Unit 115: Electronic Computer-Aided Design

Unit code: T/602/2235

QCF Level: 4

Credit value: 15

Aim

This unit will develop learners understanding of the applications of Electronic Computer-Aided Design and will enable them to apply ECAD to design problems.

Unit abstract

This unit investigates a range of Electronic Computer-Aided Design (ECAD) packages and their implications on the design process. It allows learners to evaluate ECAD tools and to appreciate how they influence the commercial viability of products. It is intended to give an insight into modern design tools and provide an opportunity for learners to develop operational skills using industry-standard software.

Learning outcomes

On successful completion of this unit a learner will:

1 Understand the features of ECAD systems

2 Be able to evaluate software packages

3 Be able to apply ECAD to design problems.

Unit content

1 **Understand the features of ECAD systems and software**

Features: development platforms; hardware configurations; processor power; memory requirements; installing software; workstation and PC-based systems; network operations; licence control and security; operating systems; essential command repertoire for common host operating systems such as DOS, Windows, UNIX, VMS, OS/2 and OS/9; file management and security

Software: ECAD tools for analogue and digital and mixed mode simulation; PCB, PLD and ASIC design; hierarchical design and schematic capture; standard file formats; and import/export protocols

2 **Be able to evaluate software packages**

Software: initialisation of project environments; library control; part and symbol creation; schematic capture; fault-free simulation; stimuli design and selection; fault simulation techniques; error analysis and rectification; design rules and checking; printing and plotting; manufacture design files; VHDL programming

Evaluate: user instruction summaries and guidelines; software bugs and fixes and hardware incompatibility; comparison of simulation results with predictions and manually calculated results

3 **Be able to apply ECAD to design problems**

Operating skills: independent operation of sophisticated tools; versatile and imaginative application of tools to achieve solutions

Project management: use of manual and software management techniques to maintain design integrity; appropriate design partitioning and hierarchical analysis

Evaluate: reports of each project should include critical assessment of the design process and the effectiveness of the tools; results of simulation, verification and error checking reports are to be documented and appraised; hard copy should be included where appropriate

Test: devise test procedures; analysis of results; evaluation reports

Learning outcomes and assessment criteria

Learning outcomes **On successful completion of this unit a learner will:**	Assessment criteria for pass **The learner can:**
LO1 Understand the features of ECAD systems and software	1.1 explain the essential features of an ECAD system of commercial standard 1.2 discuss the range of software available to assist the design of electronic circuits and systems
LO2 Be able to evaluate software packages	2.1 interpret manufacturers' user instructions to set up correct working environments 2.2 perform exercises to assess the performance of ECAD software packages 2.3 evaluate and report the results of exercises 2.4 prepare a critical review of modern ECAD software packages
LO3 Be able to apply ECAD to design problems	3.1 demonstrate operating skills to provide solutions to an engineering design problem 3.2 apply project management techniques 3.3 evaluate the results of completed projects 3.4 devise test procedures and evaluate results against predictions, where appropriate

Guidance

Links

This unit can be linked with *Unit 73: Manufacturing Electronic Products*.

Essential requirements

High performance workstations are essential to satisfy modern ECAD tools. Upgrades are likely to be frequent. Learners must have the opportunity for individual work and will need workstation access for extended periods.

Appropriate packages will be classed as industry standard, but educational versions are acceptable. The range of tools available for learning and assessment do not have to be comprehensive, though at least two dissimilar tools are essential. These may be found in a single suite of tools under a common title. Typical combinations may be Analogue and Digital Schematic entry with mixed simulation, integrated with a PCB design layout tool. PLD applications and ASIC design tools are highly desirable.

Employer engagement and vocational contexts

Delivery of this unit will benefit from centres establishing strong links with employers willing to contribute to the delivery of teaching, work-based placements and/or detailed case study materials.