FABRICATION STUDIES

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 Fabrication Studies.

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 Learning 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).

Note: A student learning guide is not a self-contained learning package like those developed by the Learning Technologies Branch (LTB) or Distance Learning Options South (DLOS).

TABLE OF CONTENTS

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 specific outcomes 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 specific outcomes. 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*.

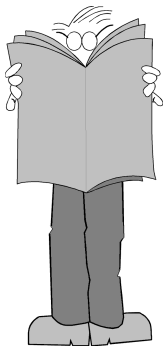
A final task in developing a student learning guide involves validating the level of difficulty/ challenge/rigour established, and making adjustments as considered appropriate.

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?

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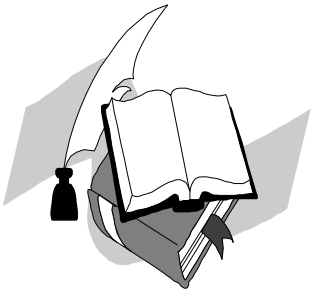
WHEN

SHOULD YOUR WORK BE DONE?

HOW WILL YOUR MARK FOR THIS COURSE BE DETERMINED?

	PERCENTAGE

WHICH RESOURCES MAY YOU USE?



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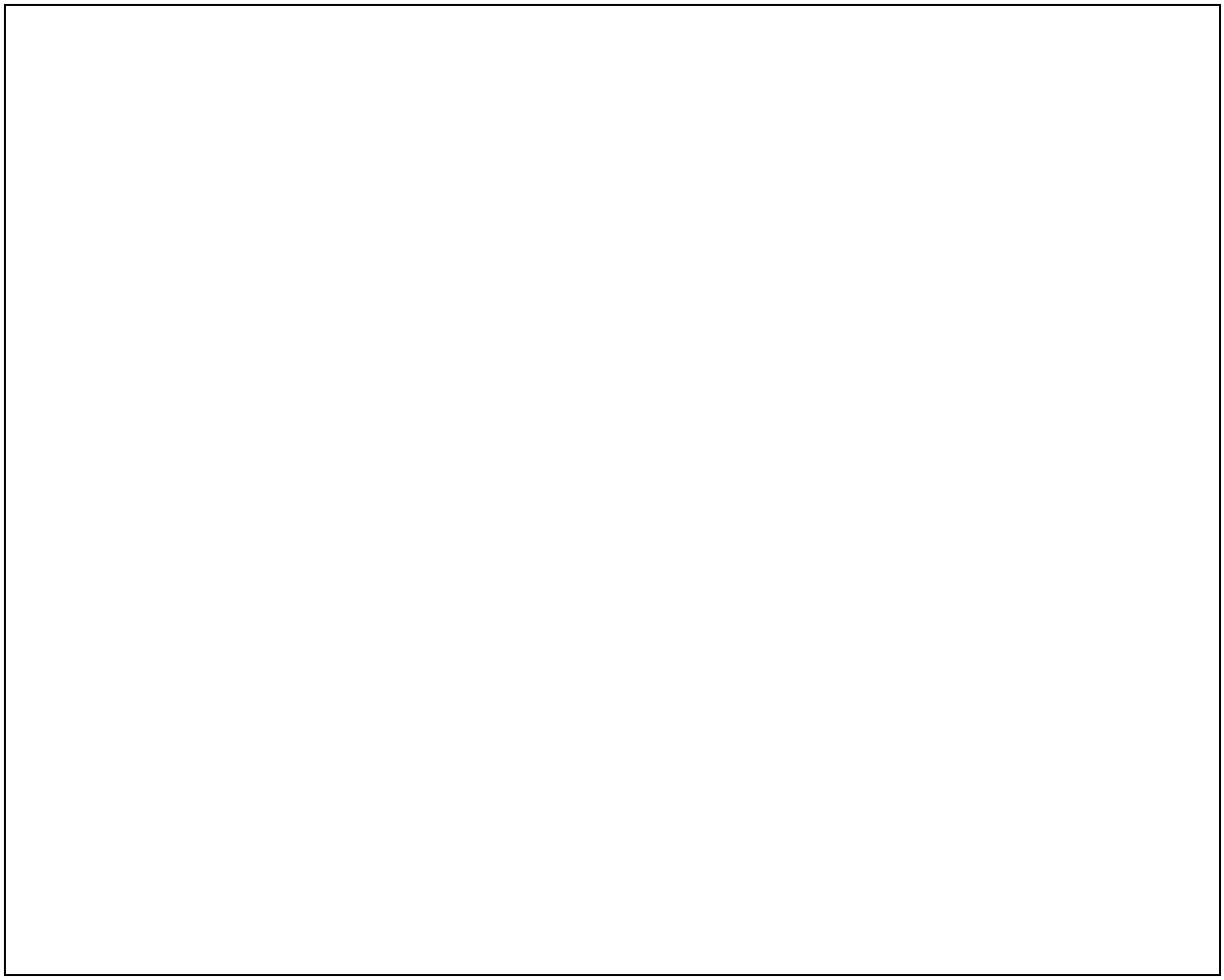
ACTIVITIES/WORKSHEETS



CAREER & TECHNOLOGY STUDIES

FABRICATION STUDIES

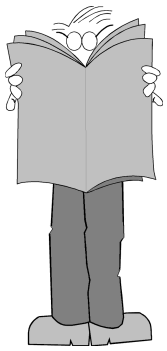
SAMPLE STUDENT LEARNING GUIDE

FAB1010 Fabrication Tools & Materials

FABRICATION STUDIES

FAB1010 Fabrication Tools & Materials

WHY TAKE THIS COURSE?



Ever since the beginning of the Stone Age, people have used technology to build needed artifacts and structures.
This course will:

- introduce you to common tools and materials
- help you understand the basic techniques used in fabrication processes
- experience the satisfaction of fabricating a useful product.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

There are no prerequisites identified for this course.

However, you should be able to read, follow directions and work with others in a safe manner.

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

Upon completion of this course you will be able to:

- identify and describe the safe use of basic hand tools
- identify and compare the properties of common metals used in fabrication activities
- apply fabrication processes and skills to produce a useful product
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

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

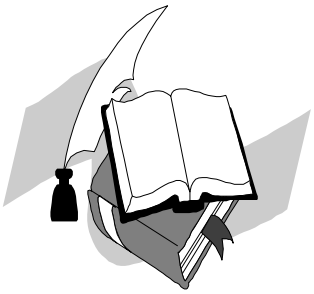
You may also wish to use a time-management planning chart to preplan the work that needs to be done in this course. Plan how you will use your class time as well as extra time needed to complete the assignments in this course.

FAB1010 Fabrication Tools & Materials

HOW WILL YOUR MARK FOR THIS COURSE BE DETERMINED?

	PERCENTAGE
You must first demonstrate **all** of the competencies required for this course. When you have done this, your mark for the course will be determined as follows: • Tool Identification and Use Test (Hand Tools, FAB1010–1) • Report on the Properties of Building Materials (Material Identification, FAB1010–3) • Project Work (Product Assessment, FABPRD)	 15% 10% 75%

WHICH RESOURCES MAY YOU USE?



- *Production Technology*, Stanley A. Komacek, 1993.
- *Technology Shaping Our World*, John Gradwell, et al., 1993.
- *Design and Technology*, Nelson, Colin Caborn, et al., 1989.

ACTIVITIES/WORKSHEETS

1. Technological System

   1.1 People create technological systems to help solve problems. A system often includes these parts: input, process output and feedback. Select a simple household item and identify what:
   - input information and resources were required to make the product
   - processes were used to manufacture the product
   - were the intended and unintended outcomes
   - feedback the manufacturer might need to know to improve the product and the production process.

   1.2 Explain the difference between an open and a closed technological system.

2. Properties of Metals

   2.1 Designers and fabricators make choices about what metals they are going to use based on availability, cost and properties. Identify the cost and availability of five ferrous and/or non-ferrous metals commonly used in fabricating artifacts and structures.

   2.2 Properties of materials tell how a material can be expected to perform during and after fabrication. Identify a simple test that can be used to determine:
   - a mechanical property
   - a metal's reaction to heat
   - how chemicals affect the metal
   - its electrical and magnetic properties.

3. Tool and Equipment Identification

   As you work with technology, you will need to select the correct hand and power tools, and use these tools in a safe manner.

   3.1 Identify and describe the use of two or more tools that can be used safely to:
   - measure
   - mark a surface
   - cut through a metal
   - smooth a metal
   - form a metal
   - hold a metal
   - install a fastener
   - apply a finish.

4. Fabrication Process

4.1 Complete the following activities in consultation with your teacher:
- Choose a simple artifact or structure that can be made from common ferrous or non-ferrous metal.
- Locate a set of plans and a set of procedures that will help you fabricate the product.
- Identify and locate the appropriate materials and tools that are required to make the project.

4.2 The purpose of this activity is to design and fabricate a matching set of structures. One structure will be fabricated using Imperial measurements and the other using SI units of measurement. When you are finished fabricating these structures you will be asked the following questions:
- Which system of measurement was easier to use?
- Which system achieved the greatest accuracy?
- What design features did you incorporate into your plan to add strength to your structure?

Structures to consider fabricating are a set of:
- book ends
- shelf brackets
- "c" clamps.

Evaluation

Your marks for these activities will be based on:
- how well you plan and manage your project
- the work skills you develop and apply
- your project work
- presentation of your project.

CAREER & TECHNOLOGY STUDIES

FABRICATION STUDIES

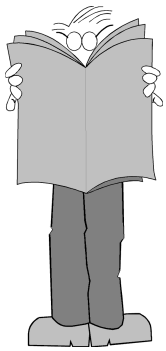
SAMPLE STUDENT LEARNING GUIDE

FAB2010 Structural Engineering

FABRICATION STUDIES

FAB2010 Structural Engineering

WHY TAKE THIS COURSE?



Structures are an essential part of our natural and constructed world. In this course you will:

- learn about many of the factors that designers and engineers need to consider when designing and building a structure
- be able to apply these principles to your project designs.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

Prerequisite: CON1010: Basic Tools & Materials

In addition, to be successful in this course you will need to apply basic math skills and be familiar with fabrication tools, materials and processes.

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

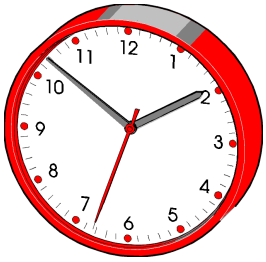
Upon completion of this course, you will be able to:

- list and describe the principal characteristics of all structures
- identify strategies to improve the efficiency of a structure
- apply principles of structural design to fabrication and construction activities
- 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.

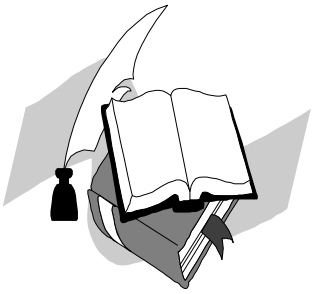


FAB2010 Structural Engineering

HOW WILL YOUR MARK FOR THIS COURSE BE DETERMINED?

	PERCENTAGE
You must first demonstrate **all** of the competencies required for this course. When you have done this, your mark for the course will be determined as follows: • Behaviour of materials presentation • Structural analysis report • Project work (Building Structures, FAB2010–1)	 20% 20% 60%

WHICH RESOURCES MAY YOU USE?



- *The Art of Construction*, Mario Salvadori, 1990.
- *Structure with Materials,* Steve Rich, 1991.
- *Design and Technology*, Colin Caborn, et al., 1989.

ACTIVITIES/WORKSHEETS

Investigation – Activity 1.0

1.1 Research Instructions: Using a separate sheet of paper, answer the following questions in statement form.

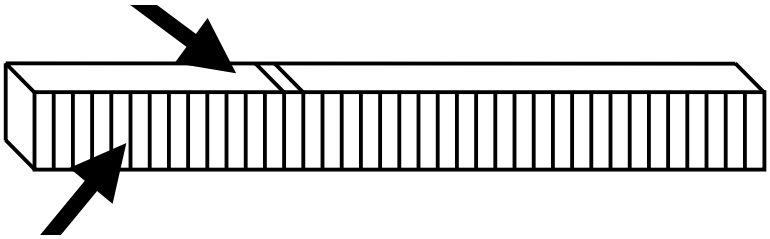
1. Define the term "structure."
2. List 5 natural or human-built structures within the current limits of your vision.
3. Classify these structures as being a frame, shell or non-rigid type structure or combination.
4. Select one of the objects and describe its structural elements.
5. Determine and list the function of each of the above elements.
6. Do any of the above elements provide more than one function? If so explain.
7. What materials are the 5 visible structures made of? Make a list of each.
8. What materials could be substituted for the materials that were used in the construction of these structures?
9. Make a list of these materials that are considered to be natural.
10. Make a list of these materials that are considered to be synthetic.
11. Look at the objects and determine which material(s) appear to be stronger, to wear or last longer.

Testing the Behaviour of Materials – Activity 2.0

Structural materials can all be tested for tensile strength, compressive strength, elasticity and ductility.

2.1 Tensile Testing

- Secure a piece of foam rubber approximately 30 cm (12") length and 5 cm (2") square.
- Using a ruler and felt marker, draw lines in 2.5 cm (1") intervals across the length of the rubber on 2 adjacent sides.



- Research the nature or a tensile load. Load the foam rubber with significant tensile stress and be sure to lock the foam into position securely for the remainder of this lab.
- On a separate sheet of paper sketch the effect of placing the foam rubber under tensile load.
- Measure the overall length of the foam rubber.
- Measure the width of the foam rubber across each of the lines and record the length at each.
- Examine the data and determine the relationship of the material and the loading.
- What general conclusion can you make from your experiment?
- List items currently in your vision which are under tensile load.

2.2 Compression Testing

Research the nature of a compressive load. Load the foam rubber with significant compressive stress and be sure to lock the foam into position securely for the remainder of this lab.

- On a separate sheet of paper sketch the effect of placing the foam rubber under the compressive load.
- Measure the overall length of the foam rubber
- Measure the width of the foam rubber across each of the lines and record the length of each.
- Examine the data and determine the relationship of the material and the loading.
- What general conclusion can you make from your experiment?
- List items currently in your vision which are under compressive load.

2.3 Testing for Elasticity

Research the nature of elasticity (deflection). To understand the nature of elasticity you should be able to set up and experiment using a ruler and strips of metal and plastic which are suspended between two points, e.g., the backs of two chairs.

- Place the metal strip on top of the chair back. Position the ruler to measure the amount of deflection of the metal strip at its centre point. Press down at the centre point of the metal strip to deflect 1 cm. Allow the metal strip to rebound (take the pressure off) and determine if the strip has returned to its original position.
- Continue to alternately measure and apply pressure, increasing 1 cm of deflection each time. Record the amount of deflection and rebound for each sequence forming a data chart.
- Determine the point at which you have exceeded the elastic capability of the material.
- Repeat the experiment using a strip of plastic.
- Which material has greater elasticity? Why?

2.4 Testing for Deflection

Research the nature of toughness (ductility). To understand the nature of toughness you should be able to set up and experiment using strips of metal and plastic which are repeatedly bent until failure results. This type of testing is called destructive testing because the structure is ultimately destroyed to determine its limits.

- Bend the strip of metal into a loop. While counting the cycles alternately move your hands apart, increasing the bend, and move them together, reducing the bend.
- As you are well aware the metal will fail sometime during the cycle. Note the number of cycles required to cause the material to fail.
- Repeat the experiment using a strip of plastic. Note the number of cycles required to cause the material to fail.
- Which material has greater toughness (ductility)? Why?

Structural Elements – Activity 3.0

3.1 Using a separate sheet of paper, answer the following questions in complete sentences.

1. Define the structural element called a beam.
2. Why is a beam described as a linear element?
3. What is the load carrying function of a beam?

4. What devices within your vision are used as beams?
5. Describe the structural force exerted on a beam?
6. Define the structural element called a column.
7. Why is a column describe as a vertical element?
8. What is the load carrying function of a column?
9. What devices within your vision are used as columns?
10. Describe the structural force exerted on a column
11. Define a non-rigid structural element.
12. How is a non-rigid structural element used?
13. What is the load carrying function of a non-rigid structural element?
14. What devices are used as non-rigid structural elements?
15. Describe the structural force exerted on a non-rigid structural element.
16. What would the function be of rigid and non-rigid materials connected to, or placed over, linear and vertical elements?
17. Give some examples of structures found in nature or in the world constructed using technology.
18. Define the structure commonly referred to as a truss.
19. Where are trusses used? (Give an example.)
20. Explain why trusses are rigid.
21. Describe the neutral axis of a beam.
22. How is a neutral axis calculated?
23. What is the effect of moving a load closer or further away from the neutral axis?

Structural Components – Activity 4.0

4.1 Structural components can all be tested for tensile strength, compressive strength, elasticity and toughness. You will now identify the action, reaction and result of these tests with the following lab.

- Secure a quantity of foam core, white glue and a razor knife from your teacher. On a cutting board cut 15, 2.5 cm (1") strips 30 cm (12") long.
- Glue the strips together to form 5, **I** beam structures.
- Place the **I** beam in a vertical position to form a column and secure it to a base.
- Place a suitable compressive load on the top of the beam forming a compressive load. Gradually increase the load to the point of failure.
- Determine the weight required (load) to cause failure.
- Determine the weight of the beam.
- Divide the value of the load by the weight of the beam to find the weight to strength ratio. (How many times its own weight will the beam support?)
- Prepare a base of wood for the next test. The edge of the base must be rounded to prevent the cutting of the bottom surface of the beam.
- Attach a beam horizontally to the base so that it extends 20 cm (8") beyond the base. Clamp the base to a table.
- Test the load carrying capability of the beam by suspending an unbreakable container of water or sand from the end of your beam.
- Slowly increase the amount of water until the weight causes the beam to fail.
- Examine the failed beam and determine the types of stress the test applied to the top and bottom surfaces of the beam.
- What are the physical characteristics of the structural failure?
- What is the strength to weight ratio for this test?

4.2 Structural shapes can be tested for shear, tension and twisting, Drawing on your previous experience devise and carry out a test for each. Write up your findings for each as you have for the previous lab. Be sure to:

- Examine the failed beam and determine the type of stress the test applied to the top and bottom surfaces of the beam.
- Determine the physical characteristics of the structural failure
- Calculate the strength to weight ratio for each test.

Building Structures – Activity 5.0

A model truss can be tested for loading. Drawing on your previous experience construct a truss model out of wood strips, metal or foam core. Devise and carry out a test for your truss.

5.1 Write up your findings for your experiment as you have for the previous lab. Be sure to:

- Examine the failed beam and determine the type of stress the test applied to the top and bottom surfaces of the beam.
- Determine the physical characteristics of the structural failure.
- Calculate the strength to weight ratio for each test.

5.2 It is a fantastic day at the ski hill. Clear sky, great powder snow, but just a bit windy. In the middle of a run a great wind comes up, you become lost and wind up in the wilderness in the middle of a blinding ground blizzard. As night falls you must construct an emergency shelter from your skis, poles, nylon cord, and a sizable piece of plastic, all of which you have been carrying around all day.

- Sketch your tent design. It must be free standing because you don't have stakes to drive into the snow.
- Determine and indicate the stress exerted from the wind and the collecting snow.
- Anticipate the most likely point of failure. Refer directly to your knowledge and experience of the previous tests.

5.3 A model tent can be tested for loading. Drawing on your previous experience, construct a tent model out of wood strips, metal or foam core and plastic sheeting. Devise and carry out a test for on your shelter.

- Write up your findings for your experiment as you have for the previous lab.
- Be sure to:
    1. Examine the failed structure and determine the type of stress the test applied to the elements.
    2. Determine the physical characteristics of the structural failure
    3. Calculate the strength to weight ratio for the test.

Project Application – Activity 6.0

6.1 Select an existing structure and prepare a presentation showing how you would redesign the structure to show increased efficiency by:

- reducing weight while maintaining strength
- enhancing its durability and usefulness
- reducing material and construction costs.

CAREER & TECHNOLOGY STUDIES

FABRICATION STUDIES

SAMPLE STUDENT LEARNING GUIDE

FAB3010 Materials Testing

FAB3010 Materials Testing

WHY TAKE THIS COURSE?

To ensure that your design needs are met, testing is often carried out to determine which materials and processes best meet the desired outcomes. In this course you will:

- investigate methods of determining the properties of various structural materials
- test various materials and processes
- select the most appropriate materials and processes for a given application.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

Prerequisite: FAB1010: Fabrication Tools & Materials

In addition, to be successful in this course you will need to have a basic understanding of material properties and be familiar with fabrication tools, materials and processes.

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

Upon completion of this course you will be able to:

- describe the purpose and nature of materials testing
- apply testing principles to construct or use a piece of materials testing apparatus
- test and compare the properties of common materials used in construction and fabrication
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

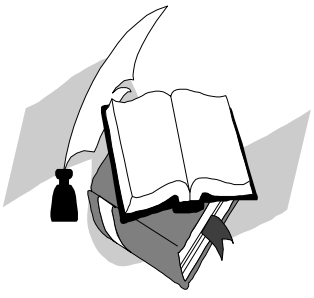
Your teacher will give you a timeline for completing tasks and assignments within this course.

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?

	PERCENTAGE
You must first demonstrate **all** of the competencies required for this course. When you have done this, your mark for the course will be determined as follows: • Investigation and reporting • Test proposal • Lab investigation (Testing Materials, FAB3010–1)	 20% 30% 50%

WHICH RESOURCES MAY YOU USE?



- *Metallurgy Testing I & II*, Ball State University.
- *Metalwork – Technology and Practice*, Victor E. Repp, 1994.
- *Welding Technology Fundamentals*, William A. Bowditch et al., 1991.

ACTIVITIES/WORKSHEETS

Types of Tests – Activity 1.0

1.1 Investigate and report on the nature of various tests, such as static tests, dynamic tests, impact tests. Questions your report should answer:

- What is a static test?
- How is a static test conducted?
- What are the nature of hazards involved in this type of testing?
- What is a dynamic test?
- How is a dynamic test conducted?
- What are the nature of the hazards involved in this type of testing?
- What is an impact test?
- How is an impact conducted?
- What are the nature of hazards involved in this type of testing?

1.2 Explain the differences between destructive and non-destructive testing.

1.3 Describe common ways to recognize when a material has failed

Mechanical Tests – Activity 2.0

2.1 Using sketches and notes, prepare a presentation that describes one or more of the tests for the following properties:

- acoustical
- electrical
- magnetic
- mechanical
- optical
- thermal.

Test Proposal – Activity 3.0

3.1 Prepare a testing proposal to present to your teacher for approval.

- List the type of property for which you wish to test.
- Decide on the materials to be tested
- Prepare a plan of the testing equipment you will construct/use to complete the test. Be sure to determine the materials, processes and tools required to construct the testing device

- Plan a safe environment in which to conduct the test
- Present your teacher with your proposal for approval.

Testing – Activity 4.0

4.1 Refer to your plans and:

- construct a piece of test equipment
- establish safety controls
- prepare the materials to be tested
- prepare a recording device on which you will collect data and record observation. Record a brief description of each anticipated test result
- conduct tests as planned
- observe testing results and collect data and samples
- compare testing results to anticipated results.

CAREER & TECHNOLOGY STUDIES

FABRICATION STUDIES

SAMPLE STUDENT LEARNING GUIDE

FAB3160 Prefabrication Principles

FAB3160 Prefabrication Principles

WHY TAKE THIS COURSE?

It is often more cost-effective to prefabricate a product in a plant and assemble it later on site. By taking this course you will:

- gain skills in assessing and meeting customer needs
- discover the advantages of working with others to solve problems and using prefabrication principles
- experience the satisfaction of creating a complete component or building a complete structure.

WHAT DO YOU NEED TO KNOW BEFORE YOU START?

Prerequisite: FAB2160: Custom Fabrication

In addition, to be successful in this course you should have a basic understanding of fabrication processes and be able to communicate effectively.

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

Upon completion of this course you will be able to:

- perform basic shop drawing take-off skills
- demonstrate advanced level resource management skills
- demonstrate appropriate prefabrication skills and practices
- demonstrate basic competencies.

WHEN SHOULD YOUR WORK BE DONE?

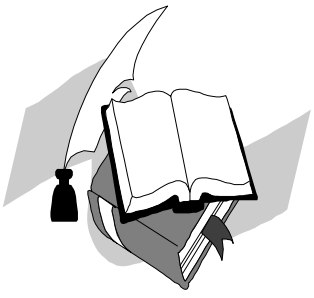
Your teacher will give you a timeline for completing tasks and assignments within this course.

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?

	PERCENTAGE
You must first demonstrate **all** of the competencies required for this course. When you have done this, your mark for the course will be determined as follows: • Theory and related activities • Project planning activities • Prefabrication project (Prefabricated Product, FAB3160–1)	 20% 20% 60%

WHICH RESOURCES MAY YOU USE?



- *Metalwork: Technology and Practice*, Victor E. Repp, 1984.
- *Modern Carpentry*, Willis H. Wagner, et al., 1996.
- *Principles & Practices of Heavy Construction*, Ronald C. Smith, et al., 1993.
- *Technology Shaping our World*, John Gradwell, et al., 1993.

ACTIVITIES/WORKSHEETS

Complete the following activities

Principles of Prefabrication – Activity 1.0

There are numerous reason why it is more economical and time saving to construct a product or structure using prefabrication techniques.

1.1 Make a list of six or more structures in your community that have been built using prefabrication processes, e.g., metal garden shed.

1.2 Examine one of the above examples and determine:
- what processes were carried out in a factory setting
- how were the prefabricated components packaged and delivered to the place where they were assembled
- what instructions were given to the customer/assembler
- what expectations did the customer have of the manufacturer and vice versa.

1.3 Identify the factors that often make it more economical and time efficient to produce a product using prefabrication techniques.

Meeting the Customer's Needs – Activity 2.0

Often the prefabricator is not involved with the final assembly of the product or structure.

2.1 What are some of the questions a prefabricator must have answered prior to making a design proposal?

2.2 Using a real or fictional product or structure identify:
- the components that can be prefabricated
- the work that is to be done on site
- the advantage to both the customer
- and manufacture to build a product/structure in the manner outlined.

Prefabrication Project Proposal – Activity 3.0

3.1 In keeping with a customer's/client's real needs individually or in a group prepare the following;
- overall statement of need, i.e., what is to be built, its purpose, design expectation and limitations
- a design drawing and specification
- materials list and cost
- list of components to prefabricated.

3.2 Prepare a list and provide designs for the needed jigs and fixtures.

3.3 Create a production flow chart, assembly drawing and written instructions

3.4 Identify what method/s the customer is expected to use in the completion phase of the construction, the expertise that will be needed and any additional materials or costs he or she will incur.

Prefabrication Project – Activity 4.0

Construct a product or structure that is best built using prefabrication principles.

4.1 Complete a task analysis and allocate your resources accordingly. If you are working with a team, pay attention to the strengths of each individual and divide the responsibilities to achieve the maximum results. Be sure to consult with your client as you work through the project. Each member of the group is expected to participate in the evaluation of each other's contribution to the project by completing the appropriate form. Each member will also be asked to evaluate the success of the product in meeting the design specifications.

Student:_____

Date:_____

Period:_____

Project:_____

GROUP EVALUATION FORM

The purpose of this form is to allow you to participate in the evaluation of how well the group functioned as a team in the planning and construction activities. Please select a numerical value, and indicate your rating in the response area provided.

Participation:

All(4), Most(3), Few(2), of your group members participated in the group activities related to the planning of your product. _____

All(4), Most(3), Few(2), of your group members participated in the group activities related to the construction of your product. _____

All(4), Most(3), Few(2), of your group members participated in the individually assigned activities related to the construction of your product. _____

Individual responsibilities:

All(4), Most(3), Few(2), selected their own individual responsibilities the completion of which the group depended. _____

All(4), Most(3), Few(2), were delegated duties by the group, to be completed. _____

All(4), Most(3), Few(2), completed their jobs accurately and on time. _____

All(4), Most(3), Few(2), attended class and participated in the production. _____

All(4), Most(3), Few(2), individuals cooperated with the other members of the group. _____

All(4), Most(3), Few(2), worked safely and with consideration for others. _____

Respond with a short written opinion:

What did you enjoy about working within a group?

What did you enjoy the least about working on a group project?

What will you do differently the next time you are involved in a group activity?