

Table 1. The relationship between courses and EDA tools (P: PC, M: MAC, U:Unix Workstation, T: Engineering Technology only).

Course	Mentor Graphics ^U	Viewlogic PowerView ^U / WorkView ^{P,U}	Low Cost Tools	Others
Logic Design	Design Architect Quicksim II Autologic II	Viewdraw Viewsim Xilinx Interface	Espresso ^U PADS-Logic ^P B ² Logic ^{P,M}	Logic Works ^{P,M} Design Works ^M OrCAD Capture ^P Max+PlusII ^P Xilinx ^P MACHXL 3.0 ^P Cupl Universal Logic Compiler ^P Abel-FPGA ^P
Introductory Circuits	Design Architect Accusim	Viewdraw Viewsim	MicroSim Design Center ^P B ² Spice ^{P,M}	Spice ^{P,U} Microcap IV ^{P,U} MicroSimDesign Center ^{P,U} OrCAD ^P FutureNet ^P P-CAD Master Designer ^{P,U}
Electronics	Design Architect Accusim Board Station Autotherm ^T	Viewdraw Viewsim	MicroSim Design Center ^P B ² Spice ^{P,M} Pisces ^P	Spice ^{P,U} Microcap IV ^{P,U} MicroSim Design Center ^{P,U} OrCAD ^P Futurenet ^P P-CAD Master Designer ^{P,U}
Computer Systems/ Computer Architecture	Design Architect Quicksim II Board Station System 1076	Viewdraw Viewsim	Any VHDL or Verilog tool	Cadence Verilog ^U VHDL ^U
Microprocessor Design	Design Architect Quicksim II Boardstation Autologic II	Viewdraw Viewsim Xilinx Interface		DesignWorks ^M

VLSI	IC Station GDT Designer Autologic II System 1076 Quick Grader Fault Simulator	VHDL Xilinx Interface	Octtools ^U Magic ^{P,U} Irsim ^U Spice ^{P,U} MPLA ^U Espresso ^U	Cadence Verilog ^U VHDL ^U Suprem III ^U L-Edit ^P
DSP	DSP Station		Hyper 2.0 ^U	TI DSP Tools ^{P,U} Motorola DSP tools ^P AT&T DSP-32 ^{P,U} SPW (Comdisco System) ^U

Table 2: Schematic Capture and Printed Circuit Board Layout Tools

Tool Name	Vendor	Characteristics	Comments
Tango Schematic	ACCEL Technologies San Diego, CA (800) 488-0680 Cost: \$595 http://www.xmission.com/~mmol/md85.html	Schematic capture	Runs on PCs
AutoCAD	Autodesk 2320 Marinship Way Sausalito, CA (800) 964-6432 Cost: Call http://www.autodesk.com	Exceptionally comprehensive drawing tool for 2D and 3D schematics	Runs on PCs
B²Logic B²Spice	Beige Bag Software Ann Arbor, MI (313) 663-4309 Cost: \$149 each on educational discount (\$35-\$55 for students); site licenses available	Schematic capture, digital and analog simulation	Runs on Windows and Macintosh

P-CAD Master Designer	ACCEL Technologies San Diego, CA (800) 488-0680 Cost: \$7495 Educational discount available http://www.xmission.com/~mmol/md85.html	Schematic capture and layout	Runs on PC
LogicWorks	Capilano Computing New Westminister, BC, Canada (604) 522-6200 Available thru Addison-Wesley (approx \$50) http://www.capilano.com	Schematic capture and digital simulation tool with library of behavioral models for 7400 series as well as analog part symbols	Runs on PCs and Macs; multiple open window capability with cut/paste, symbol editing
FutureNet	Data I/O Redmond, WA (800) 332-8246 Cost: \$495 (no educational discount) http://www.data-io.com	Schematic capture tool including all major FPGAs in symbol library	Runs on PCs and workstations; interfaces easily with ABEL-FPGA
Design Works	Douglas Electronics San Leandro, CA (510) 483-8770 Cost: \$995 (without simulation) \$1295 (with simulation)	Schematic capture and simulation for digital circuits	Macintosh only
SuperCAD SuperPCB	Mental Automation Bellevue, WA (206) 641-2141 Cost: As low as \$149 (educational discount available) http://www.mentala.com	Schematic entry and PCB layout tools; autorouting and autoplacement up to 16 layers	Runs on PCs (under Windows)
Design Architect	Mentor Graphics Corporation, Wilsonville, OR. (503) 685-7000 Cost: \$2100/yr for 10 licenses with educational discount; this fee covers all Mentor products. http://www.mentorg.com	Schematic capture for digital or analog. Full-featured.	Runs on Sun and HP workstations.
Board Station	Mentor Graphics Corporation (see above)	PC Board layout. Full-featured.	

OrCAD Capture OrCAD Layout	OrCAD Hillsboro, OR (503) 690-9881 Cost: \$199 (Capture) \$750 (Layout) (educational discount pricing) http://www.orcad.com	Schematic capture, PCB layout	Runs on Windows PCs
PADS-PowerPCB	PADS Software Marlboro, MA (508) 485-4300 Cost: As low as \$1595 (educational program available) http://www.primenet.com/ ~cadware/pads.html	PCB Layout tool	Runs on PCs (Windows 95, NT) and UNIX
PADS-Logic	PADS Software (see above) Cost: \$750 (educational program available)	Schematic capture tool	Runs on PCs (DOS and Windows 3.1) and UNIX
PADS-Work	PADS Software (see above) Cost: \$995 (educational program available)	PCB Layout tool	Runs on PCs (DOS and Windows 3.1) and UNIX
CFPCB	Phase Three Logic Beaverton, OR (503) 645 0313 Cost: Call (educational discount available) http://www.aue.com/cobra/ Capfast/capfast.html	PCB layout and routing tool	Runs on PCs;
CapFast	Phase Three Logic (see above) Cost: Call (educational discount available)	Schematic capture	Runs on PCs or workstations; interfaces to popular simulators
Cadstar PCB Cadstar Schematic Capture Cadstar Advanced Router	Zuken-Redac, Inc Westford, MA (508) 692-4900 Cost: \$995 (without educational discount) http://www.redac.co.uk	Schematic capture; PCB layout; PCB router	Runs on PCs; router runs on workstations
MAXI/PC	Zuken-Redac, Inc (see above)	Schematic capture and PCB layout package	Runs on PCs

Scepter Core Module	Royal Digital Centers James Lass Santa Clara, CA (408) 323-8080 Cost: \$9000	Panelization, DRC, drill and route, board testing, assembly	A comprehensive concurrent engineering tool which supports complete PCB development through the fabrication and assembly steps; runs on workstations.
Viewdraw	Viewlogic Systems Marlboro, MA (508) 480-0881 Cost: \$1500/yr educational for entire suite of tools http://www.viewlogic.com	Schematic capture	Runs on PCs (Workview) and workstations (Powerview)

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Table 3: Simulation Tools

Tool Name	Vendor	Characteristics	Comments
Susie	Aldec Newbury Park, CA (800) 487-8743 Cost: \$995 (educational discount available)	Schematic entry tool and logic simulator for ASIC and PLD development including FPGAs; fault simulation	Runs on PCs
Saber	Analogy Beaverton, OR (503) 626-9700 Cost: \$1500/year includes maintenance hot line (educational gift license agreement) http://www.analogy.com	Differential equation solver; Simulator for analog, digital and mixed mode; electrical and non-electrical systems	Runs on workstations; libraries include mechanical, automotive and parameterized electrical models
B²Logic B²Spice	Beige Bag Software Ann Arbor, MI (313) 663-4309 Cost: \$149 each on educational discount (\$35-\$55 for students); site licenses available	Digital and analog simulation	Runs on Windows and Macintosh
DLsim	CADsim Technologies 525 Melbourne Court Newbury Park, CA (805) 499-8653 Cost: \$495 no educational discount	Digital logic simulator	Runs on PCs; compatible with OrCAD/EDV or Schema III schematic entry tools;
LogicWorks	Capilano Computing New Westminster, BC, Canada (see above) (604) 522-6200 Cost: Approximately \$50 (through Addison Wesley) http://www.capilano.com	Schematic capture and digital simulation tool with library of behavioral models for 7400 series as well as analog part symbols	Runs on PCs and Macs; multiple open window capability with cut/paste and symbol editing
ICAP/4	Intusoft San Pedro, CA (310) 833-0710 Cost: Call (20% discount educational program) http://www.intusoft.com	Analog or mixed mode circuit simulator; schematic front end and graphical post-processor	Runs on PCs (Windows or NT) and Macs

IRSim	Part of Magic Layout tool (see below) http://www.research.digital.com/wrl/projects/magic/desc.html	VLSI switch level simulator	Runs on workstations
MUSA	Part of Octtool suite (see below)	Logic simulator	Runs on workstations
Quicksim II	Mentor Graphics Corporation, Wilsonville, OR. Sue Drouin (800) 592-2210 Cost: \$2100/yr for 10 licenses with educational discount; this fee covers all Mentor products. http://www.mentorg.com	Logic simulator. Full-featured.	Sun and HP workstations.
Accusim II	Mentor Graphics Corporation (see above)	Analog simulator	
HSpice	Meta-Software Campbell, CA (800) 346-5953 Cost: As low as \$700 12%/year maintenance (PC version, educational program) http://www.metasw.com	Analog simulator	Runs on PC or workstation; requires third party schematic entry tool
Simulate for Windows	OrCAD Hillsboro, OR (503) 690-9881 Cost: \$499 with educational discount http://www.orcad.com	Logic simulator	Runs on Windows PCs
Silos III	Simucad Union City, CA (510) 487-9700 Cost: As low as \$3000 (without educational discount) http://www.simucad.com	Logic and fault simulator for ASICs, PLDs and FPGAs	Runs on PCs and workstations
Microcap IV	Spectrum Software, Inc. Sunnyvale, CA (408) 738-4387 Cost: \$60 (licensed to Addison Wesley)	Analog circuit simulator	Runs on PCs; student edition (\$60 dollars with text) is limited to 50 nodes and includes Monte Carlo

Gatesim	Tanner Research, Inc. Bhushan Mudbhary Pasadena, CA (818) 792-3000 Cost: \$325 (educational discount) http://www.tanner.com	Logic simulator	Runs on PCs; part of the Tanner Tools.
Suprem III	Center for Integrated Systems Stanford University (415) 723 2300 Cost: Media http://aramis.stanford.edu/cis	Fab process modeling	Runs on workstations
Pisces	Center for Integrated Systems Stanford University (415) 723 2300 (see above) Cost: Media	Device simulation	Runs on workstations
Viewsim	Viewlogic Systems Marlboro, MA (508) 480-0881 Cost: \$1500/yr educational for entire suite of tools http://www.viewlogic.com	Logic, analog and behavioral simulator	Runs on PCs (Workview) and workstations (Powerview)

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Table 4: Programmable Logic Devices Design Tools

Tools Name	Vendor	Characteristics	Comments
Action Logic System	Actel Sunnyvale, CA (408) 452-8700 Cost: \$1995 (educational program available) http://www.actel.com	FPGA programming tool	Runs on PC and workstation
MACHXL 3.0	Advanced Micro Devices Sunnyvale, CA Phone: local distributor Cost: Call (educational program available) http://www.amd.com	Design tool for all AMD PLDs	Runs on Windows 3.1 PCs
Max+Plus II	Altera San Jose, CA (408) 984-2800 Cost: Free in educational program http://www.altera.com	Design entry (schematic and HDL), simulation, place and route for Altera CPLDs	Runs on PCs and workstations
XACT Design Implementation System	AT&T Microelectronics Allentown, PA (800) 372-2447 Cost: \$3995 (PC) \$7950 (Workstation) http://www.att.com/micro	Logic development system for ATT 3000 series FPGA	
ABEL-FPGA	Data I/O Redmond, WA (800) 332-8246 Cost: \$250 with educational discount http://www.data-io.com	Programming tool for all PLDs including FPGAs	Industry standard, comprehensive library, easy to use; truth table, state diagram, boolean equation design entry methods
CUPL Universal Logic Compiler	Logical Devices, Inc. Deerfield Beach, FL (800) 428-1627 Cost: As low as \$495 (educational discount program 15% less) http://www.logical.device.com	Compilation and simulation for most programmable devices	Runs on Pcs and workstations
Autologic II	Mentor Graphics Corporation, Wilsonville, OR. Sue Drouin (800) 592-2210 Cost: \$2100/yr for 10 licenses with educational discount; this fee covers all Mentor products. http://www.mentorg.com	Logic synthesis	Runs on Sun and HP workstations.

PLDSynthesis II	Mentor Graphics Wilsonville, OR (see above)	Logic synthesis for PLDs not including FPGAs	Runs on workstations.
PLDesigner-XL for Windows	MINC, Inc. 6755 Earl Dr. Colorado Springs, CO Beverly Gibson (800) 755-3742 Cost: Call for educational discount	PLD design system including CPLDs and FPGAs	Runs on PCs (W95, NT, W3.1). MINC technology forms the core of many programmable device software tools
OrCAD/PLD OrCAD/MOD	OrCAD Hillsboro, OR (503) 690-9881 Cost: \$895 for complete EDV suite with educational discount http://www.orcad.com	PLD design and modeling	Runs on PC; very popular
QuickWorks	QuickLogic Santa Clara, CA (408) 987-2000 Cost: \$99 demo version http://www.quicklogic.com	Complete FPGA tool suite including VHDL/Verilog, synthesis, simulator, auto place and route for design of pASIC FPGAs	Runs on Pcs ("QuickTools" on workstations)
XACT Family of Development Systems	Xilinx, 2100 Logic Drive, San Jose, CA 95124 (408) 559-7778 Cost: Educational discount available http://www.xilinx.com/xilinx.html	FPGA programming tool for Xilinx LCAs	Interfaces to Mentor Graphics, Workview and other tools.

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Table 5: VLSI Design Tools

Tool Name	Vendor	Characteristics	Comments
Spice	Software Distribution Office Industrial Liaison Program Univ California Berkeley (510) 643 6694 http://www.eecs.berkeley.edu/research/ilp/catalog/index.html	Analog circuit simulator	Runs on workstations.
IRSim	Part of Magic Layout tool (see below) http://www.research.digital.com/wrl/projects/magic/desc.html	VLSI switch level simulator	Runs on workstations
MUSA	Part of Octtool suite (see below)	Logic simulator	Runs on workstations
Magic	Software Distribution Office Industrial Liaison Program Univ California Berkeley (510) 643 6694 http://www.eecs.berkeley.edu/research/ilp/catalog/index.html	VLSI Layout tool	Runs on workstations.
IC Station	Mentor Graphics Corporation Wilsonville, OR Sue Drouin (800) 592-2210 Cost: \$2100/yr for 10 licenses with educational discount; this fee covers all Mentor products. http://www.mentor.com	IC design tool. Full featured.	Part of Mentor Design Suite. Works on Sun and HP workstations.
GDT Designer	Mentor Graphics, Corp. (see above)	IC designer and simulator	Not integrated with other Mentor Graphics products.
L-Edit	Tanner Research, Inc. (see above) Cost: \$245, \$750, \$375 (PC, workstation, Mac educational discount) http://www.tanner.com	Layout Editor	Part of the Tanner Tools (see below)

Tanner Tools Pro	Tanner Research, Inc. (see above) Cost: \$1695 (PC version, other versions call, educational discount) http://www.tanner.com	Complete VLSI suite including circuit simulator, mask level layout and verifier tool, DRC, extraction, standard cell libraries, gate level simulator, place and route.	Runs on PCs or workstations
Octtools	Software Distribution Office Industrial Liaison Program Univ California Berkeley (510) 643 6694 Cost: media http://www.eecs.berkeley.edu/research/ilp/catalog/index.html	VLSI semi-custom design and simulation, including logic synthesis with BDSyn	Workstation only

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Table 6: EDA Tool Suites

Tool Name	Vendor	Characteristics	Comments
Cadence Design System	Cadence Design Systems Chelmsford, MA (508) 262-6393 Cost: educational prices: \$5000/year for entire suite, \$1000/year per standalone tool http://www.cadence.com	Full featured EDA toolset	
System HILO Toolkit	Veda Design Automation Santa Clara, CA (408) 496-4515 Cost: \$2500 (educational price)	Basic suite for electronic system design including digital, behavioral and fault simulation, digital libraries, and PCB layout	Runs on DECstations (Ultrix 4.0 and up), Sparcstations, HP 9000/700, and RS6000 workstations
Intergraph Electronics Design Automation Tool Suite	Intergraph Electronics, Inc. Boulder, CO (303) 581-2421 Cost: call http://www.ingr.com/veribest	Schematic capture, analog, digital, and mixed mode simulation. PCB/MCM/hybrid edit, place and route. Behavioral modeling and synthesis. ASIC design. ATPG	Various tools run on either PC or workstation (NT, 3.1 W95, SunOS 4.1.X, HPUX)
Falcon Framework	Mentor Graphics Corporation Wilsonville, OR Sue Drouin (800) 592-2210 Cost: \$2100/yr for 10 licenses with educational discount; this fee covers all Mentor products http://www.mentor.com	Full-featured EDA tool suite	Recommended; Works on Sun and HP workstations
OrCAD/EDV	OrCAD Hillsboro, OR (503) 690-9881 Cost: \$895 with educational discount) http://www.orcad.com	Schematic design, logic simulator, PLD design and modeling, and PCB layout	Runs on PC; very popular

Ootools	Software Distribution Office Industrial Liaison Program Univ California Berkeley (510) 643 6694 Cost: media http://www.eecs.berkeley.edu/research/ilp/catalog/index.html	VLSI semi-custom design and simulation, including logic synthesis with BDSyn	Workstation only
Workview Workview Office	Viewlogic Systems, Inc. Marlboro, MA (508) 480-0881 Cost: \$1500/seat (educational); includes documentation and hot line http://www.viewlogic.com	Design capture including schematic, state diagram, VHDL and Verilog, ABEL HDL; analog, digital and behavioral simulation; logic and high level synthesis; PCB layout; ATPG	Runs under DOS (Office runs under Windows); educational discount requires yearly submission of course notes or evidence of student work
Microsim Design Center	MicroSim Irvine, CA (714) 770-3022 Cost: call (educational discount) http://www.microsim.com	Schematic capture, synthesis, place and route, PCB layout.	PC only
Powerview	Viewlogic Systems, Inc. (see above)	(see above)	Runs on workstations; educational discount requires yearly submission of course notes or evidence of student work

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Table 7: Other EDA Design Tools

Tool Name	Vendor	Characteristics	Comments
AT&T DSP-32C Development Tool	AT&T Microelectronics, Inc. (800) 372-2447 Cost: \$3800 (Sun), \$1500 (DOS) (no educational discount) http://www.att.com/micro	Algorithm development environment for speech processing, image processing, and 3D graphics algorithm development; includes VCOS operating system	Runs on PCs, Macs and workstations
Signal Processing WorkSystem (SPW)	Comdisco Systems (415) 574-5800 Cost: \$1500 (educational discount) http://www.comdisco.com	Integrated high level design environment for Digital Signal Processing and Communications algorithm and system development	Runs on workstations; graphical design entry is fast; supports hardware and software implementation
System 1076	Mentor Graphics Corporation, Wilsonville, OR Sue Drouin (800) 592-2210 Cost: \$2100/yr for 10 licenses with educational discount; this fee covers all Mentor products http://www.mentorg.com	VHDL designer and simulator	Runs on Sun and HP workstations.
DSP Station	Mentor Graphics (see above)	Digital signal processing designer and simulator	(see above)
Autotherm	Mentor Graphics (see above)	Power dissipation simulation tool	(see above)
DSP96000CLASA Design Software DSP96000CLASB Design Software DSP 96000CLASF Design Software	Motorola, Inc. Digital Signal Processor Division OE314 6501 William Cannon Drive West Austin, TX 78735 Mr. Robert Bergeler (512) 891-3098 Cost: Free to qualifying institutions http://www.motorola.com	Simulator, assembler linker and library for the DSP96000 devices, for the PC, Mac and Sun4 respectively	Similar tools for other chipsets
SPROClab Development System	Star Semiconductor Corp. 25 Independence Blvd. Warren, NJ 07059 (908) 647-9400 Cost: \$3995 (educational discount)	"Sketch and Realize" Tool for Digital Signal Processing	Runs on PC, using either Workview or OrCAD/EDV; speeds DSP application development

VSS Family	Synopsys Mountain View, CA (415) 694-1687 Cost: call (educational discount available) http://www.synopsys.com	HDL simulation environment for complete ASIC design	Runs on workstations; 100% IEEE-1076 compliant;
Design Compiler Family	Synopsys (see above)	Synthesis tools	Runs on workstations;
HYPER 2.0	UC Berkeley (see above) Cost: Media http://infopad.eecs.berkeley.edu/~hyper	Digital signal processing and imaging datapath synthesis environment	Runs on workstations; produces Synopsis VHDL or mixed standard cell/datapath netlists for use with the LAGER toolset
Espresso	University of California, Berkeley (see above) Cost: media	PLA and state table minimization tool for logic design	Part of the Octtools suite

Table 8: PC-compatible Hardware Suggestions

Vendor	IBM, Compaq, Zeos, ALR, AST, Gateway 2000, Dell, Northgate
Memory Size	16M
Disk Size	1 GB
Monitor	17"
Extras	a) network card and driver b) CD ROM drive (4X) c) graphics card (e.g., Diamond Viper) d) tape drive for backup

Table 9: Workstation hardware choices

Vendor	Sun, HP, DEC, IBM
Memory Size	64M

Disk Size	2 GB (minimum)
Monitor	17"
Other	CD ROM drive