

eSyst Frequently Ask Question

October 19, 2008



A presentation of eSyst.org



F.A.Qs.

Q: What is the eSyst program?

A: eSyst is the shorthand designation for Electronics Systems and is the name given to the National Science Foundation grant project more formally referred to as A New Systems View of Electronics for 2010. The grant is a 3-year program to develop a curriculum for Associate degree programs in electronic technology with a more systems oriented approach.

Q: What is the organization behind eSyst?

A: eSyst is a program of the Maricopa Advanced Technology Education Center (MATEC) in Phoenix, AZ. MATEC is a department in the Academic and Student Affairs of the Maricopa Community College System. MATEC is an NSF grant center that has been in operation since 1996 developing new, revised, and updated curricula and materials for AAS degree programs in electronics, semiconductors, and manufacturing.

F.A.Qs.

Q: What is the purpose of eSyst?

A: The whole idea behind the eSyst program is to revise and update AAS degree curricula in electronics technology to better address the current and future needs of industries that employ the technician graduates of AAS degree programs.

Q: What was the impetus for the eSyst program?

A: There is a growing awareness that the curricula for AAS degree programs in electronics technology are dated and not addressing the real needs of industry. Most programs continue to focus on educating engineering technicians while these jobs have virtually disappeared from industry. As a result, the content is skewed from what modern-day technicians do.

F.A.Qs.

Q: What jobs does the eSyst curricula target?

A: Most technician jobs involve service, troubleshooting, repair, maintenance, installation, and operation of electronic equipment. Testing and measuring is also a key part of these jobs. Most of these jobs involve working with the equipment, its interconnection and operation, and the work is at the PC board, module and subassembly level. There is less need to troubleshoot and repair at the component level. Furthermore technicians do not design nor do they do the extensive circuit analysis that is the job of the engineer.

Q: What has precipitated the need to change the curriculum?

A: The rapid and continuous changes in the electronics industry have made much of current curricula either irrelevant or severely dated. A dated curriculum could have been partially responsible for the decline in electronics program enrollments of the past several years. Because of the way equipment is designed with software and simulation there is less need for technicians to do prototype construction and testing. The advent of massive increased use of integrated circuits has made electronic equipment far more reliable so less maintenance and repair are needed. In addition, the complexity and small size of the components and circuits have made repair more difficult. Equipment costs are also such that it is typically cheaper to replace a unit with a new one than to spend the time and cost of repair. The result is that most technicians need a different mix of instruction than provided currently and in the past.

F.A.Qs.

Q: Is eSyst an entirely new curriculum?

A: No. eSyst is a recommended revision to the existing core courses in most AAS degree electronics technology programs. eSyst provides a way for instructors to fine tune their courses to keep the essential fundamentals while adding relevant new materials for the systems orientation.

Q: What courses does the eSyst program address?

A: The following courses are covered: DC Circuits, AC Circuits, Solid State Devices and Circuits (linear), Digital Fundamentals, Microcomputer Fundamentals, Data Acquisition and Instrumentation, and Electronics Communications. These courses are usually part of most AAS degree curricula but if they do not exist, it is recommended that they be added.

F.A.Qs.

Q: What is the eSyst approach to implementation?

A: The eSyst methodology is to keep most of the current course content but to eliminate dated and irrelevant material, reduce coverage of some topics, increase coverage of other topics, add new material and, in general, shift the emphasis from heavy discrete component circuit analysis to more integrated circuit coverage and a systems orientation. The essence of the systems approach is to consider electronics in the form of input and output signals in a block diagram form. Troubleshooting is also a key component of systems thinking.

Q: How will the adoption of the eSyst curriculum affect your program?

A: First, it will bring the courses up-to-date technically with the latest components, methods, equipment and systems coverage making them more relevant. Second, the greater focus on systems, equipment and applications will better help students understand what their future jobs will be like. In addition, less coverage of theory and analysis should improve student interest and retention. Finally, local industry should find the programs more in tune with their technician needs.

F.A.Qs.

Q: How can I be sure that eSyst is what employers want and need?

A: The eSyst project was born out of comments from industry about employees who could work at a higher systems level and with knowledge and skills somewhat different than those currently taught. Input from industry advisory committees was captured and used to formulate the eSyst solution. All eSyst revisions undergo stringent analysis and evaluation by the grant development committee as well as an industry advisory committee associated with the grant. MATEC strongly recommends that colleges seek out industry and their input with regards to job knowledge and skills, technology, and processes relevant to local jobs then adopt the eSyst elements related to those needs.

Q: Just what does MATEC provide as part of the eSyst program?

A: The eSyst materials consist of recommended course outlines and complete implementation guides outlining what to eliminate, minimize or add. Also provided are system oriented lab projects and experiments, learning modules, simulations, evaluations and online materials. All of these are accessible for free from the eSyst website at www.eSyst.org. eSyst also makes extensive use of other materials developed by MATEC, such as the online instructional modules available from www.work-readyelectronics.org and the NetWorks initiative (www.matecnetworks.org).

F.A.Qs.

Q: Do you have to adopt all eSyst materials?

A. No. You are still in control. Adopt what you feel is “right” for your program. Adopting the whole package will, however, give your program a whole new fresh, different perspective and potential.

Q. Have any schools already adopted eSyst?

A. Yes. A good number of schools are gradually testing and adding the eSyst approach and materials, course by course. Since the program is still under development, no school has yet to incorporate it all. Chabot College in California recently completely restructured their electronics program for an ESyst approach, and the new program went into effect fall of 2009. Contact eSyst for more details if interested.

F.A.Qs.

Q: What are the implications related to accreditation if you adopt the eSyst program?

A: None. The eSyst materials do not change the curriculum, just revise and update it to reflect the current technology and the local employer needs. Most accreditation organizations actually welcome, even insist on, formal revisions and updates. Most state regulated curricula permit minor course revisions and improvements without approval. Content descriptions of most accrediting bodies are broad and general enough to accommodate the eSyst changes. As a refresher, you should check with your approving bodies to see what is permitted.

Q: What is the eSyst vision or recommendation with regard to computer simulation?

A: Computer software simulation is primarily an engineering design and analysis tool. However, some community colleges and technical schools do use it to teach circuit fundamentals. The eSyst program does not use simulation to any extent but it is still under consideration. Most simulation is highly discrete component and circuit detailed and does not generally fit the learning needs related to systems or the equipment. eSyst recommends greater hands-on laboratory work in lieu of simulation and the increased use of modern test equipment where the budget allows.

F.A.Qs.

Q: What is the cost impact to my department adopting eSyst?

A: The cost impact is minimal. Most of the expenses will no doubt be related to acquiring new and different lab equipment and test instruments. Every effort has been made to create lab activities with minimal expense.

Q: What are some of the potential roadblocks to eSyst adoption?

A: The main issue so far appears to be getting full faculty buy-in. Most faculty tend to resist any change including any that greatly modifies what has been taught in the past. Some of the recommendations may be controversial to some faculty simply because of the dated nature of the faculty member's educational background and job experience. Most departments and faculty want to change and improve; therefore, the eSyst recommendations provide a way to gradually change without radical adjustments. Yet some changes will no doubt be questioned. It is wise to expect and anticipate such resistance, but you can justify and support the proposed changes by referring to the fact that they come from industry and not just some committee with random personal recommendations.

F.A.Qs.

Q: How will a change to the eSyst curriculum affect the transferability of credit for BSET degree programs?

A: If your courses are currently accepted for transfer, there should be no problem. In fact eSyst may actually increase acceptance given that the course changes include the latest technology and practices. Transfers to Bachelor of Industrial Technology and similar programs or equivalent should not change. For some more rigorous BSET university programs that require calculus and physics credits, and perhaps more advanced analysis content, it could be an issue. Transfer credit is always at the discretion of the accepting university and varies widely and usually on a course by course basis. Transferability may also be based on a formal articulation agreement with a prior review of course content. If this is a critical issue, then you should check with those schools that normally accept credit.

Q: How will adopting eSyst affect the ability of my students to pass technician certifications exams?

A: There should be little or no effect. Most exams cover just the key fundamentals that you will continue to teach under the eSyst program. Your program will be far more up-to-date than the certification exams which are rarely updated on a regular basis. There is growing concern amongst some certification organizations (ISCET, ETA) to modernize their exams to include increased system orientation and related topics.

F.A.Qs.

Q: What is the current status of the eSyst program?

A: The grant work is in its third and final year, although a fourth year extension appears to be a possibility. In general, all work is expected to be completed by June 2010. Right now materials are available for the DC, AC, Solid State and Digital courses. Some materials are also available for the other courses but will be posted in the coming months. Keep watching the website for updates and changes.

Q: How do I learn more about eSyst?

A: First, go to the eSyst website www.eSyst.org and review the materials. A good approach is to take one course and fully digest all of the content such as outline, implementation guide, list of materials, and lab recommendations. Then, decide for yourself. You should also look through the materials available through MATEC specifically NetWorks and Work-Ready Electronics, both accessible at www.matec.org. You can get answers to your specific questions by calling the project manager Tom McGlew at MATEC at 480-731-8055.