Instrumentation for Control Technology of Electrical Engineering Students

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Description

The topic is covered in the winter semester of the of the first cycle professional study program in applied electrical engineering's control engineering course. Students must complete a prescribed control technology instrumentation related project as part of a seminar, participate in a series of practical, standardized hands on experiments in the laboratory, and attend lectures. Students are then eligible to take the oral exam if they have satisfied all prerequisites. Over the course of the past two years, the pandemic situation has necessitated revisions to both the subject matter and the manner in which the seminar is delivered. Specifically, three distinct approaches to the delivery of the seminar work are presented: normal seminar work execution in a laboratory setting, hands on seminar work execution at home, and inspired remote seminar execution from home. When compared to a traditional lecture based approach, we believe that students gain a better understanding of the rather vast field of control engineering instrumentation when they are involved in hands on experiments and project work. In addition, the practical experience enables students to successfully solve problems in their future professional lives and provides them with a deeper comprehension of the fundamental concepts.

Project Scope

The use of project based learning in the teaching of electrical engineering course that includes learning to program in the graphical programming language LabVIEW and a fundamental introduction to data communication and telecommunication is the subject of our report in this paper. Student motivation has increased and learning outcomes have improved as a result of the introduction of open project scope. Additionally, as students incorporate resources from their own interests and from other courses into their projects, the inclusion of laboratory exercises that provide additional tools for interfacing with external hardware, such as arduino boards, sensors, and wireless networks, has led to further improvement in project quality. In recent years, undergraduate engineering courses have moved away from lecture based instruction and toward more learner centered approaches like problem based learning. However, empirically collected data on students learning outcomes has been used more frequently than student perceptions of the teaching method and faculty anecdotes and opinions on how they use it in research on the impact of these approaches. An investigation into the effects of Problem Based Learning (PBL) on undergraduate electrical engineering students conceptual understanding and perceptions of PBL learning in comparison to lecture is described in this paper. Block flow diagrams, process descriptions, Process Flow Diagrams (PFDs), Piping Instrument Diagrams (PIDs), cause and effect diagrams, and construction materials for the process equipment are all part of the process conceptual design. The process conceptual design also includes material balances, energy balances, utility requirements, control philosophy, equipment redundancy requirements for reliability, equipment verification studies, and the budget and schedule for the next project phase. Because the case study is about the process design, you should make a block flow diagram of the process. The BOD establishes the project's requirements, site conditions, and assumptions; It defines the project's success or testing criteria, as well as the codes and standards that must be followed. The paper demonstrates the use of a cutting edge Distributed Control System (DCS) and a four tank laboratory process in various undergraduate and graduate control engineering labs. For DCS engineering, this means making use of commercial tools and designing and putting into operation both conventional and cutting edge control solutions.

Internet Programming

Internet based automation has tremendous potential given the internets rapid expansion. According to, a variety of household electronic devices, including lights, appliances, climate control systems, and surveillance cameras, can be connected to the internet *via* wired or wireless networks. Telesurgery *via* the internet is yet another illustration. The recent transatlantic cholecystectomy performed between a stunning of tele surgery. It is anticipated that internet connected home area networks will soon spread throughout domestic life, and internet based remote surgical procedures will connect medical professionals working in different parts of the world. Industrial applications can also use the internet as an infrastructure. In the arrangement depicted in the LAN/WAN is the internet's backbone, and the corporate LAN is the intranet's backbone. Through the internet, a client connects to a web application that is housed in the web server. The intranet is then used to communicate between the web application and a

control application in the process server. Through direct wiring, the process server communicates with plants in this case, phones. Professionals trained in internet programming for instrumentation and control is in high demand because of the internet's explosive growth over the past decade. However, there are very few resources available for undergraduate students in this field to use for classroom instruction and laboratory experiments.

Distance learning is not the primary focus of the current work. It is to create a technical elective course that teaches undergraduates how to build rather than use automation systems based on the Internet. This may be the first time a course of this kind has been offered to undergraduate students. The students in this class must have a solid understanding of internet programming in addition to sensing, control, and actuation. Traditionally, this assortment of materials comes from various engineering fields. The majority of students enrolled in this technical elective course are from the fields of electrical and computer engineering. Electrical Engineering and Computer Engineering (EECE) are housed in two distinct departments. However, this arrangement does not in any way limit the strategy that is presented in this paper, and it works just as well in a situation where there is only one electrical and computer engineering department. This paper's primary objective is to describe the creation of a course for undergraduate engineering students interested in learning about and utilizing internet programming technology for internet based control tasks. We believe that the course is a viable elective engineering course that fits the electrical and computer engineering curricula very well based on the positive feedback from students who have taken it.