



Flexible Lab Environment

Instructor Guidebook

The Process of Creating a Flex Lab Environment

How do we create one credit courses for the flex lab environment?

1. **Review the 2, 3 or 4 credit course, Course Master, and assess the learning objectives and learning outcomes for the course.** These are found on the HFC web at the Course's website.
2. **Align PBOs with the learning objectives and outcomes of the course.** Each 2, 3 or 4 credit course must have a list of Performance Based Outcomes (PBOs) assigned to the courses topic areas. Many PBOs have already been developed and validated by industry. *When it makes sense, use the existing PBOs. If you have to add additional PBOs – do so. If you plan on not covering some of the existing PBOs please jot down the PBO number and submit the list to the instructional designer. She will forward this information to the M-SAMC review team.* Use the www.msamc.org website library of PBOs as a starting point for the creation of PBOs for the course. **(See Appendix I)**

Please Note: If additional PBOs are added, please submit your additions to M-SAMC for consideration. Look for the Academic Review Form found on the website. You may also give your newly written PBOs to the instructional designer.

3. **Develop the Course Structure:** Once an initial list of PBOs has been identified, the next step is to break down the multi-credit course into **one-credit courses made up of topic units**. Topic units, sub-units, and sub-sub units may be short or long in terms of content information. As a result two different one-credit courses may have the same number of units or they may differ in their number of topic units. For example, there may be 5 shorter topic units in the first one credit course, but there may be only 3 topic units in the second one credit course because the units are more involved/longer. The length of time needed for all topic units can range from 15 to 40 hours of student effort. Student effort is defined as the total amount of time needed to complete all work for a course. This includes readings, short lectures, homework, lab time, lab reports, exam preparation, exam taking and any papers to be completed. While Topic Units stand alone, there may be reasons to align two specific topic units to follow one another. These units do not necessarily have to be grouped together according to similarity of topic, but ultimately they must be grouped together based on the proposed length of the course. One organizing principal to consider is that at HFC, semesters typically run 15 weeks; therefore, if a 3 credit course is broken into 3 one credit courses, then one credit can be taken (and passed) in a 5-week interval, before moving on to the next. This establishes the “adequate progress” timeline for student completion of the three courses within a semester.





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The topic units in which each one-credit course are subdivided must relate to the course's PBOs; however, a PBO does not need to be a topic unit on its own (though it sometimes will). A topic unit contains all the information necessary for the student to understand the principles contained in the unit, and this includes “enabling” content. Topic Units do not only include readings and videos/taped demonstrations but often include both quizzes and “Test Your Knowledge” worksheets. These tools help students to assess their mastery of the unit material and represent a record of student work and accomplishment. Instructors may want to review all or some of these student materials to assess their understanding in the course.

Each topical outline should be expanded to include units and subunits (even sub-sub units if needed) the number of units depends on how much content needs to be covered in each topic and how long it will take to complete. For instance, if a unit topic in a welding course is Ferrous Welding and it takes 4 weeks to cover the material in a traditional classroom format, then there may only be one unit in that particular topic in the blended format with a series of subunits and sub-sub units.

After the course topics have been created, go back and break-up the topical outline into one credit hour chunks. Note the labs (projects/exams/etc.) do not have to be developed at this time, but from experience the instructor/developer knows where they will be needed. At this point in the course merely list where a work sheet/lab/etc. would be appropriate and will be developed later. This will evolve into the course structure.

It is important to note that only after the course structure is created, resources (text references, online references, video capture, etc.) that align with the topic units of the course can be researched, found, and referenced. The course curriculum (or projects) needs to be developed *before* the actual curriculum resources are referenced/implemented. Curriculum and Projects should be developed based on the needs outlined in the PBOs, not information found by simply following a textbook. The educational resources should be found/researched/created *only after* the course curriculum/structure or projects have been developed. These resources are not limited to printed text/documents. They can be video, lecture capture, handouts, etc. and should be listed in sequential order in the study guide (see Resource Collection Steps/Criteria and Resource Permission Guidelines). Each topic unit may have a series of different types of resources and have corresponding worksheets, exercises, or even mini-labs for students to use as checkpoints to make sure they are on track. **(See Appendix II)**





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Develop a Study Guide: Each Topic Unit should have a study guide that students will be able to follow in sequential order. Each item of the study guide should be used as a building block to the next item/task. The study guide will direct students as to how to progress in the course, and it can prepare the student for the final exam/project in the course. Items in the study guide such as review worksheets will not be graded by the instructor. They are a student tool used to assess their level of understanding of the topic. **(See Appendix III)**

Labs: One of the most powerful uses of the PBO is to create a corresponding lab for students to demonstrate their knowledge of the skills defined in the PBO. Many PBOs lend themselves to projects/labs. Instructors should design labs to verify proficiency in a PBO wherever possible. A lab template has been created for your use **(See Appendix IV)** and a sample lab **(Basic Electrical Lab: CIMEL 100-53, Topic Unit 3)** has been provided as a detailed example.

Log Sheet: Provide students with a lab log sheet that allows them to track labs they have performed for the instructor. Provide space for instructor's initials. **(See Appendix V)**

Course Master: Once the course has been developed, you may need to revise the course master or create new ones based on the new 1 credit modules. Review the college's revision process and see the Instructional Designer for assistance.

Learning Management System (for online delivery): Once course materials have been developed, populate the **LMS** with the Curriculum and Resources. Contact *technical support* to create a generic shell to house the course.

Post-test (and Pretest): Once the course is developed, instructors should create a post-test that tests the competencies learned in each of the one credit modules. Upon completing the creation of the post-test, scramble the questions and answers to create a pre-test for incoming students to determine the students' level of understanding, past knowledge, or if some type of remediation will be needed before they are able to enroll in the class. This test should be comprised of both a written and practical exam (lab). This will also determine how much time individual students need to spend on certain topic areas in the course. If there is a prerequisite and students fail to meet competency requirements, a period of remediation must ensue before students may be enrolled in course. Instructors can find Pre and Post tests for many courses/subject areas on the AMTEC site.





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Orientation: On the first day of classes, the instructor should hold an orientation for students, introducing them to the Flex Lab learning environment. This orientation should include lab hours of operation, policies and procedures, and an overview of all flex lab documents and an explanation of their purpose (ex: Course Structure, Study Guides, etc.). If it is to be an online course, instructors should also show students how to login and navigate the LMS. An example of an Orientation to the Flex Lab Environment has been added and can be used as a guide for any Flex Lab Environment. **(See Appendix VI for example).**

The instructional design team should request a meeting each week to review development submissions.

After the course is launched, a weekly debriefing between instructor and instructional designer should be required to discuss any problems/issues and revisions that may need to be made to the course.



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Appendix I

Examples of PBO Alignment for a Basic Electrical Course:

Topic Unit 1 Safety

ET-1	Safely work with electricity and electrical components.
ET-36	Match a list of the kinds of personal protection equipment to their proper description.
ET-37	Identify the level of current that poses a serious life-threatening condition to the human body.
ET-2	Match a list of safety practices to the electrical hazards they prevent.

I. Electric Shock

A. Current through the body

1. Voltage must be present to send current through the body.
2. The resistance of the body
3. The effects of current on the body

B. Safety precautions

1. Body contact
2. Power cords
 - a. 3 prong plugs
 - b. condition

C. Other safety issues

1. Insulation on hand tools
2. Safety glasses
3. Working alone
4. Jewelry
5. Knowledge of equipment
6. Capacitors
7. Metal floors, catwalks
8. Wet floors
9. Shoes



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Topic Unit 2 Units, Calculator use, Scientific Notation

ET-4	Use scientific notation to represent mathematical quantities.
ET-5	Demonstrate the ability to represent a given quantity using the following prefixes: milli, micro, nano, pico, kilo, meg, giga, and tera.

- I. Electrical, Magnetic, Light and Sound Units
 - A. Quantities and their units
 - 1. Electrical quantities and their units
 - 2. Magnetic quantities and their units
 - 3. Quantities of light and their units
 - 4. Quantities of sound and their units
 - B. Calculators
 - 1. Dedicated calculators
 - 2. Phone apps
 - C. Scientific Notation
 - 1. Powers of ten
 - D. Engineering Notation
 - 1. Metric prefixes
 - 2. Metric prefix conversion





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Topic Unit 3 Atomic Structure, Insulators, Conductors, Semi-conductors, Charge, Voltage, Current Flow, Resistance, Electrical Circuit, Closed Circuit, Open Circuit, Short Circuit.

ET-6	Match the following list of electrical terms to their proper definition:	
	<ul style="list-style-type: none">- Volt- Ampere- Ohm- Conductance- Resistance	<ul style="list-style-type: none">- Insulator- Resistor- Open- Short- Coulomb

- I. Atomic Structure
 - A. Matter
 1. Elements
 - a. Atoms
 - (1) Protons
 - (2) Neutrons
 - (3) Electrons
 - B. Atomic Number
 - C. Electron Orbits
 1. $2n^2$
 - D. Valence Electrons
 - E. Ions
 - F. Conductors
 1. Copper
 2. Other metals
 - G. Insulators
 - H. Semiconductors
- II. Electrical Charge
 - A. Unit of charge
 1. Positive charge
 2. Negative charge
 3. Unit of charge Q
- III. Voltage
 - A. Potential difference in charge
 - B. Quantity Unit = Volt = V
 - C. Formula
 1. $V = W/Q = \text{Energy (W) in Joules per unit charge (Q)}$





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- IV. Current
 - A. Movement of electrons
 - B. Free Electrons
 - C. Rate of movement of electrons
 - D. Quantity unit = Amp
 - E. Formula
 - 1. $I=Q/t$ = number or amount of electrons (Q) per unit time (t)
 - F. Direction of current flow in a conductor
- V. Resistance
 - A. Restriction of electrons
 - B. Quantity unit = Ohm
 - C. Formula
 - 1. one Ohm = V/I = Volts (V) / Amps (I)
- VI. Electric Circuits
 - A. Closed Circuit
 - B. Open Circuit
 - C. Short Circuit

Note: The above is an example of PBO alignment for a basic electrical course. It does not include the PBOs and topics in their entirety.





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Appendix II

Course Structure (template)

The Course Structure provides the breakdown of each one credit course into Topic Units and subunits (and even sub-sub units if need be). It shows the student exactly what topics are covered in each course. A space is also provided to record a student's exam grade. The end of this document provides space for the total number of points earned in combination of the 3 (or 4) one credit courses, the total percentage, and the student's grade. To keep student's on track, instructors should provide a timeline of how long each project should take along with dates. Units with more subunits will require a longer timeline. Weekly deadlines are a must for success. *Specific Example is provided.*

**** Note to instructors: Labs, Exercises, Tests, Quizzes, etc. may be dispersed throughout each of the topic units and subunits. They do not have to be left to the very end of the topic unit or module.**



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Module 1

Course Title and Number

1. Title of Unit One (timeline)

- Subunit
- Subunit
- Subunit

Exam/Lab/Project:

2. Title of Unit Two (timeline)

- Subunit
- Subunit
- Subunit
- Subunit
- Subunit

Exam/Lab/Project:

3. Title of Unit Three (timeline)

- Subunit
- Subunit
- Subunit
- Subunit

Exam/Lab/Project:

Final Exam/Practical Module 1:

1 CREDIT





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Module 2

Course Title and Number

1. Title of Unit One (timeline)

- Subunit
- Subunit
- Subunit
- Subunit
- Subunit

Exam/Lab/Project:

2. Title of Unit Two (timeline)

- Subunit
- Subunit
- Subunit
- Sub-sub unit

Exam/Lab/Project:

3. Title of Unit Three (timeline)

- Subunit
- Subunit
- Subunit

Exam/Lab/Project:

Final Exam/Practical Module 2:

1 Credit





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Module 3

Course Title and Number

1. Title of Unit One (timeline)

- Subunit
- Subunit
- Subunit

Exam/Lab/Project:

2. Title of Unit Two (timeline)

- Subunit
- Subunit
- Subunit
 - Sub-sub unit
- Subunit
- Subunit
 - Sub-sub unit

Exam/Lab/Project:

3. Title of Unit Three (timeline)

- Subunit
- Subunit
- Subunit
 - Sub-sub unit
 - Sub-sub unit

Exam/Lab/Project:

Final Exam/Practical Module 3:

1 Credit

Total: _____

Percentage: _____

Grade: _____





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Example:

Course Structure: Industrial Print Reading

****note Lab/Project/etc. can be given anytime during the course and do not have to be solely given at the end (but where instructor sees fit)**



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TADV 100

MODULE 1

Topic Unit One: Introduction to Print Reading (timeline)

1. Definition of a print
2. Types of prints
3. Six steps to reading a print

Lab/Project _____

Topic Unit Two: Alphabet of Lines (timeline)

1. Types
 - i. Object line
 - ii. Hidden line
 - iii. Centre line
 - iv. Extension line
 - v. Dimension line
 - vi. Phantom line
 - vii. Cutting plane line
 - viii. Viewing line
 - ix. Short break line
 - x. Long break line
2. Application
3. Identification

Lab/Project _____

Topic Unit Three: Scales (timeline)

1. Definition of a scale
2. Difference between a scale and a rule
3. Different types of scales
4. Usage of scales
5. Conversion of Metric and English Measurements

Lab/Project _____





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Topic Unit Four: Sketching (timeline)

1. Definition of sketching
2. Types of sketching
 - i. Orthographic
 - ii. Pictorial
 - 1) Axonometric
 - a. Diametric
 - b. Trimetric
 - c. Isometric
 - iii. Oblique
 - 1) Cabinet
 - 2) Cavalier
 - iv. Perspective
 - 1) Perspective one
 - 2) Perspective two
 - 3) Perspective three

Lab/Project _____
Final Exam/Lab/Project _____

Topic Unit Five: Multiviews (timeline)

1. Principle planes of projection
 - i. Frontal
 - ii. Horizontal
 - iii. Profile
2. Planes of Projection
 - i. 6 or more
3. Glassbox Method or Transparent Method
4. Projection
5. Lines and Surfaces
 - i. Normal
 - ii. Incline
 - iii. Oblique
6. Rounds, Fillets, Run-outs
7. Types of Holes
 - i. Counterbore
 - ii. Spotface
 - iii. Countersink
 - iv. Tapered
 - v. Blind
 - vi. Simple

Lab/Project _____





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Topic Unit Six: Assemblies (timeline)

1. Definition
2. Purpose
3. Types
 - i. Sub-assemblies/components
 - ii. Standard and non-standard parts
4. Title Block
5. Revision Schedule
6. Bill of material
7. Tolerance schedule
8. Borders

Lab/Project ____

Topic Unit Seven: Auxiliary Views (timeline)

1. Definition
2. Purpose
3. Types
 - i. Primary
 - ii. Secondary
 - iii. Successive
 - iv. Full
 - v. Partial
 - vi. Top view auxiliary view
 - vii. Front view auxiliary view
 - viii. Side view auxiliary view

Lab/Project ____

Final Exam/Lab/Project ____





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TADV 101
MODULE 2

Topic Unit Eight: Section Views (timeline)

1. Definition
2. Purpose
3. Types
 - i. Full section
 - ii. Offset section
 - iii. Half section
 - iv. Revolve section
 - v. Aligned
 - vi. Broken out
 - vii. Removed
4. Elements of Sectioning
 - i. Cutting plane line
 - ii. Section line
 - iii. Labelling
 - iv. Arrowheads
5. Features that are not Section Line
 - i. Holes
 - ii. Slots
 - iii. Key ways
 - iv. Spokes
 - v. Gear teeth
 - vi. Webs
 - vii. Ribs

Lab/Project _____





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Topic Unit Nine: Dimensioning for Manufacturing (timeline)

1. Definition
2. Purpose
3. Importance
4. Elements
 - i. Extension lines
 - ii. Centre lines
 - iii. Dimension lines
 - iv. Arrowheads
 - v. Leaders
5. Systems of Dimensions
 - i. Aligned
 - ii. Uni-directional
6. Notes
 - i. General
 - ii. Specific
 - iii. Thread Callout
 - iv. Representation
 - 1) Schematic
 - 2) Simplified
 - 3) Detail

Lab/Project _____





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Topic Unit Ten: GD&T (Geometric Dimensioning and Tolerancing)

1. Definition
2. Datum
3. Geometric Control Characteristics
 - i. Form
 - 1) Straightness
 - 2) Flatness
 - 3) Circularity (Roundness)-
 - 4) Cylindricity
 - ii. Profile
 - 1) Of a Line
 - 2) Of a Surface
 - iii. Orientation
 - 1) Angularity
 - 2) Perpendicularity
 - 3) Parallelism
 - iv. Location
 - 1) Position
 - 2) Concentricity
 - 3) Symmetry
 - v. Runout
 - 1) Circular
 - 2) Total
4. Supplementary Symbols
 - i. Maximum Material Condition
 - ii. Least Material Condition
 - iii. Projected Tolerance Zone
 - iv. Basic Dimension
 - v. Datum Features
 - vi. Datum Target
5. Types of Fits
 - i. Loose Fit
 - ii. Tight Fit
 - iii. Determining Fits
6. Types of Tolerances
 - i. Bilateral
 - ii. Unilateral
 - iii. Limits
7. Feature Control Frame

Final Exam/Lab/Project _____

Total _____





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Appendix III

Guide to Student Study Guide

A unit's study guide may include the following:

1. **Readings.** Instructors choose which readings the student will be using throughout the course. The unit study guide defines which readings, articles, pages/chapters a student is to read.
2. **Watch a video.** There are many demonstrative/performance-based videos to be found on the web including YouTube on various subjects and topics. For example:

A Safety class' unit on power tool safety may include this video as part of its Study Guide:

<https://www.youtube.com/watch?v=YbO2wLLwrPM>

Or the Study Guide for a unit on the Introduction to Refrigeration might include a video on a basic refrigeration cycle such as:

<https://www.youtube.com/watch?v=mWVFXwhyn8g&feature=youtu.be>

3. **Exercises.** There are many free online (open/non-copyrighted) resources, such as *Wisconline* that provide a demonstration of a concept or task.

For example, a unit on DC current flow in a course in Electronics may provide the following example:

<https://www.wisc-online.com/learn/career-clusters/stem/hvc403/dc-current-flow-through-a-parallel-circuit>

This animated activity also provides the student with calculations and a short quiz.

Or a course in Hydraulics may include a unit on Hydraulic System Pressure, and may want to use an animated exercise such as:

<https://www.wisc-online.com/learn/technical/hydraulics-pneumatics/hyp4907/hydraulic-system-pressure>

You can find a list of open/noncopyrighted sites on page ____, as well as a checklist to determine whether or not a resource is credible.

Or you may want to develop your own exercises.





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- Lecture Capture:** Instructors may choose to video themselves demonstrating/performing a certain task or delivering a lecture or mini-lecture on a topic. Support for recording these demonstrations and lectures is available for instructors through Tegrity (HFC's current provider of lecture capture software). Lecture capture is a great way for students to be able to review a concept repeatedly if they are struggling.
- Quizzes:** Instructors may want to develop short quizzes on topics within each unit to help students prepare for unit exams. These quizzes can be provided via the college's LMS.
- Worksheets:** Instructors can create worksheets based on a unit's corresponding resource material based on online lectures, readings, etc.
- Lab/Project:** These labs should be hands on demonstrations by the student to show they understand not just the theory, but the performance of skills that each subunit requires. ***Repeat: These labs must be developed to stand alone.*** Make sure that the Lab instructor has prompts, notes and answers or directions for each lab so that the lab instructor can easily check for proper completion.

You may want to insert thought provoking questions for the student that they have to explain to the lab instructor. *Example: the voltage reading that you just made, do not match exactly... the calculation that you made. Please call the lab instructor over and explain to him/her why they might be different and then provide the lab instructor your log sheet to initial that this was completed.* (Appendix IV)

**** Note: All readings, exercises, labs, videos, etc. must be viewed/performed in each unit in sequential order before the unit exam is taken.**

****A separate study guide must be generated for each unit of the one credit course. Some units may contain more learning objects than others, depending on the amount of material covered in each unit.**





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Example of Unit Study Guide

DIGITAL LITERACY I: FUNDAMENTALS

UNIT 3 SOFTWARE INSTALLATION

UNIT STUDY GUIDE

As you read the lessons and watch the videos, perform the tasks that you learn about by following along with the steps on your notebook computer.

INSTALLING, UPDATING, AND UNINSTALLING SOFTWARE

1. Read “Understanding Applications” at <http://www.gcflearnfree.org/computerbasics>. Watch the video on page 1, and complete the challenge activity.
2. Read the following web pages:
 - a. www.gcflearnfree.org/basic-computer-skills/installing-software-on-your-windows-pc
 - b. www.gcflearnfree.org/basic-computer-skills/uninstalling-software-from-your-windows-pc
 - c. Read “Option Five” at <http://www.tenforums.com/tutorials/4689-apps-uninstall-windows-10-a.html>
 - d. www.gcflearnfree.org/basic-computer-skills/how-to-update-your-software
 - e. www.gcflearnfree.org/basic-computer-skills/free-software
3. Take Exam 1: Installing and Uninstalling Software
4. Complete Lab 1: Installing and Uninstalling Software





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Documentation of Labs

Each hands on lab/project performed by students must be documented in more than one way. There are three crucial elements of documentation. They are as follows:

1. Lab instructions for the student: These are step by step instructions of a task the student is to perform, PPE, a list of Tools and Equipment, Safety Precautions, and Troubleshooting. Each lab will have its own set of instructions for the students, and will provide an outline of how the project will be assessed. Each project should have an identifier (e.g. CIMEL 100 – lab1) and should list the required equipment necessary to perform the lab.
2. Lab instructions/Notes for instructor: These consist of the explanation of theory behind the practice in the lab project, as well as answers/explanations to questions presented in the lab. Each lab will have its own set of instructions/notes for the Lab instructor. The instructions will also include how the task will be assessed which may use an assessment rubric.
3. Instructor Prompt Sheets: These are to be used as a guide during the instructor’s 15 minute “touchpoints” with the student. Prompts should be questions or comments that the instructor would ask a student in regards to a particular task they are performing in order to have the student explain/communicate their performance and show the instructor that they have grasped a full understanding of the knowledge presented within each task.
 - a. Ex: Why did you select **** tool name** to perform this task?
 - b. Ex: Can you tell me why you are having this result”?

See Appendix IV for lab outline and example.





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Appendix IV

Flexible Lab Outline (template)

Lab Template for Flexible Learning Labs

The student lab guide should include all supporting notes/reference material that the student may need to know which are relevant to the unit/project and identify the needed equipment to complete the project. This includes all equipment, tools, PPE, step by step instructions, supplemental information, rubric, etc.

The following is a template created for the labs/projects of the blended learning/flex lab environment. It is not limited to the categories provided.

Course Title and Number

Topic Unit Number

Subunit Title

Timeline

Student Name: _____

Table of Contents for all materials in this lab guide.

Description of Topic Unit:

Course instructor must provide a detailed description of what the topic unit covers.

Objective

The course instructor should provide a specific, detailed description of the objective of each topic unit. What is the purpose/goal of this lab? Why is it important? How will the student benefit from the knowledge obtained in this unit?





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List all objectives in sentences or in point form in the order in which they will be reached.

- Objective 1
- Objective 2
- Objective 3

Safety and PPE Usage:

Discuss the different safety precautions that should be taken and the PPE that should be used.
List all PPE in order of use.

Example:

Safety Glasses: These are to be worn at all times in the lab. Safety glasses must have side shields and sport the Z87.1 stamps (from ANSI).

Etc.

Hand Tool Recognition and Usage:

List all hand tools needed to be used.

After all tools are listed, emphasize important aspects associated with each tool (if needed) and why it is important to the project

Ex:

- Slip joint pliers (Channel locks)
- Pipe wrenches
- Needle nosed pliers
- Etc.

Lab Materials and Equipment

Identify all equipment and materials and components needed to successfully perform the lab.

Example: (for a basic lab on Series Circuits for basic electric)

DC Power supply, (12v or 24v.)

Proto strip and hook up wire

2- DVMs

The following resistors:

1/2 watt 2 - 100 ohm resistors, and 2 - 100 Ohm resistors.



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Warnings

Are there any kinds of unique warnings that need to be emphasized in regards to the Equipment/Hand Tools? Make sure to emphasize the warning(s) and make it (them) stand out in some fashion.

Lab A

After all of the PPE, Tools, and unique Warnings have been listed and discuss, the actual lab instructions may be given. Describe the project and what the student is being asked to do. Identify how the student should go about the project from start to finish.

Ex: Students should work individually or be put into teams of 2-3...etc.

Instructions

1. Describe in detail the actual first step of the lab/project
2. Step two: etc....
- 3.
- 4.
5. ...until the last step of the project

What is the project's outcome?

Checklist:

Provide a checklist of actions etc. for the student.

Ex:

1. Clear off a benchtop area of 3-4 feet...etc.
- 2.
- 3.
4. ...etc.





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Troubleshooting

Describe any unique problems that may arise when attempting this lab/project and how they may be fixed.

Supplemental Information:

Attach any additional information that student may find useful in completing this lab. Additional notes, readings, graphics, prints, description of equipment, etc.

Rubric:

Provide students the marking scheme for the project. How will the student be graded? What will the instructor be looking for. Provide a chart or list for students describing in detail.

Sample rubric to be provided.

(Example of) Sample Questions for Students:

After (or during) project completion, students should be able to answer given prompts by the instructor (to be included for the student in lab notes) to ensure that the student fully understands the material. These are equivalent to the instructor “prompts” outlined for lab instructor. An example of such prompts may include:

1. *Given the following circuit:*

Calculate the following:

$$E_{R1} = \underline{\hspace{2cm}}$$

$$E_{R2} = \underline{\hspace{2cm}}$$

$$E_{R3} = \underline{\hspace{2cm}}$$

Q1 – If R_1 were to be shorted out, what would happen to the voltage across R_1 ? Please explain your reasoning to the Lab Instructor and obtain his signature below.

-- Completed Q1





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Example of Lab

Industrial Electricity

CIMEL 100 - 53

Topic Unit 5

Student Name: _____

Description:

Demonstrate the ability to calculate Total Resistance, Total Current flow and voltage drops in a series circuit and predict the effects of open and closed switches.

Objectives:

ET – 32 Using live electrical circuits, demonstrate making voltage checks to Ground

ET – 33 Use a voltmeter to determine the state of a switch (open or closed) in a circuit under power. Additionally predict and verify whether current is flowing.

Safety and PPE: Safety glasses must be worn.

Lab Materials Required:

- 1-1000 ohm resistor
- 1-1200 ohm resistor
- 1- 1500 ohm resistor
- 1 - SPST switch
- 2- DVMs
- 1 – 10v Power source
- Proto Board and hook up wire.

Warnings: Not Applicable





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Student Instructions:

1. Measure the resistance of the contacts of switch 1.

Open resistance = _____ ohms.

Closed resistance = _____ Ohms

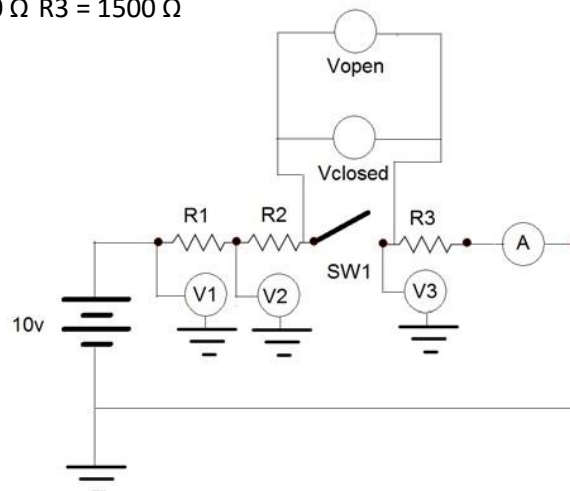
2. Analyze the circuit shown in Figure 1 and Predict:

V1 = _____ V2 = _____ V3 = _____ V open = _____ V closed = _____

I (Switch open) = _____ I (Switch closed) = _____

3. Construct the test circuit based on the following schematic diagram and verify your predictions.
R1 = 1000 Ω R2 = 1200 Ω R3 = 1500 Ω

Figure 1:



V1 = _____ V2 = _____ V3 = _____ V open = _____ V closed = _____

_____ I (Switch open) = _____ I (Switch closed) = _____

4. Was the supply voltage across the switch when it was open or closed? Answer: _____
5. Ask your Lab instructor to review your findings and verify your understanding of the above.

Troubleshooting: Not applicable

Lab Instructor Name and date:





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Appendix V

Experiment Log Sheet (template)

The experiment Log Sheet documents all labs in each unit and provides space for the instructor to sign off when the student has successfully completed the lab. These labs must be successfully completed in order, as one acts as a building block to the next. The number of labs may vary depending on the amount of content provided in each unit. If a student is not successful in completing the lab, he/she must go to the lab instructor and/or course instructor for remediation, and after doing so will be allowed to attempt successful completion again.

Experiment Log Sheet

Course Title and Number

Unit One: Title

Title of lab experiment _____

Title of lab experiment _____

Unit Two: Title

Title of lab experiment _____

Title of lab experiment _____

Title of Lab experiment _____

Unit Three: Title

Title of lab experiment _____

Unit Four: Title

Title of lab experiment _____

Title of lab experiment _____

Title of lab experiment _____

Title of lab experiment _____





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Appendix VI

Example of an Orientation to Flex Labs (at HFC)

1. Introduction:

The method of instruction presented through the flex-lab environment is what is called “individualized instruction”. Students are expected to be self-directed learners and work through the course materials at their own pace, with the guidance of the course instructor. Traditional lectures are replaced with self-study guides called “Topic Units” which can be found on Moodlerooms, HFC’s Learning Management System. Each unit outlined provides students with information on a certain competency or skill required in “field”. Each course is broken down into one credit modules and represents a major topic area of “the field” and consists of one to several units.

The lab/classroom consists of high-quality laboratory equipment that provides students with a number of hands-on related activities to help them develop their skills in _____, Students are assigned to a specific instructor who is also their academic advisor. He or she will be available during scheduled lab times and via email and office hours and will be available to assist students by monitoring their progress, grading exams, and determining the final grade for each completed course.

Lab hours are scheduled by the instructor. Students are not expected to attend every hour lab is open to them; however, they are expected to be present in lab when in need of assistance or practice various skills and techniques, or to complete lab assignments/projects/final exams. Instructors will observe and assess students performing these assignments and will sign off on student’s log sheet after successful completion of each.

Lab times for _____ are as follows:

Advantages of the Flex Lab Environment

There are many advantages to individualized instruction:

- Offers schedule and pace of learning flexibility
- Provides more advanced hands-on lab equipment as it is less expensive to operate than a traditional lab facility. (Fewer pieces of identical equipment are needed since everyone isn’t using the same equipment simultaneously).
- Develops student problem-solving skills. Students work on projects and worksheets to master material which helps them become more self-reliant and engaged in self-directed



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learning. Students become less dependent on formal instruction. In the workplace, these skills translate to students being less reliant on supervisors and can demonstrate initiative -- a valuable trait in the workplace.

- Each one credit course is always offered every semester, regardless of enrollment numbers, so students can progress as they are able.
- Students may complete their education and can actually graduate more quickly. HFC graduates students 4 times a year. Students can graduate when they complete their program of study. As a result, HFC students are not competing with grads from other schools that primarily graduate at the end of a school year. This can also enhance the value of the program as higher job placement records improve institutional program recognition and support.
- Allows students to work at their own pace. Due to life circumstances, students can accelerate their progress or adjust their effort to meet both school and other life circumstances. Some weeks or months may be better for individual student work than others.

Program Design and Student Expectations

The flexible lab requires few (if any) formal lectures. All course information is available to students at all times, and it is up to the student to discipline themselves in terms of watching videos, lecture capture, readings, exercises, participating in mini-lectures/discussions, and talking with other students and instructors. These materials are summarized in each course's/unit's Study Guide.

Although there are no formal attendance requirements, students still must complete all work required by the instructor within a given time frame that reflects the adequate progress of the student. Self-paced does not mean students have as much time as they want to complete each topic. All work in a one credit course must be completed by the end of the 5 week timeframe. Students are required to complete all one credit courses in which they are enrolled by the end of these five weeks. They will not receive a refund if the course is not completed by the end of this time block. If a course is not completed, students are required to pay for it again if they choose to take it in another semester.

Blended Environment

This course is delivered in a blended learning environment, which means the course occurs partly online and partly in the labs.





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Course materials and resources that are found online use HFC's Moodlerooms online tool. The course instructor reviews / prepares this material. If you are struggling with online course material or information, the course instructor can be contacted online, in the Flex lab according to their schedule, or in their office hours to assist you. In addition, other Flex Lab instructors will be available during lab hours to support you in your learning.

All hands-on tasks will be performed in the flex lab under the supervision of the lab instructor. Lab instructors give students guidance and may organize demonstrations/discussions with small groups of students concerning topics of a unit/course. The lab instructor is available to all students in the lab, and they will be checking on each student individually as they work, offering further guidance and assistance. The lab instructor will also sign-off on a student's successful completion of each lab.

Moodlerooms (the HFC online course platform)

Many of the materials of a course, such as the study guide and its instructions, syllabus, exercises, required readings, videos, assignment instructions, quizzes etc., will be found on the course's online platform in Moodlerooms. Student grades are recorded in Moodlerooms as well. Students must make sure to check Moodlerooms daily for announcements, changes, etc. Course evaluation forms can also be found on Moodlerooms and are to be filled out upon the student's completion of the course.

Navigation of Moodlerooms: It is up to the instructor (during the orientation) to teach students how to login to Moodlerooms, where to find login information and passwords if they don't already know, how to navigate Moodlerooms, and specifically where all course materials can be found.

Advising

Discuss advising available to students and advising policies.

Format

Review and discuss (in detail) the role and information presented in the following documents and where each can be found in the course on Moodlerooms:

- **Syllabus:** Outlines topics and learning objectives of course, credit hour, instructor contact information, HFC policies.
- **Course Structure:** Outlines topics, sub-topics and sub-sub-topics of course in chronological order, and offers a suggested timeline of completion.
- **Experiment Log Sheet:** Records all completed lab activities of student. Each must be initialed by instructor to indicate successful completion.





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- **Unit Study Guides and their corresponding material:** Lists readings, videos, worksheets and assignments to be completed by student (in chronological order)
- **Student Gradebook:** Records student grades for all assignments, labs, test, quizzes.
- **Discussion Forums:** Instructor posts topics on course material for online discussion with students. Students are expected to respond to each topic.
- **Announcements:** Announcements concerning all information related to the course throughout the semester are posted here. Students are expected to check Moodleroom announcements regularly.

Grading Policy

Outline in detail how assignments will be graded in the course and the grading scale to be used. Discuss the case of grade discrepancies and how they will be handled by both the course and lab instructors.

Testing Policy

Review in detail testing policy. (Each individual instructor must fill in own policies here)

Lab Policies:

Discuss rules of the lab. A unit on safety may be included here (during orientation) if it is not already part of the course content. (Each individual instructor must fill in own policies here)

College Policies

Please see *attached college policy documents* on:

Student Conduct

Academic Dishonesty

Discrimination Against or Harassment of Students

Safety

Instructors: Include a section on lab safety-- PPE, etc. It is recommended that students take a brief quiz/test on safety during orientation. The test should include all aspects of safety covered in the orientation.





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Academic Dishonesty

Henry Ford Community College considers academic dishonesty to be a serious offense. It shall be the policy of the College that determination of the fact of academic dishonesty and appropriate action with respect to academic dishonesty by a student shall be a matter of individual judgment by the instructor. The instructor may administer a penalty up to, and including, failure in the particular course. It is the professional obligation of the faculty to enforce academic integrity in their courses.

Academic dishonesty is any activity intended to improve a student's grade fraudulently. It includes, but is not limited to, the following:

1. Unauthorized acquisition of tests or alteration of grades;
2. Unauthorized use of notes, books or other prohibited materials during an examination;
3. Open cheating during an examination;
4. Permitting another person to take a test in the student's place or receiving unauthorized assistance with any work for which academic credit is received;
5. Providing unauthorized assistance with any work for which academic credit is received;
6. Revision of graded work in an attempt to receive additional credit fraudulently;
7. Plagiarism or using another person's work without acknowledgment;
8. Any other conduct intended to obtain academic credit fraudulently or dishonestly.

If an instructor fails a student in a course for academic dishonesty, the instructor will immediately notify, in writing, the division/ department head, the student and the registrar of the infraction, retaining copies of all notifications.

The Registrar will maintain a record of all such violations. If a student fails two classes as a result of academic dishonesty, he or she will be dismissed from the College for two academic years. In addition, a notation of the reason for academic dismissal will be placed on the student's transcript. The notation may be expunged at the discretion of the appropriate Vice President/Dean if a student petitions for its removal after at least a two-year period has elapsed since the disciplinary action.

If a student believes that the accusation of academic dishonesty is false, he or she may appeal through the Student Complaint Procedure. If the appeal reaches the Student Complaint Board, the Board will only consider whether the charge of academic dishonesty is justified and will not set aside or change the penalty given by the instructor unless the charge of academic dishonesty is set aside.





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Student Conduct

Students have the rights and accept the responsibilities of participating in an educational environment when they enroll at Henry Ford Community College. Each student is expected to respect the rights of others and to help create an environment where diverse people and ideas are valued. A collegiate community should be free from intimidation, discrimination and harassment, as well as safe from violence. Students are also expected to know and obey federal and state laws and local ordinances, as well as to be responsible for following College policies.

Students at HFCC have the same rights under the constitutions of our nation and state as other citizens. These rights include freedom of expression, press, religion, and assembly. Freedom of expression, for example, includes the expression of reasoned dissent and voicing of unpopular views. With every freedom goes the responsibility of affording the same right to others. All students have the right to be treated fairly, and to have access to College policies. Students are entitled to appropriate due process should they be accused of behavior that is in violation of laws for College policy.

The purpose of this policy is to help protect the safety and well being of the campus community and to assist the College in providing an environment that supports the educational process. The responsibility for maintaining such an environment is shared by all members of the College community.

The College Board of Trustees, acting through a delegation of authority to the President (or his/her designee) retains the ultimate right to make and enforce rules relating to student conduct and discipline. The College Board authorizes and directs the College President to develop, maintain and administer a student conduct policy and due process procedure which is consistent with the Board of Trustees' student conduct policy.

Students at HFCC are expected to show respect for order, law, personal rights of others, the educational mission of the College and to maintain standards of personal integrity.

The following are examples of behavior or situations that violate expected standards of conduct. This list is illustrative and is not exhaustive and is not to be read as a limitation of the College's right to discipline for infractions which are not listed.

1. Interference with normal College or College-sponsored activities including, but not limited to: teaching, College administration, and College Board meetings;
2. Failure to comply with the directions of College personnel, including campus safety, or with the orders of any College Board, such as the Student Council Advisory Board and the Student Newspaper Board;
3. Violation of legal standards of decency;
4. Discriminating against or harassing an individual or group in any activity, opportunity or organization on the basis of race, ethnicity, gender, religion, sexual orientation, creed, national origin, ancestry, age, disability, height, weight, or marital status, or retaliating against any such individual or group for having complained about such behavior;
5. Disrupting a class, a class-related activity, or a College sponsored or related event;
6. Physical assault;





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7. Stalking;
8. Threats of injury or harm;
9. Arson;
10. Theft;
11. Gambling;
12. Damage to College, student, faculty, or employee property;
13. Computer or technology abuse or tampering;
14. Possession of firearms or dangerous weapons by persons who are not sworn federal, state, or local law enforcement officers who are required to carry weapons during the course of their employment. (Such individuals are required to notify Campus Public Safety of this requirement prior to bringing such weapons on campus);
15. Falsifying, altering or providing false, inaccurate or incomplete information on any College application, form or document; or providing false, inaccurate or incomplete verbal information which is to be used with regard to any College application, form, document or transaction;
16. Possession, use manufacture, sale of, or being under the influence of alcohol or any controlled substance, without a physician's prescription, or possessing drug paraphernalia while on campus.

Students who commit one or more of these infractions, or who otherwise violate expected standards of conduct are subject to discipline pursuant to the Student Conduct Policy and Due Process Procedure, up to and including dismissal from the College.

Adopted Date:

Monday, August 23, 2004

Private:

Public





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Policy Prohibiting Unlawful Discrimination Against or Harassment of Students

Policy Prohibiting Unlawful Discrimination Against or Harassment of Students Harassment/Discrimination Prohibited

By adopting this policy, Henry Ford Community College reaffirms its commitment to maintain an academic setting for all students in admissions policies, administration of its educational policies and programs, scholarship and loan programs, and student activities which is free from unlawful discrimination or harassment based on age, race, gender, disability, pregnancy, height, weight, national origin, religion, marital status, or other protected status. Discrimination or harassment based on these prohibited factors diminishes individual dignity and the integrity of Henry Ford Community College as an institution of learning, and will not be tolerated. Henry Ford Community College conducts programs, services, and activities for students consistent with applicable federal and state civil rights laws.

Unlawful Harassment Defined

1. Sexual Harassment. For purposes of this policy, sexual harassment is unwelcome sexual advances, requests for sexual favors, or other verbal or physical conduct of a sexual nature, when submission to or rejection of this conduct explicitly or implicitly affects a student's education, unreasonably interferes with a student's work or educational performance, is used as the basis for tangible employment or educational decisions affecting the student, or creates an intimidating, hostile or offensive working or learning environment.
2. Racial and Other Types of Unlawful Harassment. Henry Ford Community College prohibits verbal and physical acts based on race, age, disability, pregnancy, height, weight, national origin, religion, marital status, or other protected status that are so severe and pervasive that they objectively either (1) unreasonably interfere with a student's work or academic performance or (2) create an intimidating, hostile or offensive learning or working environment.
3. The determination of whether conduct constitutes harassment is dependent on the totality of the circumstances, including the nature, duration, frequency, intensity, context, pervasiveness or severity of the conduct.

Disabled Students

Further, it is the policy of Henry Ford Community College that no otherwise qualified student with a disability is denied the benefits of, participation in, or otherwise subjected to discrimination in an educational program, pursuit, or activity.

Non-Retaliation

No individual who makes a good faith report regarding a possible violation of this policy will be retaliated against. Any such retaliation is grounds for discipline, which can include discharge or dismissal from the College.





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Implementation of This Policy

1. While equal opportunity is the responsibility of all members of the Henry Ford Community College community, the President has final responsibility for the overall implementation and monitoring of this policy. The President is authorized to delegate the responsibility for implementation of this policy, the oversight of the performance of departments that contribute to college equal opportunity policy and goals, and the promulgation of the concept of equal opportunity, as necessary to effectuate this policy.
2. Procedures developed by the administration of Henry Ford Community College are available to a student who has a concern or complaint of discrimination or harassment.
3. It is the policy of Henry Ford Community College to respond to reports by students of discrimination and harassment, and take necessary action to prevent, correct or when appropriate, discipline behavior that violates the prohibition of illegal discrimination or harassment.

First Amendment Rights Recognized

Henry Ford Community College remains committed to the United States Constitution principle of freedom of expression. This policy and the principles of freedom of expression are consistent, and will be interpreted in harmony to promote discourse yet not violate the laws against impermissible discrimination or illegal harassment of Henry Ford Community College students.





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Rubric Templates and Examples

Example Rubric #1 (can be used as template)

		PTS	(A) <i>Highly Proficient</i>	(B) <i>Competent</i>	(C) <i>Partially Competent/Developing</i>	(D) <i>Limited</i>	(E) <i>Major Improvement Required</i>
TROUBLESHOOTING PLAN							
1	Using schematics prints and test equipment to troubleshoot a system	25	Accurately identified 100% of the components		Needed some prompting to identify the components		Unable to identify 50% of the components
A	Establish plan for Fault #1-Elec	10	Selected the most efficient troubleshooting path to identify the problem		Needed some prompting to select the most efficient process		Not able to identify the failure components
B	Establish plan for Fault #2-Mech	10	Selected the most efficient troubleshooting path to identify the problem		Needed some prompting to select the most efficient process		Not able to identify the failure components
C	Establish plan for Fault #3-Fluid Power	10	Selected the most efficient troubleshooting path to identify the problem		Needed some prompting to select the most efficient process		Not able to identify the failure components
D	Establish plan for Fault #4 - Communication-Data	10	Selected the most efficient troubleshooting path to identify the problem		Needed some prompting to select the most efficient process		Not able to identify the failure components





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		PTS	(A) <i>Highly Proficient</i>	(B) <i>Competent</i>	(C) <i>Partially Competent/Developing</i>	(D) <i>Limited</i>	(E) <i>Major Improvement Required</i>
SAFETY							
1	Safe Work Practices	25	Used appropriate PPE; practiced common safety practices		Most safety practices used		Demonstrated unsafe working practices
2	Safety Attitude	25	Work practices demonstrated safety consciousness in all procedures; looked out for safety of others		Most of the time worked safely and showed some concern for safety of others		Dangerous worker; did not look out for safety of others
3	Electrical safety practices	25	Used appropriate control energy and safety procedures				Dangerous worker around electrical
TROUBLESHOOTING SKILLS							
3	Applied sequence of diagnosing problem	20	Followed their identified sequence		Skipped or added some non-valued added steps or required prompting or out of sequence		Did not follow sequence
4	Efficient use of time	15	Finished tasks on or ahead of time		Barely finished task in allocated time		Did not complete task
5	Accurately diagnosed root cause problem	25	Correctly diagnosed problem		With assistance was able to diagnose problem		Did not find the problem
6	Attention to detail	15	Every aspect followed through in detail	Some areas skipped in terms of detail	Good, but incomplete	Poor and incomplete understanding	Substantial lack of effort made





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		PTS	(A) <i>Highly Proficient</i>	(B) <i>Competent</i>	(C) <i>Partially Competent/Developing</i>	(D) <i>Limited</i>	(E) <i>Major Improvement Required</i>
7	Accuracy of Repair Plan	25	Problems/Faults/Remediation accurately documented		Skipped or missed some problems/Faults/Remediation		Substantial problems/Faults/Remediation not documented
TOOL USE							
8	Use of Diagnostic Tools	25	Correctly and efficient use of diagnostic tools in an appropriate manner		Somewhat efficiently; mishandled one or more of the tools		Had to have assistance in connecting the meter to device; or showed disrespect for the tools
WORK HABITS							
10	Work Attitude	15	Alert to finding and correcting problem		Honestly attempted to find and correct problems		Showed frustration in finding and correctly problem
11	Work Procedure	25	Always followed standard procedures; demonstrated planning and organization skills in correcting the problem		Complied with standard procedures; Showed some plan and organization in working		Did not follow standard procedures; Disorganized and slipshod methods;
12	Professionalism	20	Work showed pride in accomplishment		Tried hard and shows promise		Work lacks praiseworthy factors





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		PTS	<i>(A) Highly Proficient</i>	<i>(B) Competent</i>	<i>(C) Partially Competent/Developing</i>	<i>(D) Limited</i>	<i>(E) Major Improvement Required</i>
13	Self-confidence	15	Appeared comfortable and posed when performing tasks		Fairly self-confident; occasionally disconnected		Hesitant, timid, uncertainty
14	Knowledge of job	25	Has an exceptionally thorough knowledge of the job		Has good knowledge but needed coaching		Has inadequate knowledge of job





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		PTS	(A) Highly Proficient	(B) Competent	(C) Partially Competent/Developing	(D) Limited	(E) Major Improvement Required	Possible points	Ratings A - E	Points Awarded
SKETCHING										
1	Completeness of sketch	25	All features and details are represented in at least an isometric view		Major features and details are provided; but some missing		Too many features missing to be able to produce the task	25		
2	Clarity of sketch	20	Legible; no ambiguity in the design		Some assumptions need to be made in order to produce the part		Too many assumptions need to be made; part could not be produced from the sketch	20		
MATERIALS AND PROCESSES										
3	Selection of materials for bill of materials	10	Appropriate materials for load, safety, cost		Needed assistance or prompting to select materials		Unable to select appropriate materials	10		
4	Selection of fasteners for component	25	Appropriate fasteners for load, safety, cost		Needed assistance or prompting to select fasteners		Unable to select appropriate fasteners	25		
5	Selection of tools	10	Appropriate drills and taps		Needed assistance or prompting		Unable to select appropriate tools	10		
6	Resource utilization	25	Used appropriate resources for selecting materials, selecting fasteners, and tools		Needed assistance or prompting		Unable to use resources	25		
LAYOUT AND FABRICATION										
	Accuracy of layout	10	Correct measurements; marked center points of holes; accurately cut parts		Need prompting to do correctly		Unable to layout	10		





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	Use of fasteners for component	25	Appropriate installation of fasteners for load, safety, cost		Needed assistance or prompting to install fasteners		Unable to install fasteners or incorrect fasteners used	25		
	Use of tools	10	Appropriate operation of drills press, taps, wrenches, etc.		Needed assistance or prompting		Unable to use tools	10		
	Assembly	25	Assembly was easily put together; holes appropriately located		had to alter to assemble; rework required		Was impossible- could not be assembled	25		
SAFETY										
11	Safe Work Practices	25	Used appropriate PPE; practiced common safety practices		Most safety practices used		Demonstrated unsafe working practices	25		
12	Safety Attitude	25	Work practices demonstrated safety consciousness in all procedures; looked out for safety of others		Most of the time worked safely and showed some concern for safety of others		Dangerous worker; did not look out for safety of others	25		





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13	Machining safety	25	Guards used on drill press; secured; band saw--pusher used	Had to be prompted	Dangerous worker; did not look out for safety of others	25			
PRODUCT EVALUATION									
14	Safe product	10	Product was deburred so could be handled safely	Minor deburring problems; but overall safe	Ouch	10			
15	Durability, reliability and load appropriate	25	Appropriate materials, fasteners and design made the product durable for use in an industrial environment	Minor design issues could have improved the durability	Not at all durable	25			
16	Function	25	Product met the needs of the problem presented	Will basically work	Will not serve the needs of the problem	25			
WORK HABITS									
17	Work Attitude	15	Alert to finding and correcting problem	Honestly attempted to find and correct problems	Showed frustration in finding and correctly problem	15			





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18	Work Procedure	25	Always followed standard procedures; demonstrated planning and organization skills in correcting the problem	Complied with standard procedures; Showed some plan and organization in working	Did not follow standard procedures; Disorganized and slipshod methods;	25		
19	Professionalism	20	Work showed pride in accomplishment	Tried hard and shows promise	Work lacks praiseworthy factors	20		
20	Self-confidence	15	Appeared comfortable and posed when performing tasks	Fairly self-confident; occasionally disconnected	Hesitant, timid, uncertainty	15		
21	Knowledge of job	25	Has an exceptionally thorough knowledge of the job	Has good knowledge but needed coaching	Has inadequate knowledge of job	25		

TOTAL POINTS	
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Instructor Guidebook

Example Rubric #2 (can use as template)

Student Name: _____ Date(s): _____

Instructor Name: _____

Scoring Guide: Maximum Points: 160

Highly Proficient – 10, Competent – 8, Developing – 6, Limited – 4 Scattered – 2, Unable to start - 0

Skill Number	Skill Title	Skill Rating
1	Followed Safety Procedures without prompting	
2	Used Proper PPE	
3	Install and Adjust a Pillow Block Antifriction Bearing and Shaft	
→	Proctor Sign Off:	
4	Performed LOTO of energy sources when necessary	
→	Proctor Sign Off:	
5	Mount an Electric Motor and Correct for a Soft Foot Condition	
→	Proctor Sign Off:	
6	Level Motor to Shaft and Bearing Assembly	
→	Proctor Sign Off:	
7	Installed Flexible Coupling to Specifications	





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→	Proctor Sign Off:	
8	Submit Completed Documentation	
9	Efficient use of time	
10	Attention to Detail	
11	Work Attitude	
12	Work Procedure	
13	Professionalism	
14	Self Confidence	
15	Knowledge of Job	
	Total Points	





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Instructor Guidebook

Practicum Feedback

Practicum # _____

Date _____

Apprentice Name _____

Apprentice's Employer _____

Practicum Element	Assignment Name	Score
<i>Project</i>	...	XXXX
<i>Exam</i>	<i>Written exam</i>	XXXX
<i>Presentation</i>	<i>Student presentation</i>	XXXX

Demonstrated Strengths:

Observed areas for improvements:





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Recommendations

Practicum Feedback Template

Practicum # _____

Date _____

Apprentice Name _____

Apprentice's Employer _____

Practicum Element	Assignment Name	Score
<i>Project</i>	...	
<i>Exam</i>	<i>Written exam</i>	
<i>Presentation</i>	<i>Student presentation</i>	

Demonstrated Strengths:

Observed areas for improvements:



Flexible Lab Environment Instructor Guidebook

Recommendations

Example Rubric
#3 (can use as
template)

Period 5 PLCs Rubric

Student Name: _____

Evaluator 1:

Dates: _____

Evaluator 2:

Evaluator 3:

Point assignment: 5 = Highly Proficient, 4 = Competent,
3 = Developing, 2 = Limited, 1 = Improvement required.

Note: Items 1g and 6g are used in lieu of 1 a through f and 6 a through f. If partial credit is to be given then a through f would apply and g not used.

Part 1	Circuit design and Build	PTS	Part 5	Work Habits	PTS
1a	Using schematics prints and test equipment to troubleshoot a system		5a	Work Attitude	
1b	Circuit designed and entered into PLC		5b	Work Procedure	
1c	Establish communications		5c	Professionalism	





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	between PLC and Laptop				
1d	Tags configured		5d	Self-confidence	
1e	I/O Configured		5e	Knowledge of job	
1f	Trainer wired and Piped if applicable		5f	Use of Diagnostic Tools	
1g	Circuit functioning as required. This implies Proficiency in all of Part 1 requirements		5g	Safe Work Practices	
PART 2	Demonstrated proficiency in Software utilization	PTS	5h	Safety Attitude	
2a	Search Function		Part 6	Circuit design and Build	PTS
2b	Toggle Function		6a	Using schematics prints and test equipment to troubleshoot a system	
2c	Apply and remove forces		6b	Circuit designed and entered into PLC	
2d	Manipulation of Presets in the Tag area		6c	Establish communications between PLC and Laptop	
PART 3	Discovered and remediated fault	PTS	6d	Tags configured	
3a	Fault 1		6e	I/O Configured	





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3b	Fault 2		6f	Trainer wired and Piped if applicable	
3c	Fault 3		6g	Circuit functioning as required. This implies Proficiency in all of Part 1 requirements	
Part 4	Will be assessed separately				





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Resource Collection and Documentation

Once you have established a document/video's credibility, there are two things that you must do.

1. Establish the resource's credibility using the guidelines and checklist below.
2. Download a pdf of the material, if available, so that we can ensure that the information does not disappear and we can add it to our database of resources. If there is no download-able version of the resource, ensure to document the resource website well enough that it can be found in the case that the link "breaks".
3. Record the resource's (including YouTube and other videos) bibliographic information. In doing so, use the most recent APA documentation style. APA citations can be generated online through several "citation generators", e.g. [Citation Machine](#). All resources must be documented to avoid plagiarism issues. If there are are questions concerning documentation, please contact the instructional designer for assistance.

Resource Quality Guidelines

Many times, course resources can be found online and flex lab instructors are encouraged to do so. The internet is a valuable source of knowledge, and you (being the SME) will be able to easily tell if a document, video, etc. is worthwhile. There are certain criterion, however, that need to be followed, not only to make sure that the source is verifiable, but to also ensure that the resource maintains its link to the materials and doesn't simply "vanish" from the website.

The following are some clues to look for in deciding whether or not a source is reliable, and whether it can or should be used as a resource to curriculum.

1. Online documents and YouTube videos are a great source of information. The problem with these documents and videos is that they sometimes do not include exactly who the presenter is and their qualifications/credentials. Are they someone from industry? A student? Professor? Anyone can post anything on the internet on any subject at any time – whether they are an authority on the matter or not, or whether they hold a particular bias. There is no regulating body that monitors the reliability of information found on the Internet, so it is important that you ensure the validity of the source.
2. Online documents and YouTube videos can be removed by the author at any time without any notice. If this happens, your cited resource may disappear. For this reason, it's important to download copies of the resource if they are available. Similarly, links to documents and videos often "break" if they are moved or modified within their source website. For this reason, you must clearly document what the resource is called and who authored it, so that, in the case that the link "breaks", it can be easily found again by an online search.





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3. Written documents (such as articles, reports, etc.) seem to be more readily accessible on the Internet (and many times can be found in PDF versions). However, there can be many such documents on a given topic/subject. This may pose a problem in determining which contains the best quality information. As with hard copy resources, the best tend to be those that are Peer Reviewed, (PR; PR documents are those that are reviewed by peers in the same field that verify information, or request authors to make changes before publication). However, this is not always the case. .edu sites typically contain PR documents, but most others will not distinguish if a document is PR or not, and much (if not most) information found online will not be PR. As with hard copy resources, look to the authorship for verification of information.
4. Not only must one consider the author's education and experience, but where did the article appear? An author may be an expert; however, if their article is printed on a commercial site, one has to be careful of bias. This is also true of personal websites (.com), blogs, or web forums. Even if the author is an expert, make sure to check why the information is presented in this chosen form.
5. Domains such as .edu, (websites that represent educational institutions) and .gov (official government websites) are the most trustworthy online sources. Sites that contain the .com, .net, .org., or a country domain (e.g. .jp for Japan or .ca for Canada, etc.) are much less reliable, as they can be personal websites that offer an opinion or commercial websites that offer a bias. Pay careful attention to who (or what institution/organization) published the site. Is it a reputable news source? Special Interest? Consider the motive for publication before you deem the material reliable.
6. The age of information can also be an issue, especially in dealing with technological topics. Is the information up to date? When did the author last edit the information presented? Check the date the information was published and if it provides any links to other sources. Are these links out-of-date or broken? Can you access the information?
7. Is the information copyrighted? In using copyrighted information, one must seek permission of use from the creator/author. Permission is not denied when the information is not for sale and is being used for educational purposes; however, you must still fill out the form (see information found under **CURRICULUM RESOURCE PERMISSION GUIDELINES**) and submit it to the proper channels (author/publisher).
8. If the website offers links to other resources, review these resources. If the site offers dead links, or links to personal sites, web forums, etc. reconsider the value/reliability of information found in the original source.





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9. Does the site offer a bibliography of sources used to compile the information presented on the site? If so, what are the sources and who wrote them? Are they accessible? Outdated? Make sure to verify these resources, as well.

The following table outlines factors to consider when evaluating an online source (document or video):

Factors to Consider	Least Reliable	Possibly Reliable	Most Reliable
Type of Source	Unfamiliar Website	Published Material	Official websites, institutional sites, academic journals
Author's Background	Uncredited	Educated on Topic	Expert in field
Date Published	None	Outdated	Recently Revised
Depth of Review	Controversial Reviews	Good public response; general approval	Peer-Reviewed by reliable sources
Sources Cited	None	Credible Sources	Citations referencing other well-cited works
Objectivity	Clearly biased	Sponsored Source	Balanced, neutral





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Resource Quality Checklist

This table can be used as a tool to verify that the selected resource meets the criteria described above.

Resource Quality Checklist	
Criteria	Check
Did an expert in the field (or someone well educated on the topic) develop this resource?	Y / N
Has the resource been reviewed for accuracy and correctness?	Y / N
Did the resource come from (a) a peer reviewed source, (b) a .edu site, (c) a reliable open source content repository, or (d) some other reputable source?	Y / N
Is the resource less than ~5 years old (if it is about a topic that may evolve, e.g. various technologies)?	Y / N
Was the author sponsored by an interested party (e.g. might there be a bias in its content)? Does the resource seem at all biased?	Y / N
Does the resource cite other reputable sources? Have you validated that the additional resources are valid?	Y / N
Is the resource housed on a website? If so, is the website organized and easy to use?	Y / N
Is the resource housed on a website? If so, have you taken precautions to ensure that the resource is easy to find in the case of a broken link (e.g. document the author and title, so that the resource can be found through an internet search)?	Y / N





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Curriculum Resource Collection Steps

PURPOSE

The following steps outline an ideal process for finding and selecting **curriculum support resources** as part of the flex lab curriculum development

1

STEP ONE: Review your own accumulated curriculum resources for suitable material

2

STEP TWO: If your own resources don't cover all of the required material, review open source online materials *

* At a minimum, check the following sites for aligned materials:

[Skills Commons](#)

[MIT Open Courseware](#)

[WiscOnline](#)

3

STEP THREE: If there is not sufficient open source online material, search for content on Google or YouTube **

** To ensure that you are collecting reliable content, refer to the **Resource Quality Checklist**

3

STEP FOUR: If you're unable to find sufficient resources on the web, create new resources (e.g. handouts, slideshows)



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QUESTIONS?

See Instructional Designer for support and guidance. Schedule your mandatory bi-weekly meetings with the Instructional Designer to review your resources.





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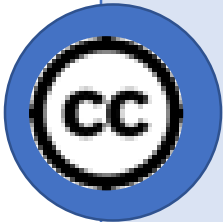
Curriculum Resource Permission Guidelines

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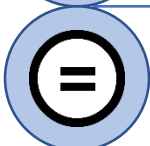
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1. Determine whether you need permission (e.g. is it copyrighted?)
2. Identify the owner of the copyrighted material.
3. Define the rights that you need.
4. Contact the owner of the material and negotiate permission.
5. Obtain permission in writing.

The resources linked below will provide you with more information about how to obtain permission to use copyrighted materials.

1

The **basics** of getting permission:

<http://fairuse.stanford.edu/overview/introduction/getting-permission/>

2

Sample permission **request letter**:

<http://wustl.edu/policies/request.html>

3

From **copyright.gov**: How to Obtain Permission

<http://www.copyright.gov/circs/m10.pdf>

MORE INFORMATION: <http://copyright.gov>



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Document Citations

Since some resources may not have either Creative Commons licensing **or** Copyright, it is important that you document the bibliographic information (using APA format) for **all resources** regardless of their licensing. This includes all YouTube videos and any other resource that does not appear to have any licensing clearly listed. This will ensure that Henry Ford College is not liable for using materials that are licensed. For details about documenting bibliographic information, refer back to the *Resource Collection and Documentation Steps* on page 63.

Tips for Online Teaching

Moving from the traditional classroom model to the virtual online classroom is a transition that may take some getting used to for both instructors and students. As with traditional classroom teaching, there is a series of techniques for instructors to implement in the virtual classroom that will assist in helping maximize success for both the student and the teacher. These tips and techniques will contribute to an effective teaching and learning experience for both faculty and students. They will assist the instructor in engaging the online learner, create an effective learning community, and alleviate some of the frustrations both instructors and students may feel when first attempting to participate in an online course.

Best Practices for Online Teaching

1. ***Create an engaging environment.*** In developing your course platform, be sure to have a variety of learning resources and activities that hold the learner's attention. As with traditional classes, a class that is solely lecture based becomes boring and tedious for the student. Same as with online learning. Podcasts, videos, animated demonstrations, worksheets and exercises are only a few of the resources that can be used as an alternate to traditional readings, etc.
2. ***Make yourself present on the course site.*** As with the traditional classroom, the more an instructor's presence is seen, the more comfortable the student is in his/her learning environment. This can be done in a multitude of ways:
 - i. Post a welcome message the first day of classes. Introduce students to yourself and to the course. Make sure to also post your contact information to the students such as email, phone extension, etc. Give students your hours of availability and how long it will take for you to respond to their email.





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- ii. Post daily announcements for students to read. Make sure to tell students during orientation that you regularly post announcements and it is up to them to logon to the course platform to read them. They will not be emailed the announcements.
These announcements could discuss things like the weeks' assignments, due dates, assessments, etc. Anything you think the student will need to/like to know.
 - iii. Post weekly discussion questions. Ask students to respond to a discussion that you ask on the platform's discussion board. It helps if you make it mandatory for students to give a response to each discussion topic you post. Giving students' feedback on their responses is also a way for them to interact and get to know their instructor.
 - iv. Host a virtual office hour where students can come to you for concerns, comments, or additional discussion. Although it is still a good idea to hold traditional face to face office hours, a virtual hour held at the same time every week, or held after traditional school hours will let your students see how invested you are in their success in the course.
- 3. Create an online community.** Though a course is offered online, it doesn't mean it has to be impersonal. In traditional classroom settings, students are able to "bond" through interactions with one another, the instructor, and in small groups which creates a learning community. The same can be done in the virtual classroom.
- i. Launch your course with a welcome announcement of personal introductions or allow for a personal introductions on the discussion board during the first week of classes. This information can be a "mini" assignment or something that student's choose to participate in at will. You may want to start off the discussion yourself by offering information about yourself, or ask the students a series of questions to answer about things like their family/friends/vacations/past times/etc.
 - ii. Create small groups (similar to study groups) for students to participate in for various activities, summarizing of articles, or problem-solving discussions. This way, students can act like mentors to one another and offer each other support throughout the semester.





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4. ***Set clear, realistic guidelines.*** Make sure the students know how to contact you and when, but also what your availability will be. It is important to let students know that you are still accessible to them, even though the class is online, and let them know the length of time it will take for assignment turnaround.
 - i. Include a list of expectations on the course site for things like how students can contact/communicate with you (live chat, discussion boards, email, phone), the best times to contact you, and your expected response time. This will lessen student anxiety and let them know that you are still available to them – even more than with face to face classes, as with online courses there are a number of different electronic ways to contact you.
 - ii. Be consistent with due dates (if your course has any). Some online courses give the student the whole semester to work on materials, others have a consistent due date such as “weekly assignments will not be accepted past Thursdays at 11 pm” or “online submission of assignments will only be accepted on Fridays up to 11 pm” etc. This establishes a routine in the virtual classroom.

5. ***Use a variety of online activities.*** Because online courses focus more on self-directed learning, it is important to keep students actively engaged in the materials. Merely giving the students a series of textbook readings will quickly make them lose interest. *Do not teach to text.*
 - i. Give students a variety of activities such as worksheets, small group exercises, quizzes, videos, etc. in addition to readings. These will offer students a variety of learning styles and opportunities, thus keeping them engaged in course materials and subject matter.
 - ii. Provide both choice and options for students. This allows potential for both personalized and customized learning.
 - iii. In addition, create discussion posts/forums that encourage critical thinking and reinforce course concepts. Create open-ended questions so that students can explore various concepts. Stay away from questions that require an obvious or “yes” or “no” answer.

You should log in to the online platform and monitor student’s progress regularly (minimum 4 times a week). This will allow you to track students’ success, allow problem solving tips, and be an active participant in student forums and discussions. A successful online classroom makes students – not the material—a number one priority.





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