

ELECTRO-TECHNOLOGIES

SECTION J: SAMPLE STUDENT LEARNING GUIDES

The following pages provide background information, strategies and a template for developing student learning guides. Also included at the end of this section are several sample student learning guides for Electro-Technologies.

A student learning guide provides information and direction to help students attain the expectations defined in a specified CTS course. It is designed to be used by students under the direction of a teacher.

Many excellent student learning guides (SLGs) are available for use and/or are in the process of being developed. While Alberta Education provides a development template accompanied by some samples, most student learning guide development is being done by individuals and organizations across the province (e.g., school jurisdictions, specialist councils, post-secondary organizations). Refer to the *Career & Technology Studies Manual for Administrators, Counsellors and Teachers* (Appendix 11) for further information regarding student learning guide developers and sources.

Note: A student learning guide is not a self-contained learning package (e.g., Distance Learning Module), such as you might receive from the Alberta Distance Learning Centre (ADLC) or Distance Learning Options South (DLOS).

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BACKGROUND INFORMATION

A Student Learning Guide (SLG) is a presentation of information and direction that will help students attain the expectations defined in a specified CTS course. It is designed to be used by students under the direction of a teacher. A SLG is not a self-contained learning package such as you might receive from the Alberta Distance Learning Centre (ADLC) or Distance Learning Options South (DLOS).

Each SLG is based on curriculum and assessment standards as defined for a particular CTS course. Curriculum and assessment standards are defined in this document through:

- general and specific outcomes (Sections D, E and F)
- assessment criteria and conditions (Sections D, E and F)
- assessment tools (Section G).

The SLG is written with the student in mind and makes sense to the student in the context of his or her CTS program. SLGs are designed to guide students through courses under the direction of the teacher. They can be used to guide:

- an entire class
- a small groups of students
- individual students.

In some instances, the Student Learning Guide may also be used as teacher lesson plans. When using SLGs as teacher lesson plans, it should be noted that they tend to be:

- learner-centred (versus teacher-directed)
- activity-based (versus lecture-based)
- resource-based (versus textbook-based).

Components of a Student Learning Guide

The student learning guide format, as developed by Alberta Education, typically has *seven* components as described below.

1. *Why Take This Course?*

This section provides a brief rationale for the work the student will do, and also establishes a context for learning (i.e., in relation to the strand, a life pursuit, a specific industry, etc.).

2. *What Do You Need To Know Before You Start?*

In this section, prerequisite knowledge, skills and attitudes considered necessary for success in the course are identified. Prerequisites may include other courses from within the strand or from related CTS strands, as well as generic knowledge and skills (e.g., safety competencies, the ability to measure/write/draw, prior knowledge of basic information relevant to the area of study).

3. *What Will You Know And Be Able To Do When You Finish?*

This information must parallel and reflect the curriculum and assessment standards as defined for the course. You may find it desirable to rewrite these standards in less formal language for student use.

4. *When Should Your Work Be Done?*

This section provides a timeline that will guide the student in planning their work. The timeline will need to reflect your program and be specific to the assignments you give your students. You may wish to include a time management chart, a list of all assignments to be completed, and instructions to the student regarding the use of a daily planner (i.e., agenda book) to organize their work.

5. *How Will Your Mark For This Course Be Determined?*

This section will interpret the assessment criteria and conditions, assessment standards, assessment tools and suggested emphasis as defined for the course within the context of the projects/tasks completed. Accepted grading practices will then be used to determine a percentage grade for the course—a mark not less than 50% for successful completion. (**Note:** A course is “successfully

completed” when the student can demonstrate ALL of the exit-level competencies or MLEs defined for the course.)

6. *Which Resources May You Use?*

Resources considered appropriate for completing the course and learning activities are identified in this section of the guide. The resources may be available through the Learning Resources Distributing Centre (LRDC) and/or through other agencies. Some SLGs may reference a single resource, while others may reference a range of resources. Resources may include those identified in the Learning Resource Guide (Section I) as well as other sources of information considered appropriate.

7. *Activities/Worksheets*

This section provides student-centred and activity-based projects and assignments that support the course learner expectations. When appropriately aligned with curriculum and assessment standards, successful completion of the projects and assignments will also indicate successful completion of the course.

Strategies for Developing Student Learning Guides

Prior to commencing the development of a student learning guide, teachers are advised to obtain:

- the relevant Guide to Standards and Implementation
- the student learning guide template.

Information communicated to the student in the SLG must parallel and reflect the curriculum and assessment standards as defined for the course. Therefore, critical elements of the Guide to Standards and Implementation that need to be addressed throughout the SLG include:

- general and specific outcomes
- assessment criteria and conditions
- assessment standards
- assessment tools.

Additional ideas and activities will need to be incorporated into the student learning guide. These can be obtained by:

- reflecting on projects and assignments you have used in delivering programs in the past
- identifying human and physical resources available within the school and community
- networking and exchanging ideas (including SLGs) with other teachers
- reviewing the range of resources (e.g., print, media, software) identified in the Learning Resource Guide (Section I) for a particular course/strand.

Copyright law must also be adhered to when preparing a SLG. Further information and guidelines regarding copyright law can be obtained by referring to the:

- *Copyright Act*
- *Copyright* and the *Can Copy Agreement*.

A final task in developing a student learning guide involves validating the level of difficulty/challenge/rigour established, and making adjustments as considered appropriate.

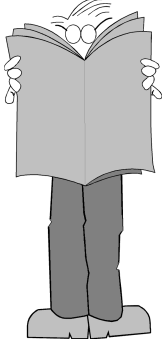
A template for developing student learning guides, also available on the Internet, is provided in this section (see “Student Learning Guide Template,” pages J.5–10). Several sample student learning guides are also provided in this section (see “Sample Student Learning Guides,” starting on page J.11).

CAREER & TECHNOLOGY STUDIES



SAMPLE STUDENT LEARNING GUIDE TEMPLATE

WHY TAKE THIS COURSE?



WHAT DO YOU NEED TO KNOW BEFORE YOU START?



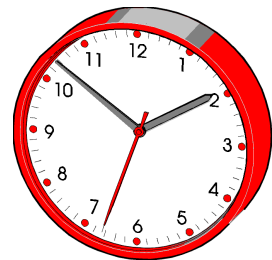
WHAT

**WILL YOU KNOW AND
BE ABLE TO DO
WHEN YOU FINISH?**

-
-
-
-
-
-
-
-
-

WHEN

SHOULD YOUR WORK BE DONE?

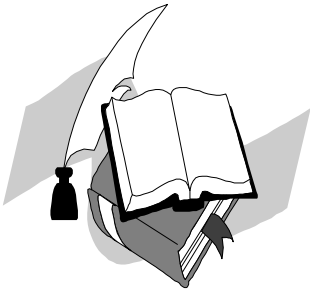


HOW WILL YOUR MARK FOR THIS COURSE BE DETERMINED?

| | PERCENTAGE |
|--|------------|
| | |

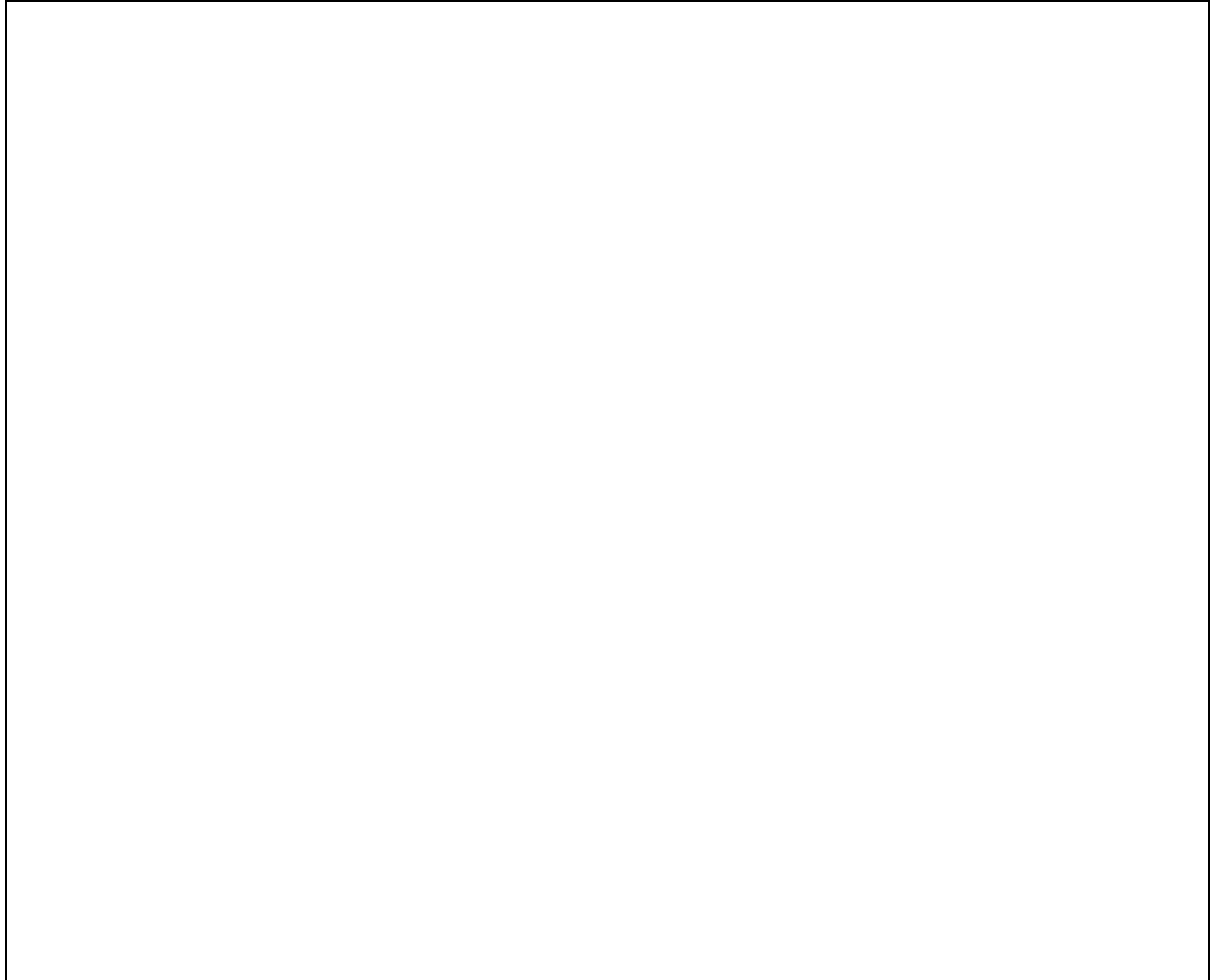


WHICH RESOURCES MAY YOU USE?



| |
|---|
| <ul style="list-style-type: none">••••••• |
|---|

ACTIVITIES/WORKSHEETS



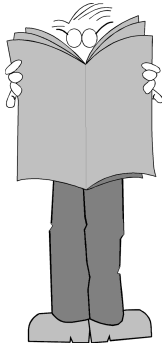
CAREER & TECHNOLOGY STUDIES

ELECTRO-TECHNOLOGIES

SAMPLE STUDENT LEARNING GUIDE

ELT1010 Electro-assembly 1

WHY TAKE THIS COURSE?



The areas of electricity and electronics offer many job opportunities. Competent electronics technicians will be in demand well into the 21st century. An understanding of basic technology, principles and skill will enable you to learn about many other areas of electronics.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

There are no prerequisites identified for this course.

However, you should be able to make basic arithmetic calculations and be able to read and follow instructions accurately.



ELT1010 Electro-assembly 1

WHAT

**WILL YOU KNOW AND
BE ABLE TO DO
WHEN YOU FINISH?**

Upon completion of this course you will be able to:

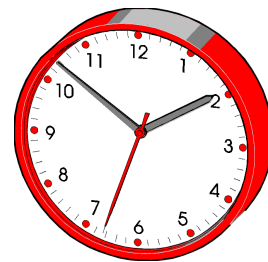
- apply the appropriate fabrication techniques, including proper soldering and component assembly procedures, to construct and test a simple electronic circuit
- apply the appropriate fabrication techniques to construct and test an electromagnetic device
- identify and assemble common electrical/electronic cables and connectors used in power, audio and video connections
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

WHEN

SHOULD YOUR WORK BE DONE?

Your teacher will give you a timeline for completing tasks and assignments within this course. Usually the work will be completed within 15 classes from the starting date.

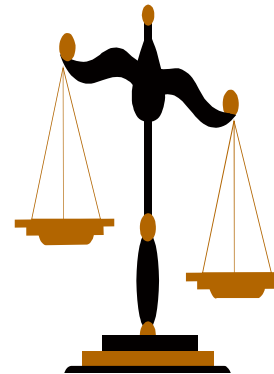
You may also wish to use a time-management planning chart to preplan the work that needs to be done in this course. Plan how you will use your class time as well as extra time needed to complete the assignments in this course.



ELT1010 Electro-assembly 1

HOW WILL YOUR MARK FOR THIS COURSE BE DETERMINED?

| | EMPHASIS |
|---|----------|
| You must first demonstrate all of the competencies required for this course. | |
| When you have done this, your mark will be determined as follows: | |
| <ul style="list-style-type: none">• Splicing | 10% |
| <ul style="list-style-type: none">• Wire and Cable | 10% |
| <ul style="list-style-type: none">• Small Circuit | 20% |
| <ul style="list-style-type: none">• Measuring Instruments | 10% |
| <ul style="list-style-type: none">• Electromagnetic Devices | 20% |
| <ul style="list-style-type: none">• Components | 20% |
| <ul style="list-style-type: none">• Troubleshooting | 10% |



WHICH RESOURCES MAY YOU USE?



- (BE) *Basic Electronics Series A, B, C, D, E.*
- (EL) *Elementary Electronics.*
- (EO) *Essentials of Electronics.*
- (GC) *GCSE Electronics.*
- (QH) *Quality Hand Soldering and Circuit Board Repair.*
- (TE) *Troubleshooting Electrical/Electronic Systems.*
- The attached worksheets.
- John Shore booklet.

ACTIVITIES/WORKSHEETS

1. Splicing (attached sheets)
 - Watch demo by instructor
 - Read (QH)
2. Wires and Cables (attached sheets)
 - BNC cables
 - Banana plug test leads
 - Alligator clip test leads
 - Telephone connectors
 - RF cables
 - Extension cords
3. Small Circuits (attached sheets)
 - Watch demo by instructor
 - Lamp
 - Single doorbell
 - Double doorbell
 - Multiple doorbells
4. Measuring instruments
 - Read (BE) p. 47A; (EE) Ch. 4; (EL) Ch. 2, pp. 21–23; (EO) Ch. 8, pp. 73–90; (FE) pp. 54–60; (TE) Ch. 4, pp. 73–80–98
 - Read appropriate manuals
 - Measure cells and batteries (attached sheet)
 - Measure resistors (attached sheet)
5. Electromagnetic devices
 - See John Shore booklet
 - Construct an electromagnetic device
 - Demonstrate the operation of an electromagnetic device
6. Component identification and installation
 - Lesson by instructor
 - Watch demo by instructor
 - Solder components onto boards
 - Breadboarding
7. Troubleshooting
 - Repair of small appliances (as available)
 - blow dryer
 - curling iron
 - toaster
 - kettle

ELT1010 Electro-assembly 1

WIRE SPLICING PROCEDURE

Materials Needed

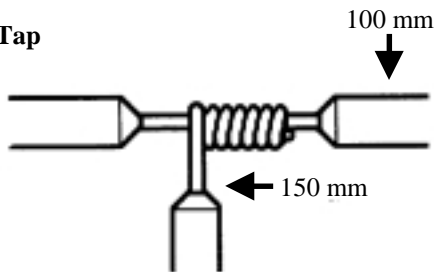
- 10 pieces of 14 gauge solid wire, 100 mm long
- 3 pieces of 14 gauge solid wire, 150 mm long
- 7 pieces of 19 gauge stranded wire, 100 mm long

Pigtail



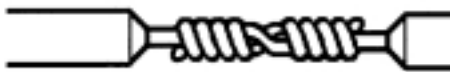
- Make 3 pigtails
- Use 2 pieces of 100 mm solid wire
- Strip 25 mm of insulation off one end of each wire
- Twist the wires together as shown
- Clip the uneven ends off the wires

Tap



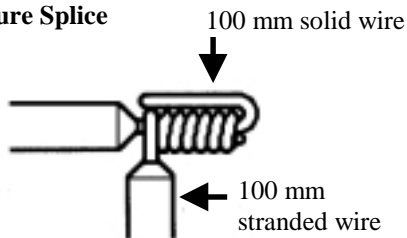
- Make 3 taps
- Use 1 piece of 100 mm solid wire
- Use 1 piece of 150 mm solid wire
- Strip 65–70 mm off the end of the 150 mm wire
- Strip 25 mm out of the middle of the 100 mm wire
- Twist the wires together as shown
- You must have at least 6 complete wraps

Western Union



- Make 3 Western Unions
- Use 2 pieces of 100 mm stranded wire
- Strip 37 mm of insulation off one end of each wire
- Twist the wires together as shown
- Ensure the stranded wire does not splay apart
- You must have at least 3 turns on either side of the cross over

Fixture Splice



- Make 1 fixture splice
- Use 1 piece of 100 mm solid wire
- Use 1 piece of 100 mm stranded wire
- Twist the wires together as shown

Note: Make sure the ends on all splices are wrapped in tight.
Have the instructor check your splices and initial here. _____

ELT1010 Electro-assembly 1

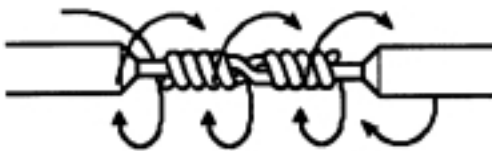
Soldering

1. We solder connections to increase strength and to make a better connection with lower resistance.
2. Read the MSDS regarding FLUX and SOLDER.
FLUX must be put on splices before they can be soldered. Use FLUX sparingly. FLUX does three things: it removes oxides (cleans the metal), it breaks down surface tension (allows solder to flow more easily along the wire), and it acts as a catalyst (helps to form a better bond between the solder and the wire).
3. Observe a demonstration of the correct method of soldering by the instructor.
4. The soldering pencil or soldering gun is only a source of heat. **DO NOT** put solder on the tip and try to spread it around on the splice. Use the soldering pencil to heat the splice. Push the solder against the splice. When the splice is hot enough it will melt the solder. The solder will run freely throughout the splice. Take away the solder. Take away the soldering pencil. **LET IT COOL!!**
5. Have the instructor check your soldering and initial here. _____

Taping

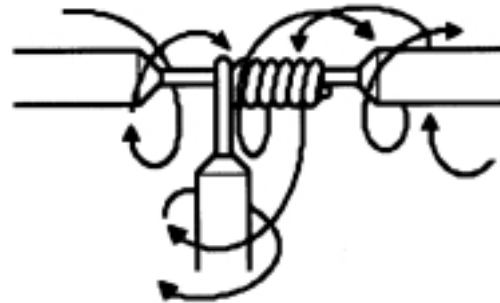
1. One of each type of splice must be taped with electrical tape (except the fixture splice).
2. Follow the arrows in the diagrams for proper procedure.
3. Pull the tape tight as you wrap it.
4. When finished you should not be able to see any bare wire, all uninsulated wire should have 3 layers of tape on it, and there should not be any openings or gaps in the layers of tape, **NO WRINKLES OR FOLDS**.
5. Have the instructor check each taping sample after it is taped.

Western Union



Circular pattern around the wire

Tap



**FOLLOW ARROWS – AND PUT
THREE LAYERS OF TAPE
OVER THE SPLICED AREA**

Instructor's Initials _____

Instructor's Initials _____

ELECTRO-TECHNOLOGIES

ELT1010 Electro-assembly 1

Pigtail

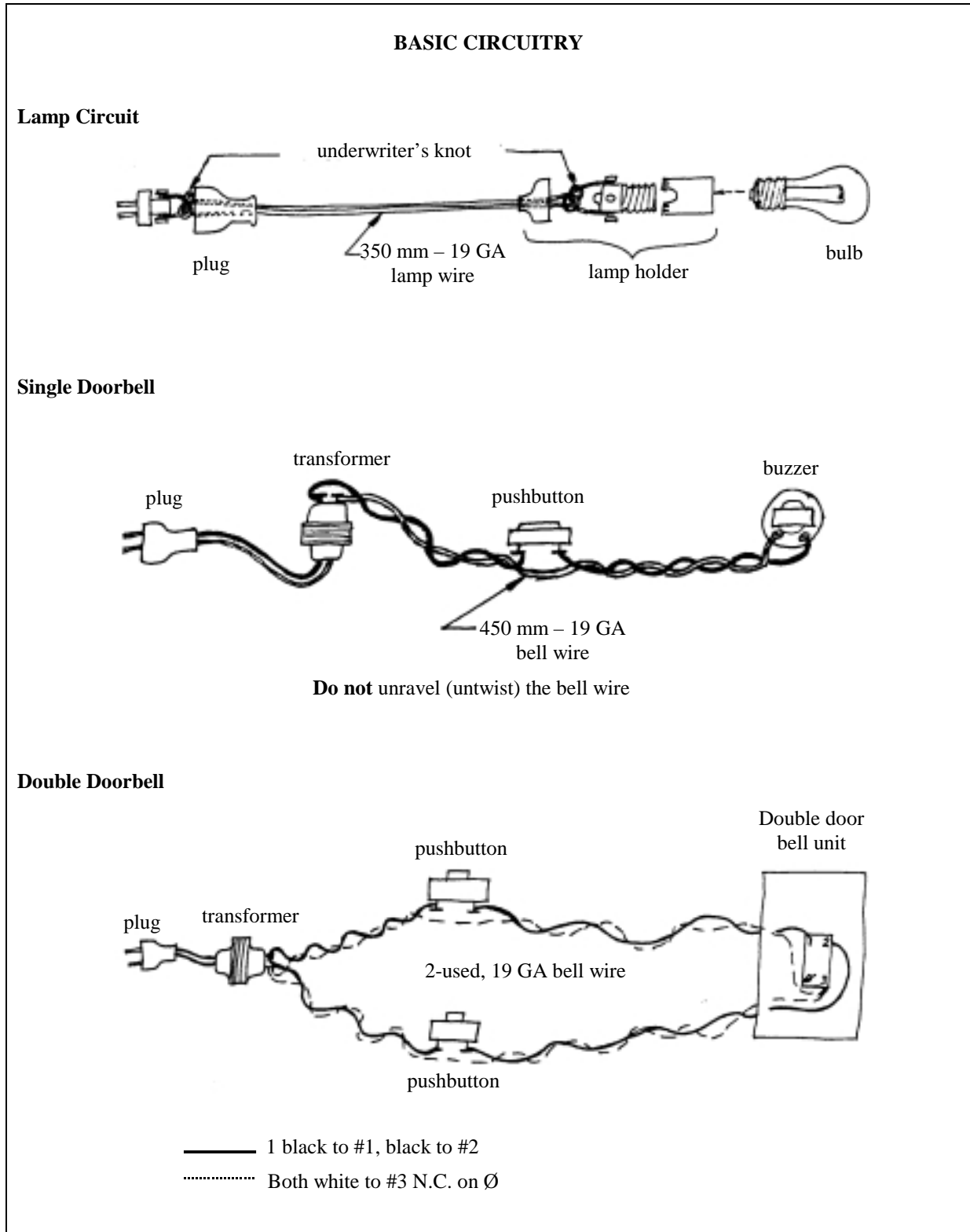


Instructor's Initials _____

Hand In

Use a minimum length of masking tape to tape all of your splicing samples together, put your name neatly on the tape and hand in all of your splicing work for marking.

ELT1010 Electro-assembly 1



ELT1010 Electro-assembly 1

Student's Name _____

Cell and Battery Measuring Exercise

Measuring Instruments

Answer the following questions:

1. How many instruments measure AC?
2. How many instruments measure DC?
3. How many instruments measure V?
4. How many instruments measure A?
5. How many instruments measure Ω ?

Start time: _____ End time: _____

| | | | |
|---------------|----|---|-----|
| <u>Marks</u> | | | |
| Speed of work | 1 | 2 | 3 |
| Accuracy | 1 | 2 | 3 |
| Neatness | 1 | 2 | 3 |
| Complete | +1 | | |
| | | | /10 |

| Cell or Battery | #, Letter | Analogue | | Digital | |
|-----------------|-----------|----------|---|---------|---|
| | | V | A | V | A |
| AA | | | | | |
| AA | | | | | |
| C | | | | | |
| C | | | | | |
| D | | | | | |
| D | | | | | |
| 9V | | | | | |
| 9V | | | | | |
| 4½V | | | | | |
| 6V | | | | | |
| 12V | | | | | |
| | | | | | |
| | | | | | |

| | | | |
|---------------|----|---|-----|
| <u>Marks</u> | | | |
| Speed of work | 1 | 2 | 3 |
| Accuracy | 1 | 2 | 3 |
| Neatness | 1 | 2 | 3 |
| Complete | +1 | | |
| | | | /10 |

Resistance Measuring Exercise

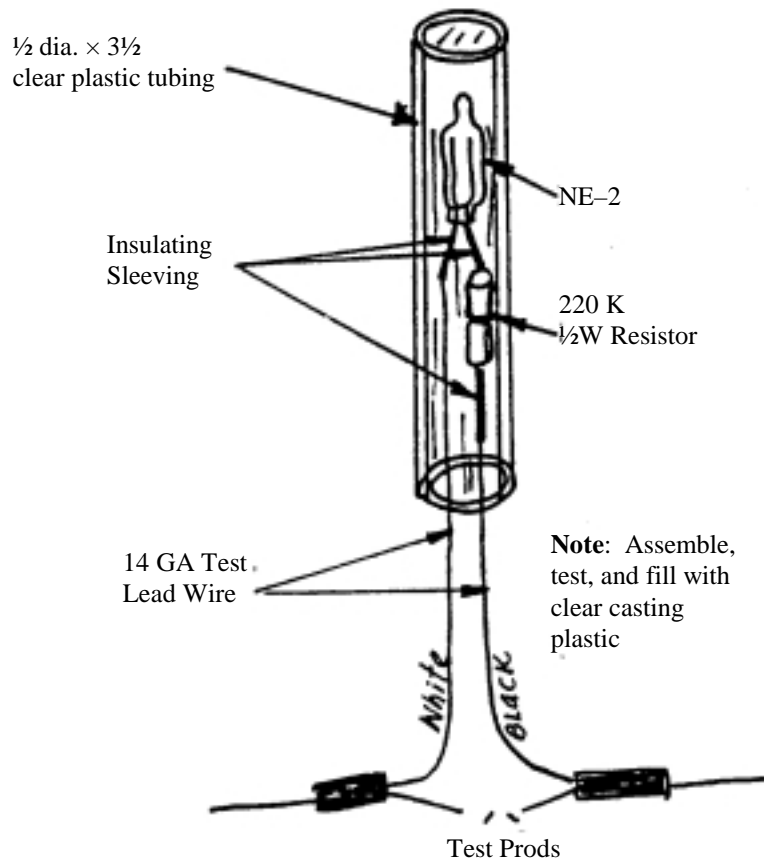
| # | Colour Code | Value | Tolerance | Tolerance Range | Measured | Comment |
|----|------------------------------|-----------|-----------|-----------------------|-----------|---------|
| 0 | brown, violet, green, silver | 1 700 000 | ±10% | 1 530 000 – 1 870 000 | 1 690 000 | good |
| 1 | | | | | | |
| 2 | | | | | | |
| 3 | | | | | | |
| 4 | | | | | | |
| 5 | | | | | | |
| 6 | | | | | | |
| 7 | | | | | | |
| 8 | | | | | | |
| 9 | | | | | | |
| 10 | | | | | | |

ELT1010 Electro-assembly 1

Ideas and Methods

Electricity Circuit Tester

Idea by GrayMark
Instructions by St. Albert Industrial
Education Teachers Group



Electrical Tester

ELT1010 Electro-assembly 1

1. Measure and cut a 9 cm piece of acrylic tube.
2. File, sand and buff only one end of this piece of tube.
3. Obtain the remainder of the materials from the instructor.
4. Study the diagram for the procedure in making a Western Union splice.
5. Position the resistor about 15 mm from the neon lamp and use the Western Union splice to connect the two leads together.
6. Strip off 1 cm of insulation from one end of each number 14 wire.
7. Twist together one lead from the neon lamp with one of the number 14 lead wires.
8. Twist the other lead from the resistor to the second number 14 lead wire.
9. **CHECKPOINT**
Have your teacher inspect your connections and give you a soldering demonstration if necessary.
10. Solder the connections.
11. Insert the assembled components into the tube until the end of the neon bulb is 10 mm from the end of the tube.
12. Now bend the two lead wires over opposite edges of the other end of the tube to keep the components in place.
13. Have the instructor check your work at this point.
14. Place masking tape over the open end of the tube and place the tube in the holding jig taped end down. Put your name on the masking tape.
15. Put on a face shield.
16. Have the instructor assist you in mixing the resin and catalyst.
Note: Catalyst is highly dangerous to the eyes.
17. Pour the mixture into the tube until it is full. Leave the rest of the mixture in the cup.
18. Carefully remove the tube from the jig and place it in the storage cupboard. It will take 12 hours to set.
19. After the resin is set, remove the masking tape and file or sand the end of the tube down to the level of the resin.
20. Use wet and dry sand paper to give a smooth finish to the top of the tester.
21. Obtain permission to use the buffer and buff the top of the tester.
WEAR EYE PROTECTION.
22. Cut the longer lead end to the same length as the shorter one.
23. Strip 10 mm of the insulation from both leads of the tester.
24. Have the instructor test and mark your project.

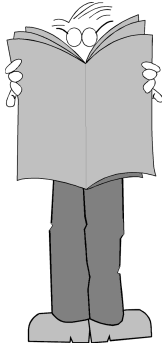
CAREER & TECHNOLOGY STUDIES

ELECTRO-TECHNOLOGIES

SAMPLE STUDENT LEARNING GUIDE

ELT1130 Robotics 1

WHY TAKE THIS COURSE?



Industries of all kinds use robots to perform repetitive tasks or hazardous work. They might be used to weld, fasten or paint automobile parts or transport goods in a factory or warehouse or to remove and dispose of a bomb and in the process, save human life!

Watching a robot in action can give you the impression that these machines have an intelligence of their own. In fact robots must be designed and programmed by humans.

Are you ready for an exciting and intense study of robotics?

In this course you will learn the basics in the world of robots. You will program a commercial robot and make it perform useful tasks. You will also design, assemble and program robots from kits to solve problems.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

Prerequisite: ELT1010 Electro-assembly 1

In addition, you should be able to:

- use basic hand tools in a safe manner
- be able to follow instructions as given in tutorial and assembly manuals
- work very hard and use time wisely
- enjoy assembling kits
- demonstrate a positive attitude to problem solving (e.g., stick to the task even when the going gets tough).



WHAT WILL YOU KNOW AND BE ABLE TO DO WHEN YOU FINISH?

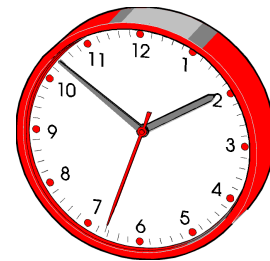
Upon completion of this course you will be able to:

- describe the evolution and applications of robotic systems
- identify and classify robotic systems and subsystems
- design and build a direct control robotic system
- demonstrate established laboratory procedures and safe work practices
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

Your teacher will give you a timeline for completing tasks and assignments within this course.

You may also wish to use a time-management planning chart to preplan the work that needs to be done in this course. Plan how you will use your class time as well as extra time needed to complete the assignments in this course.



HOW WILL YOUR MARK FOR THIS COURSE BE DETERMINED?

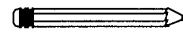
You must first demonstrate **all** of the competencies required for this course.

When you have done this, your mark will be determined as follows:

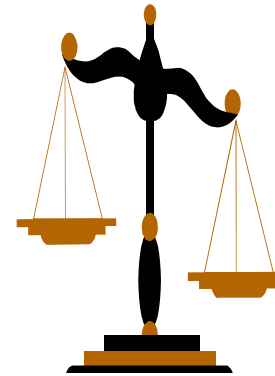
Each of the three major sections of this course has its own evaluation sheet. Your marks on each sheet will be determined by your own evaluation of your work and by your teacher's evaluation. Your final mark for this course will be totalled from these three sheets.

When you have completed any of sections A, B or C find the evaluation sheet near the back of this package and fill in the student column.

The following graphic will remind you during each section.



Remember to complete your self-evaluation!



WHICH RESOURCES MAY YOU USE?



- *Robix Construction Techniques* (Video)
- *Robix RCS–6 Models* (Video)
- *Eshed – Robotics Training Program:*
 - Textbook 1 *Fundamentals of Robotics*
 - Textbook 3 *Robotic Laboratory Experiments*
 - Textbook 4 *Robotic Structure*
 - Workbook 1 *Fundamentals of Robotics*
 - Workbook 3 *Robotic Laboratory Experiments*
 - Workbook 4 *Robotic Structure*
- *Eshed – Advanced Robotics Laboratories*, Booklet 2, Accessory Exp.

Robix RCS–6 Robot Kit and Computer

- *Robix Software V1.03*
- *Robix User’s Guide* and Project Book

Lego Dacta

- *Construction Kit #9701*
- *Lego Control Lab Software V1.0*
- *Technology Investigations and Inventions*, Lego Dacta
- *Quick Start Guide*, Lego Dacta
- *Reference Guide*, Lego Dacta

General Reference

- *Robotics Curriculum Package #1 and 2* by Brian Rutherford
- *The Robot Builders Bonanza*; 99 Inexpensive Robotics Projects by Gordon McComb
- *Introduction to Robots*, Mid-America Vocational Curriculum Consortium
- *The Way Things Work*, David Macaulay
- *Isaac Asimov’s “The Ultimate Robot”* CD ROM for Mac

ACTIVITIES/WORKSHEETS

Each section below has a list and description of your assignments and activities. There are two blanks by each activity. One is for you to write in your estimated completion date and the other is for your teacher's initials, which you should obtain as soon as you have completed a section. Budget your time wisely. To help you remain accountable for your time, during the first class hand in the completed due date sheet at the back of this package. The dates on this sheet should match the dates you estimate for the activities below.

SECTION A: Introduction to Robots and Fundamentals of Robotics (Sample Activities)

In this section you will be thoroughly immersed into the world of robotics. You will complete a test to see how much you know about robotics before you start and another test at the end to measure how much you learned. You will have the opportunity to teach, program and operate the Scorbot robot arm and use it to solve exciting problems like bomb disposal. The Scorbot robot arm is a commercial model. Variations of this accurate robot are used for laser surgery.

Time Budget: Approximately 9 hours

1. Introduction to Robots: Pretest

- Locate "Introduction to Robotics." Answer the questions to the pretest on the sheet provided in this package. This test measures your knowledge of robotics before you start. You need not worry about not knowing all answers as the mark for the test will not count in the course mark. This must, however, be completed. Ask for the marking guide when complete.

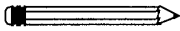
Date _____ Init. _____

Don't forget to get your instructor to initial your activities when complete

2. Introduction to Robots: Activities 1–10

- Locate "Introduction to Robotics" and the robot arm. Ten activities can be found. If you read carefully, the step-by-step nature of the material will guide you through all activities. If you really feel that you are stuck, ask your instructor for help. Each activity has review questions at the end. These questions are to be answered neatly in your notebook and should be ready for inspection at the end of this section.

Date _____ Init. _____


Remember to complete your self-evaluation!

3. Introduction to Robots: Post-test

- Ask your instructor for the post-test. Answer these questions on the sheet provided in this package. This test measures your knowledge of robotics now that you have completed ten activities. The mark for this test will be counted in your course mark.

Date _____ Init. _____

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4. Robotics Fundamentals Chapters 1–5 and worksheets Date _____ Init. _____
 Attached to this package is a handout entitled “Robotic Fundamentals.” This handout is your textbook and includes worksheets on the chapters, which should be completed to help you prepare for the quiz below.

5. Robotics Fundamentals Chapters 1–5 Quiz Date _____ Init. _____
 When you are ready ask your instructor for this quiz.

6. Section Evaluation Date _____ Init. _____

SECTION B: Robix and Lego Dacta – Robot Model Construction and Programming

In this section you will have the opportunity to work with some incredible Lego and a robotics kit. The exercises in this section take you beyond the “robot arm” to other robotic models. Both of these systems are very flexible and leave lots of room for creativity. If you enjoyed playing with Lego when you were younger you will enjoy these kits. Be careful, however, not to spend too much of your time with building and assembling, because you will be required to program and make your robot models operational.

Time Budget: Approximately 9 hours

1. Robotics RCS–6 Robot Project Date _____ Init. _____
 Locate the robix components and user’s guide inside. You will also need two videos, one entitled *RCS 6 Construction Techniques* and the other *RCS 6 Models*. Ask your instructor which computer you will use and how to load the Robix software.

- You should start by watching the models video. This video will inspire you and show you the potential of the Robix system. Look for the footage of a model named “strider” (looks like a little man with eyes); this will be your first project. Watching a few minutes of the construction video will help you with the assembly techniques. Detailed construction and programming help along with actual program code for the “strider” can be found in the user’s guide. Demonstrate this model to your instructor when complete.

2. Lego Dacta Robotics and Automation Date _____ Init. _____
 Obtain the 9701 Lego Dacta Kit. Build the robotic arm model. An assembly diagram (#9701–7) for this model is in the kit. Once the robot is assembled, obtain the computer interface controller, the reference guide and the book entitled “Technology Investigations and Inventions.”

Important: The Lego kits are very expensive and contain many pieces. Part of your mark for this section is taken from your ability to manage the kit effectively; i.e., no missing pieces!

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- Ask your instructor which computer has the Control Lab V1.0 software. Read chapter one in the Reference Guide. This chapter will familiarize you with the software and interface controls.

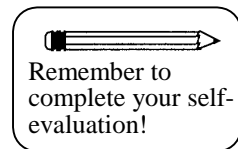
- Now open the Technology Investigations and Inventions book to page 2.1. This is where the fun begins. Pages 2.1 to 2.3 get you warmed up to the problem you are going to solve with your robot. Page 2.5 gives you the suggested hookups to the interface/controller. Starting on page 2.6 you will need to concentrate on the instructions. They will step you through all procedures concerning the set-up page, the command centre, the project page and the procedures page. The actual coding for the procedures page can be found on page 2.12.

- You can expect some difficulties along the way. There are many details to pay attention to in order to get the robot model working correctly. Don't allow yourself to get too frustrated. Take your time (take a break if needed) and retrace your steps through the manual. If you have read all the required pages and feel that you have done your best, but still can't solve the problem, ask your instructor for help.

- Once you have the robot functioning correctly, demonstrate it to your instructor.

- Now feel free to modify this Lego model. Use no more than one class period to add more motors or sensors or change the programming to perform a different task.

- Now return your Lego Dacta kit to the organized condition shown on the side of the box. Make sure your kit contains all of the required pieces as outlined on the inventory pages in the kit's manual. Have your instructor inspect your kit and initial this activity.



3. Section Evaluation

Date _____ Init. _____

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SECTION C: Robotics Projects

In this section you will test your combined knowledge of robotics and your creative and innovative abilities. By now you have seen a variety of robot applications in the various books and videos used in this course. It's time for you to come up with your own application for robotics.

Time Budget: Approximately 7 hours

Choices

Your own original idea! (*not for the faint of heart*)

Date _____ Init. _____

- Use one of the available robotic systems in the lab to design a solution for your own problem. Explain your idea to your instructor before you start. Now complete a basic plan that states your objectives (the problem[s] you are going to solve) and outline the basic steps you will need to follow to complete your project. A simple flow chart like those available in the Claris Impact software would work here.

Or

Using the Robix RCS-6 system

- Assemble, program and demonstrate two of the models shown in the video (other than the strider).

Or

Scorbot ER3 Robot Arm

- Complete activity 11 in "Introduction to Robots."

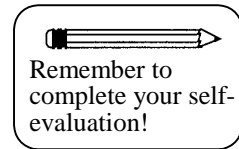
Plus

Lego Dacta

- Complete and demonstrate one more model from the plans in the Lego kit.

Section Evaluation

Date _____ Init. _____



Are You Done?

Feel free to spend your remaining course time exploring Isaac Asimov's robot world on the Mac. CD-ROM game "The Ultimate Robot"

