



# Lincoln University

Course Title	Advanced Systems Analysis and Design.	
Course No.	BA 352	Instructor: Walter Kruz
Units	3 (45 lecture hours)	Contact: wrkruz@lincolnuca.edu
Class Hours	Thurs 3:30-6:15 PM	Office Hours: By arrangement
Semester	Fall 2014	

## **Textbook:**

SCADA: Supervisory Control and Data Acquisition, by Stuart A. Boyer,  
ISBN: 1-55617-660-0, [www.amazon.com](http://www.amazon.com), plus various resources from industry sources

## **Course Description:**

Analysis of real world information systems. Included are requirement analysis, data flow diagrams, data dictionaries, systems proposals and design. Prerequisite: BA 260 and BA 350.

## **Learning Objectives:**

The course objective is to introduce students to the fundamental concepts of industrial control systems, including industry standards and definitions, as an overview of the subject. The topic deals with industrial systems, specifically, SCADA (Supervisory Control and Data Acquisition). The course addresses the basic architecture of SCADA and the parameters for process selection, communications, security, and the economics and risks of such systems.

Topics covered include system architecture, network communication methods, reliability considerations, operator interfaces, and commissioning. A control system architecture review and recommended SCADA configurations for typical small, medium, and large facilities are also presented. By completing this course, the student will acquire basic concepts of automated systems enabling him/her to participate in automation projects in various industries.

## **Methodology:**

This class offers is a highly interactive learning environment. All students will participate in class discussions, research findings, and computer laboratory and class exercises. Short oral presentations may also be assigned. Assignments will be given weekly and may consist of textbook exercises and research questions. Attendance is highly encouraged as exams include questions from class discussions. Students will benefit from using a laptop and a calculator although these devices are not allowed during exams.

**Standards:**

Standards for this class are similar to those found in professional organizations. All assignments are due on the date indicated and collected during the first 10 minutes of the class. Late assignments will not be collected or graded. Make-up exams are allowed only due to a documented medical excuse. Students are encouraged to study and work in groups for enhanced learning.

**Project:**

Project work is designed to familiarize students with the practices and automation technologies necessary to manage industry projects. Projects may be assigned individually or as a group. If as a group, the grade is the same for all members. Partial drafts may be evaluated on an agreed upon schedule during the semester. Final deliverable will be turned in as a hard copy. Plagiarism is not allowed; all sources must be referenced. APA style is encouraged.

**Testing:**

Typically, the class will consist of two or three exams of equal weight as well as homework and quizzes throughout the semester. All exams are individual deliverables. They consist of short answers related to the material being discussed and some quantitative problems. The exam format is usually closed book with no electronic devices allowed.

**Grading:**

Quizzes, homework assignments, exams, and the project allow students to accumulate points throughout the semester. These earned points are added and compared against the total possible for the semester to calculate a percentage.

Exams and Project are typically worth 100 points each (~ 75% of the total points). Homework and quizzes from 5-10 points (~ 25% of the total points). Assuming that 2 exams, one project, and 10 homework assignments are given, this will mean a total possible of 400 points can be accumulated. The student grade will be calculated as follows:

$$\text{Grade} = (\text{Student's score} / \text{Total possible points}) * 100 = \%$$

A final grade is then assigned as follows:

95 – 100%	A
90 – 94%	A-
87 – 89%	B+
84 – 86%	B
80 – 83%	B-
76 – 79%	C+
70 – 75%	C
66 – 69%	C-
60 – 65%	D
Less than 59%	F

**Classroom Protocol:**

Classroom protocol is similar to the one students will find in a professional environment. Students are expected to arrive on time and be prepared to participate. Laptop use is allowed only for a class purpose. No cell phones allowed.

**Schedule:**

This is a proposed schedule. It may change according to class progress or student interests.

Module 1	<ul style="list-style-type: none"><li>• Intro to industrial systems.</li><li>• Fundamentals of control.</li><li>• System architecture.</li></ul>	Lecture, exercises, project research.
Module 2	<ul style="list-style-type: none"><li>• Communications technology.</li><li>• Reliability considerations.</li><li>• Operator interfaces.</li></ul>	Lecture, exercises, project research. Exam 1
Module 3	<ul style="list-style-type: none"><li>• Security considerations.</li><li>• Commissioning/Validation.</li><li>• Maintenance practices.</li></ul>	Lecture, exercises, project research.
Module 4	<ul style="list-style-type: none"><li>• Documentation and change control.</li><li>• Project planning and implementation.</li></ul>	Lecture, exercises, project delivery. Exam 2

**Faculty Information:**

Dr. Kruz is an industry consultant. His expertise includes operations, engineering, and project management in various industries. He actively conducts business research, is a published author, and a member of various industry organizations.

**Update:**

August 4, 2014