook presents a comprehensive view of the subject with particular emphasis of the role played by analog elements in the design of discrete and integrated circuits. *McGraw-Hill's National Electrical Code Handbook*, Hartwell, Frederic P.; McPartland, Joseph F.; McPartland, Brian J., 28th ed., New York, NY: McGraw-Hill Education LLC, 2014, ISBN: 9780071834797. This is an excellent companion to the National Electrical Code, it gives the practicing engineer the tools to interpret and apply the code. *Newnes Electrical Pocket Book*, Reeves, E. A.; Heathcote, Martin J., 23rd ed., Oxford: Newnes, 2003, ISBN: 1417505257. This is a handy reference tool for the practicing engineer; it is a good source for basic principles of electrical engineering and installation projects. *Reference Data for Engineers: Radio, Electronics, Computer, and Communications*, Middleton, Wendy, Boston, Oxford: Newnes, 2002, ISBN: 9780750672917. This handbook is a good source of information on radio, electronics and communications for students and practicing engineers. *Resource Handbook of Electronics*, Whitaker, Jerry C., Boca Raton, FL: CRC Press, 2001, ISBN: 1420036866. It is a good resource for engineers and technicians; it offers numerous tables, charts, formulas, definitions and references. *Sensor Technology Handbook*, Wilson, Jon S., Amsterdam; Boston: Elsevier, 2005, ISBN: 141755276X. Sensors are a technology with applications in science, engineering, industry and military. Therefore, this handbook provides comprehensive treatment, including types of sensors, guidelines for their selection, as well as their related software and hardware. *Space Antenna Handbook*, Imbriale, W. A.; Gao, Steven, Chichester, UK; Hoboken, NJ: Wiley, 2012, ISBN: 9781119945130. It is a reference handbook for students and researchers; it presents an extensive basic treatment of all areas related to space antennas. *Standard Handbook for Electrical Engineers*, Beaty, H. Wayne; Fink, Donald G., 16th ed., New York; London: McGraw-Hill, 2013, ISBN: 1283572680. This handbook has been an essential reference tool for students and engineers for many years; every new edition published brings to the readers the latest advances in electrical engineering and related fields. *Standard Handbook of Electronic Engineering*, Christiansen, Donald; Alexander, Charles K., 5th ed., New York: McGraw-Hill, 2012, ISBN: 9780071384216. A regular in a reference collection, this handbook has a good coverage of electrical engineering in communications technology, networking and medical applications. *The ARRL Handbook for Radio Amateurs*, American Radio Relay League, Newington, CT: American Radio Relay League, 2014, ISBN: 9781625950000. It is the standard handbook for radio amateurs and widely recognized as an essential tool in the field. *The Electrical Engineering Handbook*, Dorf, Richard C., Boca Raton, FL: CRC/Taylor and Francis, 2006, ISBN: 084932274X. Since its first edition in 1993, this handbook has been a reliable source of information to electrical engineers. It covers, in 12 sections, all major areas of this field. *The Handbook of Formulas and Tables for Signal Processing*, Poularikas, Alexander D., Boca Raton, FL: CRC Press, 1999, ISBN: 9781420049701. Signal processing has practical applications in a many areas of science and engineering; therefore, this handbook addresses fundamental principles and multiple topics of interest to researchers. Numerous tables, formulas and examples are presented. *The Measurement, Instrumentation, and Sensors Handbook*, Webster, John G.; Eren, Halit, 2nd ed., Boca Raton, FL: CRC Press, 2014, ISBN: 9781439848890. This two-volume set contains 196 chapters with practical instrumentation and measurement techniques applicable to engineering, applied sciences and medicine. It is a good resource for students, engineers and

scientists. *Wiley Engineer's Desk Reference*, Heisler, Sanford I., 2nd ed., New York: Wiley, 1998, ISBN: 0470172320. The concise guide for engineering is packed with basic and everyday usable information. Its 700-plus pages covers the essentials of electricity and electronics; energy sources; engineering practice; hydraulics; mathematics; mechanics and materials; process control; statistics and economics; structures; the design process and thermodynamics. *World Radio TV Handbook*, 2014 ed., Oxford: WRTH Publications Limited, 2013, ISBN: 9780955548161. This is a directory of radio on LW, MW, SW and FM frequencies, terrestrial television station and a range of interesting information about the industry.

Others sources

Basic Engineering Circuit Analysis, Irwin, J. David; Nelms, R. M. Hoboken, 10th ed., NJ: Wiley, 2011, ISBN: 9780470633229. It is considered, by many instructors, as a classic textbook for beginning students of this complex subject. *Designing Embedded Hardware*, Catsoulis, John, Sebastopol, 2nd ed., CA: O'Reilly, 2005, ISBN: 9780596520939. For students and researchers wanting to have a working knowledge of embedded systems, this book is written by an expert and gives all the basic tools needed. *Designing Embedded Systems with PIC Microcontrollers, Principles and Applications*, Wilmshurst, Tim, 2nd ed., Boston: Newnes, 2010, ISBN: 9780080961842. Written for advanced undergraduate and beginning graduate students, this is an area with wide applications extensively used in industry. *Energy Systems Engineering*, Georgiadis, Michael C.; Kikkinides, Eustathios S., Weinheim: Wiley-VCH, 2009, ISBN: 9783527631292. With the support from the Centre for Process Systems Engineering at Imperial College London, it covers a broad range of methodologies and process systems. *Fuel Cell Systems Explained*, Larminie, James; Dicks, Andrew, 2nd ed., Chichester, West Sussex: Wiley, 2003, ISBN: 1591248078. For students in power engineering and related areas, this book is a good introduction to fuel cell systems. It covers operation principles, design and applications. *Introduction to Digital Systems: Modeling, Synthesis, and Simulation Using VHDL*, Ferdjallah, Mohammed, Hoboken, N.J. Wiley, 2011, ISBN: 9781118007716. This textbook for undergraduate students covers digital systems modeling and simulation, integrated logic, Boolean algebra and logic, logic function optimization, number systems, combinational logic, VHDL design concepts and sequential and synchronous logic. *Making Embedded Systems*, White, Elecia, Sebastopol, CA: O'Reilly Media, 2012, ISBN: 9781449320591. This book contains basic technical details used in the development of system architecture for processors. *National Electrical Code*, National Fire Protection Association, 2014 ed., Quincy, MA: National Fire Protection Association, 2013, ISBN: 9781455906727. It is the set of codes, standards and practices recommended for the safe installation of electrical wiring and equipment. *PIC Microcontrollers, an Introduction to Microelectronics*, Bate, Martin, 3rd ed., Boston: Newnes, 2012, 9780080969114. This book is intended for undergraduate students on the technology of microelectronic systems using Programmable Interface Controllers. *Robot Building for Beginners*, Cook, David, 2nd ed., Berkeley, CA: Apress, New York: Springer-Verlag, 2009, ISBN: 9781430227496. This is an introductory book for the technology of robot building. For beginners, it is a step-by-step guide to this fascinating field. *Three-dimensional Integrated Circuit Design*, Xie, Yuan; Cong, Jason, New York: Springer, 2010, ISBN: 9781441907844. This a comprehensive treatment of *three-dimensional integrated circuit design* for graduate students covering advanced technologies, applications and future development, appropriate for those needing to learn more about the field.

Conclusion

The results of this survey represent a sample of significant electrical engineering titles identified as reference resources that have been selected by librarians for students and researchers and posted on specialized subject LibGuides. It does not include information resources typically described as core databases, patents, technical reports and standards. Although the results are not a comprehensive bibliography of electrical engineering reference sources, the results show a list of sources considered to be important that can be used for comparison, collection development and in instruction.

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