The Irvin E. Houck Center for Information Technology

Information Technology at Oberlin College

Information technology is integral to the educational mission of Oberlin College. The College encourages students and faculty in all disciplines to employ computers and related technology in pursuit of their academic objectives. The staff of the Irvin E. Houck Center for Information Technology takes pride in providing a wide array of technology resources and support services to Oberlin's diverse academic community

The Center maintains about 300 Macintosh and Windows computers in general-purpose labs, public work areas and departmental labs spread across the campus. All Macs run the latest version of Mac OS X, and the Windows computers use Windows XP Pro. The most public computers are located on the A-level of the Seeley G. Mudd Center. Students use machines in the public areas for a host of academic tasks, including writing papers, performing statistical analysis, computer programming, email, browsing the World Wide Web, and doing course assignments on discipline-based software.

Oberlin also maintains computer labs dedicated to the curricular concerns of particular departments and programs. Among these more specialized facilities are computer labs for art, biology, chemistry, computer science, geology, the modern foreign languages, physics, psychology, and the social sciences in the College of Arts and Sciences and for TIMARA in the Conservatory of Music.

Although Oberlin does not require students to possess their own personal computers, over 95% currently do. All students residing in College residence halls and OSCA co-ops can connect their personal computers to the campus-wide data network the Internet at no charge. Students may also connect wireless equipped computers to the network using our wireless services available from many parts of campus, including residence hall common areas.

Every student is provided with an electronic mail account, and web accounts are available on request.

To learn more about Oberlin's technological resources, visit Oberlin Online at: http://www.oberlin.edu/cit/
If you have questions about the Houck Center for Information Technology and its services, please feel free to contact John Bucher, Director of Information Technology (phone: 440-775-6727; e-mail: John.Bucher@oberlin.edu).

Curricular Applications of Computing Resources

Art – The Art Department has recently expanded its curriculum to include courses in Interactive Multimedia, Digital Video Production, Digital Photography, and Media Installations. These courses employ digital technologies as a tool in art making processes and as a means of exploration into the aesthetic and theoretical potential of these new media.

Biology – In Bio 120, a core course, the science librarian teaches students how to conduct computer-based literature searches. These skills are further developed in upper level courses when students use computerized databases to locate primary literature for their term papers. In Bio 328 and Bio 333 students access web sites of scientific companies to obtain needed technical information about the reagents they use in lab exercises, and in Bio 305 they access genomic information from public databases on the web. In Bio 214, another core course, students locate web resources telling them how to handle and dispose safely of hazardous chemical and biological materials. They also explore medical databases detailing the molecular basis of genetic diseases. Students are introduced to computerized data analysis in the core courses. In upper level courses students learn to use statistical and graphical software to analyze and display data generated in the laboratory. In Bio 328 and Bio 333, students use computers to capture data directly from research equipment, and then analyze and graphically display it. In the physiology courses (Bio 312, 313, and 314) students analyze the structure and function of particular proteins using databases and computational tools associated with the Human Genome Project, and computer models allow students to perform "virtual" experiments, e.g., testing the human body's renal response to drinking water. In Developmental Biology students use an interactive computerized animation of events that occur during development of the embryo, and in Virology students utilize interactive tutorials, "virtual" experiments (such as virus growth) and computer-generated animations of virus structures, and viral infection of cells. Immunology students use computers to access the textbook accessory materials (study questions, related readings, etc) that are available on-line only. In several courses students can download PowerPoint presentations from lecture as well as answers to problem sets.

Chemistry/Biochemistry – Computers are used at all levels of the chemistry program. A computer laboratory equipped with iMac G5 computers is located in the Science Center adjacent to the Chemistry Department. These computers are set up with software used in chemistry courses and general use applications. Molecular modeling is used in many courses to examine the structures of simple inorganic and organic molecules, coordination complexes, ionic solids, and small proteins. Organic chemistry students use computers to learn about nomenclature, structure, spectroscopy, and reactions of organic compounds. Physical and analytical chemistry students and biochemistry students rely on spreadsheets and graphing programs to facilitate data analysis. In the chemical information course, computers are used to access information from Chemical Abstracts and other databases and to process and present information. In the advanced organic chemistry course, students perform molecular mechanics and molecular orbital calculations. High-end workstations are used in fitting high-resolution infrared spectra and in the theoretical treatment of molecular vibrations as well as ab initio studies of interactions between atoms and molecules. The department also houses an NSF-funded 70-node parallel computational cluster, which is used by several student-faculty teams in their research. Each node in the supercomputer consists of dual 64-bit Opteron processors with 4 GB of memory and gigabit ethernet connectivity. The cluster possesses an 8 terabyte disk array for large scale data storage. It is also used by students in a physical chemistry course to calculate various quantum mechanical properties of molecules, including vibrational frequencies, three-dimensional geometries, electronic energies, rotational constants, and NMR parameters.

Classics —Virtually all of the classical texts are available for qualitative and stylistic studies on CD-ROM in Greek (via the Thesaurus Linguae Graecae) and in Latin (from the Packard Humanities Institute). Students may also study Greek civilization using the multimedia database of the Perseus Project on the web.

Computer Science — The Computer Science Program has two computer labs available to students in its courses and to others upon request. It also makes use of the Computing Center's Macintosh labs for some of its non-major courses. The Computer Science labs are located in King 201 and King 135 (24 and 20 dual boot machines Linux and Windows 2000 with hardware graphics acceleration). The CS Program also has a fast central server computer running Unix (AlphaServer 1200) and an NT server, both of which can be accessed from the lab machines and from elsewhere on campus. Programming environments or compilers are available for most current and popular programming languages: C, C++, Java, Scheme, Prolog, and many others.

East Asian Studies – Mac OS 9, which is loaded on computers in the Language Lab available to students, has built-in language kits, fonts, and keyboard layouts for both Chinese and Japanese, allowing students to word-process and visit Chinese and Japanese language web sites. For e-mail with Chinese or Japanese, students now use hotmail accounts with the language kits. We also have access to a large collection of Chinese Quicktime movies created at Middlebury College for the study of everyday situations (and the conversation that transpires in those situations) on a CD for the Macs. There is also a series of conversations in Japanese (again, everyday dialogues) produced by Carnegie Mellon that are available for teacher and student use. Elementary and Intermediate classes in Japanese use the software for our textbook GENKI. The standard machines in the language lab have the ability to utilize DVDs, which have multiple language tracks built in. More and more of the "less commonly taught" languages are appearing on DVD tracks.

Economics — Computers are used extensively in the economics program. Intel-based PCs running WindowsXP are used by all members of the department; potential majors should keep this in mind when purchasing their own microcomputers. Many of the faculty make extensive use of on-line course materials, and course syllabi can be found via the departmental home page. Spreadsheet software (Excel), statistical packages (EViews), and mathematical modeling programs (Mathcad and Mathematica) are commonly used software packages. Students have access to high-powered PCs in the Computing Center's DOS/Windows laboratory and the Social Science Data Laboratory. Students taking research seminars or working as assistants on faculty research projects can also take advantage of a growing CD-ROM library maintained both by the department and the Main Library.

Geology – Computers are integral to visualizing geological features and to gathering and analyzing geological data. Since geology is a highly visual science, faculty routinely use digital images, digital videos, and/or custom graphics created using *Canvas*, *Illustrator*, or *Photoshop* to augment classroom and laboratory *PowerPoint* presentations. We have digital camera systems fitted to our research and teaching microscopes, including the College's scanning electron microscope (which is housed in Geology). Two of those camera systems are configured for simultaneous web broadcasting. Laboratory work in geology classes and student-faculty research is increasingly dependent on digital data and computer-based modeling. For example, faculty and students regularly use standard image analysis software to characterize images of geological materials. In other instances, students and faculty measure the positions and orientations of geological features in digital format (i.e. using GPS or electronic surveying equipment) and characterize their properties using computer-based statistical tools. We also use ESRI ArcView and similar programs to compile those measurements, to construct maps and cross sections, to examine three-dimensional rock and crystal structures, to collect and manage water-well data, and to organize data and model geologic processes. We have an in-house computational facility consisting of 4 GIS workstations with appropriate input and output hardware. We are assembling digital maps, air photos, etc. for use in exercises that focus on local or representative examples of geologic systems. We expect to broaden the use of these facilities to include other disciplines, notably hydrogeology, in the coming year.

History – The History Department uses information technology in a variety of ways: to provide multimedia classroom instruction; to access electronic resources on the World Wide Web; to search historical databases available through special subscription; to teach historical methods and analysis; and to communicate with students at all hours of the day and night. Many history courses make use of PowerPoint, online syllabi, electronic reserve, and Blackboard to enhance students educational experience both inside and outside the classroom.

Mathematics – Computers are used routinely in many mathematical fields, such as calculus, analysis, statistics, geometry, discrete mathematics, operations research, number theory, and differential equations. Mathematics students and faculty use sophisticated software, such as Mathematica, for both computation and visualization purposes. Statistics students use DataDesk for exploratory data analysis; students studying chaotic systems use spreadsheets and other software to investigate discrete dynamical systems and fractals; operations research students use CPLEX and OPL to solve linear, integer, and constraint programming problems.

Neuroscience — Neuroscience computers are used routinely to operate and gather data from various scientific instruments in the laboratory. They are used for image analysis of microscopic material, for the analysis of electrophysiological data, for the operation of instruments such as our high performance liquid chromatograph, for the testing of animals in behavioral situations and for the statistical analysis of data. In addition, we use various simulation programs to study neuroanatomy and to analyze neuro-physiological and neuropharmacological phenomena and some of the Neuroscience professors do computer modeling of neural networks.

Physics — The Wright Laboratory of Physics houses roughly 60 computers. Of these, 40 are used in the physics laboratory courses for acquiring and analyzing data. Eighteen of these are generally available to majors for use outside of laboratory hours. Available software includes LabView, Electronics Workbench, Mathematica, e-mail and web browsers, Microsoft Office, and numerous other networked applications supported by the Center for Information Technology. Computers are used for simulations, for symbolic manipulation of mathematical formulae, for data analysis and graphing, for experimental control, and for other purposes.

Psychology – Computers play a vital role in the Psychology Department. A computer laboratory consisting of 18 Windows PCs is available to psychology students. First and foremost, these machines are used for analysis of data, primarily with SPSS statistical software (which is used extensively in Research Methods courses [Psych 200 and 300] and most laboratory courses). The lab computers also run SuperLab, a software package that allows students to author and execute computer-based psychological experiments. Throughout the

department, numerous other Windows and Macintosh computers are devoted to tasks including classroom presentation, research instrument control, stimulus preparation and presentation, data acquisition, and specialized analyses in perception, cognition, and psychophysiology laboratory facilities.

Sociology – The Sociology Department uses computers in its courses on social research methods and data analysis as well as in other courses such as gender stratification. The department is a founding member of the Social Science Data Lab, which has about 20 computers and is located in the main classroom building. This lab is used by students for their research and class assignments, and is used for teaching as well. Software that is utilized includes SPSS. Class projects involve survey data collection, hypothesis testing, and analysis of national datasets. Students are encouraged to construct their own research designs and conduct independent research. Some students work with faculty members on their research, which often includes computer assisted data analysis.

Theater and Dance – Computer technology is being used most heavily in the design-technical areas. Professional staff members are using the new technology to reduce the amount of time spent on the more mundane tasks of scheduling and budgeting. The recent acquisition of a pen plotter allows for in-house computer aided design and drafting. Light plots are being generated as well with theater specific software. Video/midi/multi-media work is being taught in the area of dance and performance art in conjunction with the Art Department and the Conservatory's TIMARA (electronic music) department. There are also many opportunities for students to work one-on-one with faculty and staff on computer-related projects. Computers have worked their way solidly into the daily operations of the Theater and Dance Program especially in terms of communications and planning.

TIMARA (Conservatory of Music) – Computers play a central role in the Technology in Music & Related Arts Department. Although the TIMARA Department stresses technological mastery, at its heart is music composition and the creation of digital artwork. TIMARA students follow a four-year curriculum leading to a bachelor of music degree. After a two-year introductory sequence, students participate in seminars and special topic courses. Course work emphasizes a variety of commercial and public-domain software for composition, notation, sequencing, sampling, interactive performance, sound/video editing, internet authoring, and electronic publishing. There are five TIMARA studios as well as a public laboratory. Each facility houses Macintosh and PC computers, synthesizers, digital recording and mixing equipment, and professional monitoring systems. The Media Studio is home to equipment for producing professional quality material on CD, Video, and DVD.

Revised 2/2007