

Iowa State University Library  
Collection Development Policy  
Electrical and Computer Engineering

## **I. General Purpose**

The collection supports the faculty and students—including off-campus graduate students—of the Department of Electrical and Computer Engineering in their research and curriculum needs. In addition, there are other programs at Iowa State University whose students and faculty use this collection.

## **II. History (based on ECpE Web site section by C. James (Jolly) Triska)**

Courses in electricity, electro-magnetism, electrical measurements and telegraphy were taught within the Department of Physics from 1869 to 1891. In 1891 the Department of Physics and Electrical Engineering was created within Iowa State College. In 1909, the Department of Physics and Electrical Engineering was split into separate disciplines. The Department of Physics remained within the Division of Science and the Department of Electrical Engineering was placed in the Division of Engineering.

In 1939, the world's first electronic digital computer was built by Iowa State physics professor John Atanasoff and electrical engineering graduate student Clifford Berry.

In 1948, Professors Warren B. Boast, John D. Ryder, and George R. Town planned the construction of a Network Analyzer, a scaled model of an actual electrical generation and distribution system. With funding by several Iowa based utilities, the actual construction began in 1949, was completed in 1950, and was constantly improved until about 1970. At that time, modeling power networks with digital computers became more economically feasible than using the Network Analyzer.

One of the highlights of the Electrical Engineering Building completed in 1950 was the new power lab. The power machines laboratory was, in 1950, considered by many to be the most modern and well laid out student power laboratory in the country. In 1994, forty-four years later, the power laboratory was removed and a Learning Complex was constructed in its place. The Electrical Engineering building was named Coover Hall in about 1968. Prof. Mervin S. Coover was the Head of the Electrical Engineering Department from 1935 to 1954.

In 1956, Iowa State University started construction of a large-scale digital computer patterned after the Illiac machine at the University of Illinois. Immediately upon its completion, the ISU Cyclone Computer underwent a number of changes including a memory size increase to 16,384 40-bit words. With the help of many Master and PhD graduate student candidates, the Cyclone Computer underwent many modifications and improvements until the middle 1960s when it was retired and replaced by the Symbol Computer.

When Iowa State College became a University, the Divisions became Colleges. The Department underwent two more name changes. For a short time, the official name was Department of Electrical Engineering and Computer Engineering, but in 1984, it was changed again to Department of Electrical and Computer Engineering. In 1989, the Charles W. Durham and Margre Henningson Durham Center for Computation and Communication opened; some of the Department's office and laboratories are in the Durham Center.

In 2006, researchers brought CyBlue, an IBM Blue Gene/L supercomputer to Iowa State. The computer ranked among the world's 100 most powerful computers at the time it was acquired. Work also began on renovation and expansion of Coover Hall. In 2007, the undergraduate software engineering degree program (administered with the Department of Computer Science) was launched.

### **III. Iowa State University Program (from the 2007-2009 Iowa State University Bulletin)**

#### Undergraduate Study

The Electrical and Computer Engineering (ECpE) Department at Iowa State University offers undergraduate curricula leading to the degree bachelor of science in electrical engineering, computer engineering, or software engineering.

The computer engineering curriculum offers emphasis areas in computer architecture, software engineering, information security, networking, concurrent systems and VLSI. Students may also take elective courses in control systems, electromagnetics, microelectronics, VLSI, power systems, and communications and signal processing.

The electrical engineering curriculum offers a number of emphasis areas at the undergraduate level, including control systems, electromagnetics, microelectronics, VLSI, power systems, and communications and signal processing. Students may also take elective courses in computer networking, security, computer architecture, digital systems, and software.

The software engineering curriculum, jointly administered by the Electrical and Computer Engineering Department and the Computer Science Department, provides undergraduate students with the opportunity to learn software engineering fundamentals, to study applications of the state-of-the art software technologies, and to prepare for the practice of software engineering. The software engineering curriculum offers emphasis areas in software engineering principles, process, and practice.

#### Graduate Study

The Department offers work for the degrees master of science and doctor of philosophy with major in computer engineering or electrical engineering and minor work to students

with other majors. The Department also offers a graduate certificate in electric power systems engineering.

The Department of Electrical and Computer Engineering participates in the following interdepartmental graduate problems: minor in Complex Adaptive Systems, M.S. and Ph.D. degree programs in Bioinformatics and Computational Biology, and the M.S. in Information Assurance program..

#### **IV. Subject Boundaries**

This collection includes materials classed in the Library of Congress call number ranges listed in Section XII below. Additional materials are chosen for the collection as needed to support teaching and research in the Department of Electrical and Computer Engineering. Some materials with LC call numbers in the listed ranges may be more appropriate for other collections, most commonly Computer Science, General Engineering, or Reference.

Research-oriented works on the technology of the Internet and on computer networking are relevant to the Electrical and Computer Engineering collection, while secondary literature on these topics is generally in the purview of the General Engineering collection.

#### **V. General Collection Guidelines**

##### **A. Linguistic.**

English is the primary language of the collection, though works in other languages may be selected if they are of sufficiently high quality or interest.

##### **B. Geographical Areas.**

No geographical areas are excluded, as engineering research is worldwide. Works which emphasize the law, regulations or standards that apply in the United States are collected more comprehensively than those emphasizing the law, regulations or standards specific to any other country or group of countries not including the United States.

##### **C. Types of Materials Collected.**

Monographs, monographic series, journals, proceedings, society publications, and handbooks are purchased to support research, teaching and learning. Society publications are well represented. Periodicals represent a large part of the collection. Theses and dissertations produced at Iowa State University are comprehensively collected under an arrangement between the ISU Library and the Thesis Office. Indexes, abstracts and other reference materials are collected under a separate policy for Reference.

#### D. Format of Materials Collected

Online versions of materials in this collection are preferred as long as their quality, price, archiving options and licensing conditions meet the Library's needs. No format is excluded except in cases when special equipment not owned by the Library would be needed to use the work in question.

### **VI. Specific Collection Guidelines**

In general, a conscious effort is made to acquire the monographic and serial literature that supports the broad and specific research interest of departmental faculty. In addition, ISU interlibrary loan reports are systematically reviewed on a semi-annual basis to identify the current and emerging needs and interests of faculty and staff associated with the Department.

### **VI. Detailed Subject Areas**

The following areas reflect the current research directions of the Department of Electrical and Computer Engineering:

#### Strategic Research Areas

To meet the challenge of the future and to carry out the cutting-edge research for the betterment of society, the ECpE Department has identified five strategic areas in which the department will invest and spend its energy. These areas are:

- Bioengineering
- Cyber Infrastructure
- Distributed Sensing and Decision-making
- Energy Infrastructure
- Small-scale Technologies

#### Core Research Areas for Graduate Study

To impart undergraduate and graduate education in the core areas of electrical, computer, and software engineering, the ECpE Department is organized according to the following nine research areas:

- Communications and signals processing
- Computing and networking systems
- Electric power and energy systems
- Electromagnetic, microwave, and nondestructive evaluation
- Microelectronics and photonics
- Secure and reliable computing
- Software systems

- Systems and controls
- VLSI

#### Research Centers and Institutes

Iowa State provides first-rate facilities and support for conducting innovative research. Below are the eleven centers and institutes on campus for electrical and computer engineering:

- Ames Laboratory
- Center for Nondestructive Evaluation (CNDE)
- CyberInnovation Institute
- Electric Power Research Center (EPRC)
- Information Infrastructure Institute
- Information Assurance Center
- Institute for Physical Research and Technology (IPRT) Centers
- Microelectronics Research Center (MRC)
- Plant Science Institute and L.H. Baker Center
- Power Systems Engineering Research Center (PSERC)
- Virtual Reality Applications Center (VRAC)
- VLSI Design Center

#### Laboratories

The ECpE Department has more than a dozen technical and general computer labs especially for electrical and computer engineering students and faculty to use, as well as several specialized research laboratories.

- Computer labs
- Control Engineering Education Lab
- Dependable Computing and Networking Laboratory
- Discrete Event Systems Lab
- High-Speed Communications Carver Laboratory
- High Speed Systems Engineering Laboratory
- iCube Wireless and Sensor Networking Laboratory
- NanoDynamics Systems Lab
- RF/Microwave Circuits and Systems Laboratory
- Rockwell Automated/Allen Bradley Power Electronics and Drive Systems Lab

#### **VII. Other Resources Available**

##### IEEE

IEEE, originally the of Electrical and Electronics Engineers, promotes the engineering process of creating, developing, integrating, sharing and applying knowledge about

electrical and information technologies and sciences for the benefit of humanity and the profession. From its earliest origins, IEEE has advanced the theory and application of electrotechnology and allied sciences, served as a catalyst for technological innovation and supported the needs of its members through a wide variety of programs and services. It is the world's largest technical professional society with more than 370,000 members. IEEE publishes a large proportion of the world's literature in electrical engineering and computer science, including journals, conference proceedings, standards, and monographs. Their web site, <http://www.ieee.org> , includes information on their publications. IEEE and IET together publish the IEEE/IEE Electronic Library.

#### The Institution of Engineering and Technology (IET)

Formed in 2006 by the Institution of Electrical Engineers (IEE) and the Institution of Incorporated Engineers (IIE), the Institution of Engineering and Technology (IET), , the largest professional engineering society in Europe, represents the public, professional and educational interests of over 150,000 engineers and technologists world-wide. Key activities include publishing, the organization of conferences, the maintenance of technical standards, interaction with government departments and the provision of scientific and technical information services. The Institution is a major information provider through its publishing operation and Inspec database. The IET web site is <http://www.theiet.org/>.

#### Association for Computing Machinery (ACM)

Founded in 1947, ACM is the world's first educational and scientific computing society, with a membership of over 82,000 computing professionals and students world-wide. ACM provides publications, conferences, and leadership, as well as the ACM Digital Library with bibliographic information, abstracts, reviews, and the full-text for articles published in ACM periodicals and proceedings dating back to the 1950s. The ACM web site is <http://www.acm.org/>.

### **IX. Cross-references to Collection Policies**

- Computer Science
- General Engineering
- Reference

### **X. Creation date**

2000 (Kristine K. Stacy-Bates)

### **XI. Revision History**

2007 (Kristine K. Stacy-Bates)

### **XII. LC Ranges**

TA1630-1650

TK1-5104.2

TK5107-8404

TK9900-9971

**XIII. Bibliographer name**

Kristine K. Stacy-Bates