Subject
Engineering

Mission
Engineering materials are acquired and maintained by the Library to support the research, teaching and learning of the School of Engineering. The Engineering & Architecture Library is located on the second floor of the Engineering Building in Pangborn Hall.

History
The engineering program was established in 1896, soon after the founding of The Catholic University of America. The School of Engineering was formally established in 1930 and was shortly thereafter renamed as the School of Engineering and Architecture. In 1992 the School of Engineering and Architecture separated into the School of Engineering and the School of Architecture and Planning.

Prior to 1950, the primary focus of the school was on undergraduate professional programs. However, research activity and graduate professional offerings have increased at a steady rate since 1950. Today the school offers bachelor's, master's and doctoral degrees in five academic programs as well as a master's degree in engineering management.

The school prides itself on being a small, Catholic engineering school, providing quality education with a personal touch. Students can expect close interaction with faculty, small class sizes, a small student-to-teacher ratio, and a faculty dedicated to teaching and research. All members of the full-time faculty hold doctoral degrees and are very active in funded research and scholarly publication. (Source: http://engineering.cua.edu/generalinfo/index.cfm)

Clientele
Clientele served by School of Engineering materials in the Library include

- Students enrolled in undergraduate, masters and doctoral degree programs offered by the School of Engineering.
- Faculty of the School of Engineering, faculties of the Department of Math, Department of Physics and the School of Architecture and Planning.
- Other University faculty, students, and staff.
- Faculty, students, and staff of other WRLC institutions and other local consortia.
- Other researchers who need to consult materials not available to them in the libraries which ordinarily support their study.
Any other clientele served by the subject area collections.

Current areas of departmental course offerings include the following undergraduate and graduate level degree programs:

**Biomedical Engineering**

Biomedical engineers bridge the gap between medicine and engineering. Accredited since 1991, the program at CUA prepares students for this evolving field by teaching them to apply core engineering principles to invent and advance technologies necessary for diagnosing medical conditions, assisting with rehabilitation and improving the lives of people with disabilities and/or chronic illness.

Research concentrations include:
- Cardiopulmonary biomechanics; home care technologies; telerehabilitation
- Circulatory dynamics, air pollution
- Rehabilitation Robotics and human motor control
- Biomechanics, Rehabilitation Robotics
- Biomaterials, tissue engineering
- Biomedical optics, biomedical instrumentation

**Civil Engineering**

Civil engineering as a discipline is dedicated to building a sustainable future through the development of our civil infrastructure and the betterment of our global environment. At CUA, the faculty are dedicated to excellence in undergraduate teaching and are at the forefront of civil engineering research.

Research concentrations include:
- Application of appropriate experimental methods to determine the three-dimensional stress-strain and strength behavior of soils and the development of constitutive models for frictional materials such as soils, concrete, and rock
- Wave propagation in solids, random vibration, structural dynamics, elastodynamics inverse problem, non-destructive testing and evaluation;
- Transportation infrastructure management and information systems, highway and airport pavement design and performance modeling;
- Transportation systems: intelligent transportation systems, network routing, traffic forecasting, traffic flow theory and simulation, transportation safety;
- Applications of operations research, statistical science and data mining to credit scoring, financial risk and portfolio management, and transportation engineering
- Mathematical modeling, simulation, and analysis of project schedules and their relationship with other aspects, e.g. costs, construction equipment operations and economics, optimization methods,
- Engineering education
- Reactive contaminant fate and transport in aquatic systems;
- Individual based modeling of ecological systems and fish population dynamics;
- Storm-water quality, management and BMP optimization;
- Evolutionary and soft computing methods in inverse modeling of contaminant fate and transport in natural systems
- Contaminant sediment water interactions in streams and wetlands and
- Bacterial horizontal gene transfer in porous media
- Engineering seismology, earthquake engineering, structural dynamics and structural mechanics, and include topics related to mechanics and physics of earthquakes, deterministic and stochastic ground motion simulations, fracture and frictional processes, seismic hazard and risk analysis, and computational modeling

Engineering Management

The Engineering Management Program at Catholic University has a twenty-five year history of successfully educating military, government, and industry professionals in the art and science of managing technical organizations and their processes.

Research concentrations include:
- Application of multi-attribute utility analysis as well as systems analysis and engineering economics to the implementation of environmental, safety, and health regulations
- Strategic planning, risk management and performance management
- Occupational ergonomics, safety, Americans with Disabilities Act (ADA), and classical industrial engineering, with specialized expertise in the area of cumulative trauma disorders and low back injuries
- History of science, technology and engineering including the development of systems engineering and behavior of engineering organizations
- Career management of science, technology and engineering professionals
- Project management and systems integration for telecommunications projects, information systems projects, and customer service systems
- Risk management, performance metrics, and program management analytical support
- Project management, risk assessment and marine engineering
- Management and strategy

Electrical Engineering and Computer Sciences

Electrical engineering incorporates the fundamentals behind today’s cable, wireless, and fiber-optic communications systems, the ever-increasing speed of computers, the intelligence embedded into home appliances and automobiles, or emerging alternative energy sources.

Computer science studies the fundamentals of hardware and software components, advanced system design and human interface issues, and pursues their applications in science, engineering and technology in daily lives.
Research concentrations include:
  - Communication systems, computer communication networks, asynchronous transfer mode based broadband integrated services digital networks, optical communications, optical networks, Internet and multimedia communications
  - Medical informatics, modeling and simulation, pattern recognition, combinatorial design, Information retrieval, parallel processing, and telecommunication applications
  - visualization, computer graphics, medical image processing and analysis, noninvasive image-guided procedure, and bioinformatics
  - Antennas, wave propagation, satellite communications systems, and microwave remote sensing
  - Solid state radiation imaging systems, optical data storage systems, and laser micro-fabrication of microelectronic and microfluidic structures
  - Elastic and anelastic properties of liquids and solids, magnetic resonance, and the effect of ELF and microwaves on biological cells
  - image motion detection and estimation, image sequence filtering/restoration, digital communications and classification
  - Digital filter design and adaptive filtering

**Materials Science & Engineering**

It has been estimated that the work of one in three engineers is directly related to materials, while over half of all engineers have at least an indirect concern for the properties of materials.

Research concentrations include:
  - Biomaterials
  - Glasses, ceramics & metallurgy
  - Magnetic and optical materials
  - Nanotechnology
  - Processing and instrumentation
  - Structural materials engineers who possess skills to assume leadership roles in industry, academia, and government.

**Mechanical Engineering**

Mechanical engineers contribute to protecting the environment, increasing quality of life, and contributing to overall economic development. Mechanical engineers deal with things that move and use energy. CUA offers up-to-date design, laboratory, and computer experiences.

Research concentrations include:
  - Dynamics, Controls, Vibrations, Experimentation, MEMS, NEMS
Fluid Mechanics, Heat Transfer, Combustion, Thermodynamics, Environmental Engineering
Acoustics, Vibration, Design, Experimentation, MEMS, NEMS
Mechanics, Computational Mechanics, Reliability, Design, Experimentation, Finite Element Analysis, Electronic Packaging, MEMS, NEMS
Solar Winds, Magneto-hydrodynamics, Applied Mathematics

Geographical

There is no geographic limitation in the Engineering collection development.

Language

Works are collected primarily in English; materials in other languages are acquired only by specific request.

Publication Dates

Materials published recently are collected. Older titles are acquired by specific request.

Formats

Collection development in Engineering involves coordination with other disciplines including Math, Physics and Architecture. The interdisciplinary subjects include the science of materials, optics, nanotechnology engineering construction and project management. Added copies of heavily used titles are acquired as availability and budget allow.

Research level monographs and some textbooks are acquired. Research journals and serials constitute a large portion of the Engineering collection. Serials decisions are made in conjunction with the University Libraries CERT committee and procedures. Serials, abstracts and indexes, electronic resources, and conference proceedings and dissertations are part of the collection. A growing number of resources are available in electronic formats; decisions to collect in e-format are made on a title by title basis. Reference materials may be selected in electronic format for greater access. Audio-visual materials have not been collected.

Subjects

Materials that support the study of Engineering appear mainly in the T section of Library of Congress classification. Materials are collected generally in LC Classification Description:

T Technology (General)

Materials are collected specifically at advanced research levels for in the following LC Classification Descriptions:

TA Engineering (General). Civil engineering
TA164  Bioengineering
TA165  Engineering instruments, meters, etc.  Industrial instrumentation
TA166-167  Human engineering
TA168  Systems engineering
TA170-171  Environmental engineering
TA174  Engineering design
TA177.4-185  Engineering economy
TA190-194  Management of engineering works
TA197-198  Engineering meteorology
TA213-215  Engineering machinery, tools, and implements
TA329-348  Engineering mathematics.  Engineering analysis
TA349-359  Mechanics of engineering.  Applied mechanics
TA495  Disasters and engineering
TA501-625  Surveying
TA630-695  Structural engineering (General)
            Underground construction
TA715-787  Earthwork.  Foundations
TA800-820  Tunneling.  Tunnels
TA1001-1280  Transportation engineering
TA1501-1820  Applied optics.  Photonics
TA2001-2040  Plasma engineering.  Applied plasma dynamics

TC  Hydraulic engineering.  Ocean engineering
TD  Environmental technology.  Sanitary engineering
TE  Highway engineering.  Roads and pavements
     Highway engineering.  Roads and pavements
     Highway design.  Interchanges and intersections
     Roadside development.  Landscaping
     Materials for roadmaking
     Location engineering
     Construction details
     Including foundations, maintenance, equipment
     Pavements and paved roads
     Streets
     Pedestrian facilities
     Sidewalks.  Footpaths.  Flagging
     Curbs.  Curbstones
TF  Railroad engineering and operation
TG  Bridge engineering
TH  Building construction
TH1-9745  Building construction
TH845-895 Architectural engineering; Structural engineering of buildings
TH900-915 Construction equipment in building
TH1000-1725 Systems of building construction
Including fireproof construction, concrete construction
TH2025-3000 Details in building design and construction
Including walls, roofs
TH3301-3411 Maintenance and repair
TH4021-4977 Buildings: Construction with reference to use
Including public buildings, dwellings
TH5011-5701 Construction by phase of the work (Building trades)
TH6014-6081 Environmental engineering of buildings. Sanitary
engineering of buildings
TH6101-6887 Plumbing and pipefitting
TH7005-7699 Heating and ventilation. Air conditioning
TH7700-7975 Illumination. Lighting
TH8001-8581 Decoration and decorative furnishings
TH9025-9745 Protection of buildings
Including protection from dampness, fire, burglary

TJ Mechanical engineering and machinery
TJ163.13-163.25 Power resources
TJ163.26-163.5 Energy conservation

TK Electrical engineering. Electronics. Nuclear engineering
TK5101-6720 Telecommunication
Including telegraphy, telephone, radio, radar, television
TK7800-8360 Electronics
TK7885-7895 Computer engineering. Computer hardware
TK8300-8360 Photoelectronic devices (General)

TL Motor vehicles. Aeronautics. Astronautics
TL500-777 Aeronautics. Aeronautical engineering
TL780-785.8 Rocket propulsion. Rockets
TL787-4050 Astronautics. Space travel

TN Mining engineering. Metallurgy

TP Chemical technology
TP480-498 Low temperature engineering. Cryogenic engineering.
Refrigeration

TR Photography
TR624-835 Applied photography
Including artistic, commercial, medical photography,
photocopying processes
TR925-1050 Photomechanical processes
Materials that support the study of Computer Science appear mainly in the QA 75-76 section of Library of Congress classification. Materials are collected generally in LC Classification Description:

Q Science
QA Mathematics

Materials are collected specifically at advanced research levels for in the following LC Classification Descriptions:

Q 300 Cybernetics
QA 75.5 - 76.95 Computer Science
QA 76.6 Computer Programming
QA 76.7 Programming Languages
QA 76.75 Computer Software
QA 76.8 Computers A-Z
QA 76.9 Other Topics A-Z
TK 5105 Web Technology

General

The preference by researchers and students in the sciences is to provide electronic access to research serials. Reference materials in Engineering are beginning to be collected in eBook format. The current nature of the scientific serials is expensive. The University Libraries are working with publishers and the departments involved in the sciences to provide documents on demand as requested and as funding allows. Most pre-1990 journal literature is housed at WRLC.