

Recommended schedule

Day 1

Classroom session: *Informational interviews, job searching* – **attendance is mandatory!**

Independent activity: *Contact employer(s) to set up informational interview(s)*

Independent activity: *Work on homework questions – 1 through 11 (includes informational interview assignment)*

Independent activity: *Complete and submit a “Degree Application” form with the BTC registration office so that you will be awarded a degree upon completion of all required coursework*

This is the major assignment for this course: conducting an *informational interview* of an employer, targeted to instrumentation-related work. A recommended resource for you is the tutorial *So You Want To Be An Instrument Technician?* available from your instructor as a free electronic book. Using this or any other reference on informational interviewing, your major task is to interview a representative of some employer who hires technicians and submit the notes from that interview to your instructor by Day 5. Questions 1 through 11 in this worksheet are homework questions for you to complete, also due by Day 5 of this course (unless you have completed a jobshadow or internship during this course or during the break immediately prior).

Do not be surprised if an employer does not answer your query for an informational interview. It is recommended that you contact multiple employers in order to ensure successful completion of this exercise, and that you interview all who agree to your request. Informational interviews do not take long to conduct, and they have been known to lead to job offers!

Day 2

Independent activity: *Work on homework questions – 1 through 11 (includes informational interview assignment)*

Day 3

Independent activity: *Work on homework questions – 1 through 11 (includes informational interview assignment)*

Day 4

Independent activity: *Finish all homework questions – 1 through 11 (includes informational interview assignment)*

Day 5

Homework due at the end of the day (*questions 1 through 11, includes informational interview assignment*)

Note: Successfully completing a “jobshadow” experience either during the week this course is scheduled or during the school break immediately preceding this course counts as equivalent credit for all course assignments including the informational interview as well as attendance at the classroom session. Your instructor will need proof of your jobshadow completion, so be sure to leave a contact phone number and/or email for the jobshadow employer that your instructor may use for this purpose.

IMPORTANT NOTES!

This course is largely self-directed, with little formal instruction given. It is *imperative* that you attend the classroom session and also complete all the prescribed activities by the end of the school day on Day

5. Anyone absent from the classroom session (unless due to a jobshadow or an emergency situation) will be dropped from the course as a no-show. Completing the informational interview in particular will likely require more time than you think, so start early! Barring some personal (documented) emergency preventing your timely submission of assignments, any late work will result in a failing grade for the course! The work you must submit by Day 5 is listed in **bold** print above.

While completing a jobshadow or internship during this course or during the prior school break does count as equivalent credit for all course assignments, it does *not* substitute for registration and payment for the course. No grade may be submitted for you unless and until you are registered.

Of these, the one most often responsible for students' failure of the course is the informational interview, because companies may not be able to provide you with an interview opportunity in a timely manner. *Work on getting the informational interview done as soon as possible!* Contact multiple employers to ensure success.

Program Outcomes for Instrumentation and Control Technology (BTC)

#1 Communication

Communicate and express concepts and ideas across a variety of media (verbal, written, graphical) using industry-standard terms.

#2 Time management

Arrives on time and prepared to work; Budgets time and meets deadlines when performing tasks and projects.

#3 Safety

Complies with national, state, local, and college safety regulations when designing and performing work on systems.

#4 Analysis and Diagnosis

Analyze, evaluate, and diagnose systems related to instrumentation and control including electrical and electronic circuits, fluid power and signaling systems, computer networks, and mechanisms; Select and apply correct mathematical techniques to these analytical and diagnostic problems; Select and correctly use appropriate test equipment to collect data.

#5 Design and Commissioning

Select, design, construct, configure, and install components necessary for the proper function of systems related to instrumentation and control, applying industry standards and verifying correct system operation when complete.

#6 System optimization

Improve technical system functions by collecting data and evaluating performance; Implement strategies to optimize the function of these systems.

#7 Calibration

Assess instrument accuracy and correct inaccuracies using appropriate calibration procedures and test equipment; Select and apply correct mathematical techniques to these calibration tasks.

#8 Documentation

Interpret and create technical documents (e.g. electronic schematics, loop diagrams, functional diagrams, P&IDs, graphs, narratives) according to industry standards.

#9 Independent learning

Select and research information sources to learn new principles, technologies, and techniques.

#10 Job searching

Develop a professional resume and research job openings in the field of industrial instrumentation.

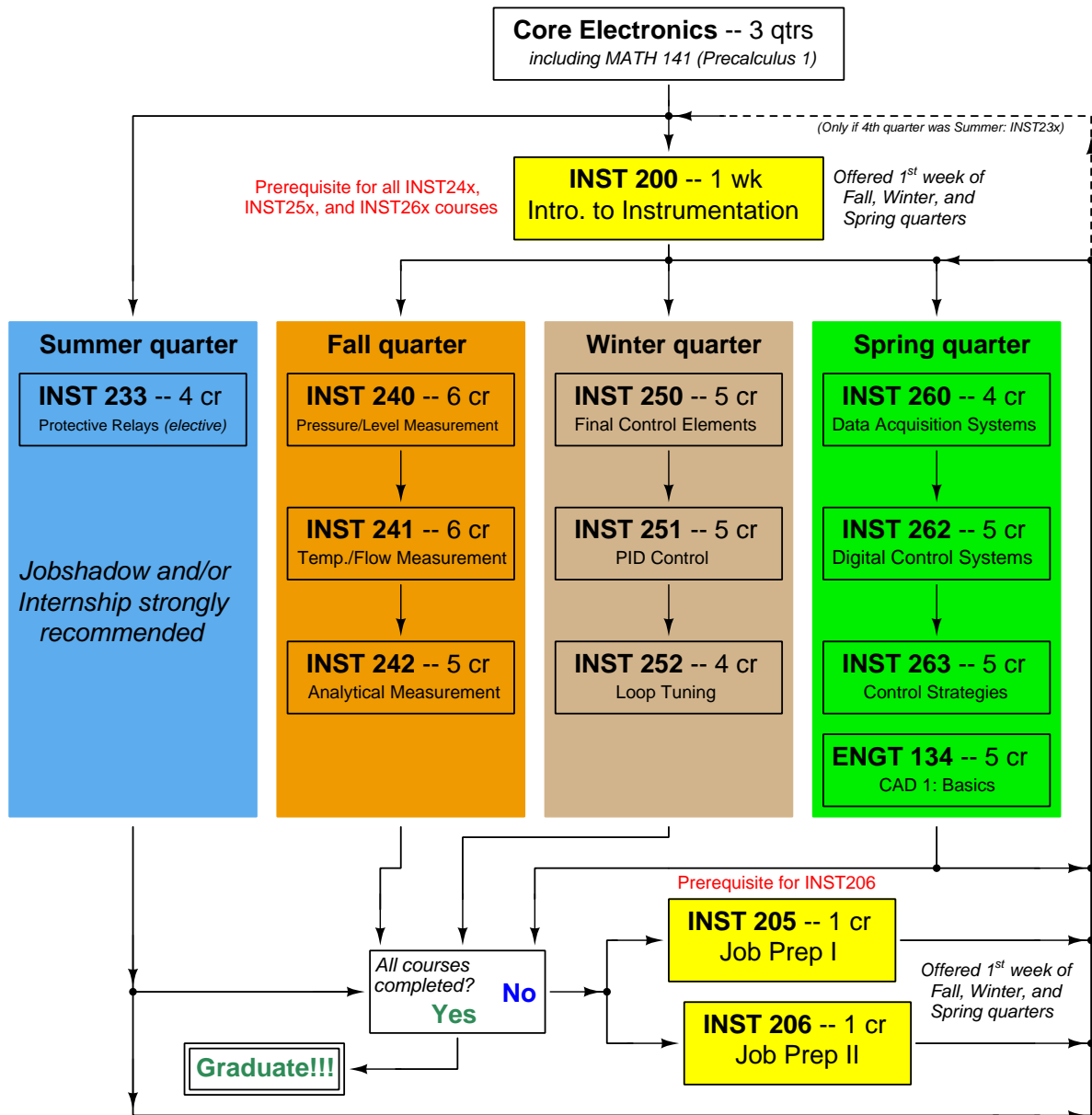
file outcomes_program

INST 206 Course Outcomes

Each and every outcome in this course is assessed at a mastery level (i.e. 100% competence)

- Research and document multiple employers of instrument technicians. Note: successfully completing a “jobshadow” or “internship” experience either during the week this course is scheduled or during the break immediately preceding this quarter counts as equivalent credit for the employer research assignment. [Ref: Program Learning Outcome #10]
- Interview a representative of a company hiring instrument technicians, either in-person or over the telephone, documenting the conversation to record the informational interview. If conducted over telephone, the employer must be outside of the Whatcom and Skagit County areas. Note: successfully completing a “jobshadow” or “internship” experience either during the week this course is scheduled or during the break immediately preceding this quarter counts as equivalent credit for the informational interview assignment. [Ref: Program Learning Outcome #10]

Sequence of second-year Instrumentation courses



The particular sequence of courses you take during the second year depends on when you complete all first-year courses and enter the second year. Since students enter the second year of Instrumentation at four different times (beginnings of Summer, Fall, Winter, and Spring quarters), the particular course sequence for any student will likely be different from the course sequence of classmates.

Some second-year courses are only offered in particular quarters with those quarters not having to be in sequence, while others are offered three out of the four quarters and must be taken in sequence. The following layout shows four typical course sequences for second-year Instrumentation students, depending on when they first enter the second year of the program:

Possible course schedules depending on date of entry into 2nd year



file sequence

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Questions

Question 1

List at least five appropriate informational interview questions:

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A resource you may find helpful for crafting informational interview questions is the open-source guide entitled *So You Want To Be An Instrument Technician?* available on the Socratic Instrumentation website (<http://ibiblio.org/kuphaldt/socratic/sinst>).

[file i01854](#)

Question 2

When attempting to contact potential employers, you will usually encounter automated telephone answering systems where you must leave a message for someone to listen to later. One problem with voicemail messages is that they tend to sound unprofessional: vocalized pauses (“um”), meandering sentences, and missing information may leave a bad “first impression” with the person you are trying to contact.

One helpful way to overcome this is to have a pre-written paragraph ready to read aloud when leaving a voicemail message. This will help you overcome anxiety when faced with having to leave a voicemail message (“What do I say?”), shorten the message by eliminating wasted time, and ensure no critical information is forgotten.

Write your own introductory paragraph for the purpose of leaving voicemail messages with prospective employers. Be sure to include the following points:

- Your name, and how (and when!) you may be reached (e.g. phone number)
- The purpose of contacting this company (to explore career options there)
- (Optional) *a statement describing your interest in this company*
- Conclude with a repeat of your contact information (e.g. phone number)
- A friendly sign-off (e.g. “Have a nice day”)

[file i01856](#)

Question 3

Read this fictitious account of an Instrumentation graduate who accepts a position with a company, then decides to leave very soon after:

Gary graduates from the Instrumentation program of a two-year college, and immediately takes a factory maintenance position with Widgets, Inc. During the interview, Gary is told that this job entails much more than just instrumentation work: Gary will have to perform janitorial duties, light carpentry, and clean windows in addition to performing maintenance on the automation systems at this facility. Gary has all these skills, and is eager to get started in his new career, so he accepts.

After working a few months at Widgets, Inc., Gary realizes that instrumentation is a very small part of the job. Most of his time spent working there is occupied with janitorial, carpentry, and window cleaning. In those months, Gary has only had opportunity to use his instrumentation skills once or twice. This is not what he expected when he took the job.

While looking through the local newspaper, Gary sees an opening for an instrument technician at a company where he knows the technicians do far more “traditional” instrumentation-type work. He decides to apply for this other job, and eventually gets it. When he gives two weeks notice to his boss at Widgets, Inc., his boss is quite upset. Now his boss must put out another posting for a maintenance technician, and incur all the costs of interviewing again.

Explain how Gary could have avoided this unfortunate situation, and also identify some of the far-reaching consequences of his decision to leave Widgets, Inc. after just a few months. Hint: the general rule of staying with your first employer for one to two years minimum may be helpful to you in brainstorming consequences, and also in determining how this situation could have been avoided.

Question 4

The most important assignment for this course is to conduct an informational interview of an employer hiring instrument technicians (or some closely related craft such as industrial electrician, electronic communications technician, etc.). The purpose of this assignment is to practice making first contact with employers as a practical job-searching strategy, and to learn more about your chosen profession.

Electronic interviews (e.g. telephone, video conference, etc.) are acceptable only for employers located outside of Whatcom or Skagit counties. Please use a land-line telephone for this rather than a mobile phone, as the poor voice quality of most cell phone connections is viewed as unprofessional. For an employer within Whatcom or Skagit county, *only an in-person interview will be accepted*, and a business card from the person interviewed must accompany your interview results for course credit.

You should do some basic research on the company prior to contacting anyone there for an informational interview. It is considered unprofessional to ask questions in an informational interview that may be easily answered from the company's website or other publicly-available sources. Remember that the person you are interviewing has a job to do, and would rather not have you waste their time.

People appropriate to contact when scheduling an informational interview include front-desk receptionists, Human Resources personnel, instrument technicians, and instrument shop supervisors (in that preferential order). Shop-level personnel generally do not take kindly to strangers' queries, but receptionists and HR personnel are much more accustomed to working with the general public.

If you intend on conducting an in-person informational interview, please be sure to dress and behave appropriately: treat it as if *you* are being interviewed for a job! Bear in mind that this informational interview may very well open a door for your employment at this company, so treat it with the sense of importance it deserves!

Document the questions you asked during your informational interview and the responses received:

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file i02160

Question 5

Suppose you are working on the job, and you are the first to encounter a person who has been seriously injured. The person in question is clearly in need of help, and no one else is there besides you.

What is the *very first thing* you should do in this event, before giving any direct aid to the injured person? Note: the answer here is exactly the same for non-industrial emergencies!

[file i01862](#)

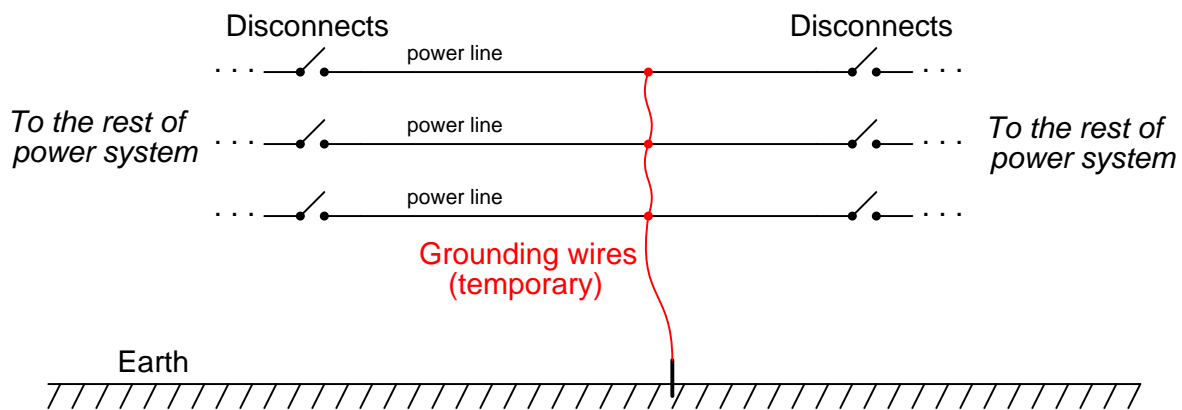
Question 6

Under what conditions is it advisable to wear hearing protection? What are some of the different types of hearing protection available to industrial workers? Describe what *cumulative hearing loss* is.

[file i01864](#)

Question 7

Linemen working on high-voltage conductors do not simply rely on open disconnect switches to isolate sections of power lines from sources of electricity during maintenance. They also attach “grounding” cables from line to line, and then to earth ground like this:



Explain why this decreases the risk of electric shock for the linemen, based on what you know about *electrically common points* in a circuit.

[file i01860](#)

Question 8

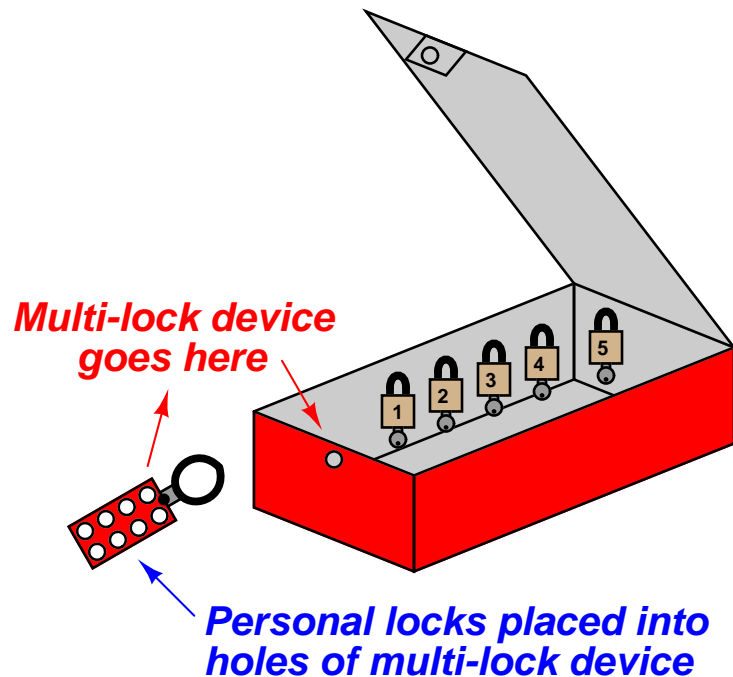
A common concern in industrial maintenance work is *confined spaces*. Research the definition of a “confined space” and explain the precautions typically taken before any worker enters a confined space.

[file i01866](#)

Question 9

When “locking out” a complex piece of equipment or machinery for maintenance work, a large number of different energy-flow devices (e.g. circuit breakers, block valves, bleed valves) must be secured in their safe positions by multiple workers. If each worker were to place their own personal padlock on each of these devices, the total number of locks required would be staggering.

A more efficient system for managing this is to use a sheet-metal box containing a numbered padlock (with matching key) for each energy-flow device to be secured on the equipment, as well as a list identifying which lock goes on which energy-flow device. The lid of this device is then lock-able with a multi-lock device, permitting multiple peoples’ personal locks to be applied so the lid cannot be opened unless *all* personal locks are removed from it:



Explain how having numbered padlocks stored inside this lock-box prior to a job, and by having workers apply their personal padlocks to secure the lid of this lock-box, help to ensure the equipment will be safe for everyone to work on.

Also, identify any way(s) this safety system could fail, thereby placing people in danger.

file i01858

Question 10

Cardio-pulmonary resuscitation, or *CPR*, is a very important procedure to know for certain types of emergencies. Identify what “CPR” is, what it is used for, and what situations require it.

file i01870

Question 11

In order for BTC to award you a degree, you *must* complete the online Graduation Application form. Without this form completed, you will not be awarded your degree even if all required courses have been successfully passed!

Complete this online form, and provide proof of completion by attaching a screenshot of the completed form in your homework as a response to this question.

file i01296

Answers

Answer 1

Answer 2

Here is a sample voicemail message I made in April of 2007 for contacting multiple oil refineries in California (on behalf of students):

Hello. My name is Tony Kuphaldt, and I'm an instructor of Instrumentation and Control Technology at Bellingham Technical College in Washington state. My telephone number is 360-752-8477.

I have a class of 19 students ready to graduate this June with their two-year Associates degree in Instrumentation, and some of them are specifically looking to move to California. I'm interested in exploring job opportunities with your company, for the benefit of these students. We have placed graduates in Instrument/Electrical positions at other oil refineries in California, including BP in Carson (near LA), and Tesoro in Martinez (Bay Area). I believe these students' skill set would be valuable to your operation, and I would like to see if this year's graduates could fulfill some of your technical staffing needs.

Again, my telephone number is 360-752-8477. Please feel free to contact me about any open positions you may have at the moment, or that you predict you may have later in the year.

I look forward to discussing possibilities with you. Thank you very much!

Answer 3

This is a graded question – no answers or hints given!

Answer 4

There is no answer for me to give on this sort of question!

Answer 5

Activate the emergency response system for the facility. Sometimes this may take the form of a fire alarm pull box, or perhaps a radio (walkie-talkie) call for help. Whatever emergency response system is in place at this facility, you need to summon help right away so that qualified people attend to the injured person, and also so you do not succumb to the same hazard in trying to help the injured person.

Follow-up question: think of a scenario where *not* activating the emergency response system as a first step could cause additional problems.

Answer 6

I'll let you research the answers to these questions!

Answer 7

By connecting the three wires together, you make them electrically common to each other. This prevents any substantial voltage (potential difference) developing between them. Likewise, connecting the three wires to the earth makes them electrically common to the earth, preventing any substantial voltage from developing between any of the wires and ground.

Follow-up question: after the linemen are done with their work, they remove the grounding wires from the power lines before they close the disconnect switches. Explain why this is done, by describing the catastrophic consequences of closing the disconnect switches with the grounding wires still in place.

Answer 8

I'll let you research the answers to these questions!

Answer 9

Answer 10

I'll let you research the answers to this question!

Answer 11

You may use **Snipping Tool** in Microsoft Windows to capture a screenshot and save it as a graphic image file.

Alternatively, pressing the **Print Screen** button on any computer keyboard saves an image of the screen's contents, where it may be "pasted" into any program accepting graphic images.