

Time Hrs	Day 1	Current Instructor Activities	Student Essential Skills Based Activities	References and Resources	Evaluation: Written Practical
2.5		7:00 a.m. – 9:30 a.m. • Shop: Glossary of Terminology, Introduction to the Rigging Tools Used on the Job	The three ES Activities (see below) reinforce various concepts in Chapters 1, 2 and 3.	• U.A. Rigging Manual • Classroom Laptops	
1.8		9:45 a.m. – 11:30 a.m. • Chapter 1: Fiber Rope			
2.0		12:00 p.m. – 2:00 p.m. • Chapter 2: Knots & Hitches • Chapter 3: Wire Rope (12:00 p.m. – 2:00 p.m.) <u>Assign Homework:</u> Assignments Chapters 1, 2 & 3			

ES Activity #1: Fiber Rope Applications and Specifications

Purposes:

- To gain experience with online research related to synthetic rope specifications and uses
- To gain understanding of various manufacturers methods for citing measurements for synthetic rope sizes, breaking strengths, etc.
- To generate interest and increase knowledge about ropes and their various industrial and recreational uses.

Materials:

1. UA Rigging Manual: Chapter 2 and Appendix A (Table of Natural and Synthetic Fiber Rope Characteristics) on page A-3
2. The Internet

Method:

1. 8 different rope websites could be assigned to the 8 student pairs (e.g. Phillistran, Cortland, Masterpull, Webrigging, etc.). All student pairs could be asked to find effective options for ropes to be used in instructor-designed realistic industrial (plumbing related) rigging scenarios, given specific loads and conditions.
2. Student pairs use both the Internet and the information in their UA Rigging Manual (Chapter 2 and Appendix A on page A-3).
3. Student pairs could also choose another rope application from an instructor-generated list, which includes various outdoor and indoor industrial and recreational applications, such as tree climbing (arborists), rock climbing, various marine applications (sailing, power boating, commercial fishing, canoe transport), forestry, camping, theatre stage/prop, movie special effects, etc.). Student pairs then find what they consider to be the best online information source(s) for ropes for specific applications/activities. They could also focus on one specific application task (e.g. sailboat rigging, lifelines, etc.) and cite a specific example of a synthetic rope (with specs) for this application, crediting a specific manufacturer.
4. Students present their findings in brief oral presentations over the next few days.

All 9 Essential Skills Used:

A: Reading Text; B: Document Use; C: Writing; D: Numeracy; E: Oral Communication; F: Thinking Skills; G: Working with Others; H: Computer Use; and I: Continuous Learning

ES Activity #2: Knots and Hitches (Days 1 and 2, before the *Knots Practical* on Day 3)

Purpose: To reinforce knot and hitch tying skills, by engaging each student’s imagination, organization, and verbal skills.

Method: Before ES Activity #2, all students have practiced tying knots and hitches in the classroom, using the Rigging Manual’s instructions in Chapter 2, and rewriting any of these instructions to make them clearer. Then students work in pairs, sitting or standing back-to-back, pretending that they are talking to each other on speaker phones. The two students take turns being each other’s unseen verbal guide, giving each other step-by-step instructions for tying one or more knots and/or hitches. Students must avoid directly looking at any explanations in Chapter 2, unless they have to. This activity could be repeated on Day 2.

Students could also research the use of specific knots and hitches for specific industrial *and/or* recreation situations (e.g. tying a horse to a hitching post or horse trailer; securing a boat’s bow and stern to a dock; tying a tarp over a load in the back of a pickup truck; etc.).

Essential Skills: A: Reading Text; E: Oral Communications; F: Thinking Skills; H: Computer Use; and I: Continuous Learning.

ES Activity #3: Shock Load Avoidance

Purpose: To reinforce the importance of shock load avoidance through written instructions and verbal rationales.

Method: Using a laptop and page 36 of their “Rigging” Manual, students in small groups or pairs write a set of “Instructions” for “How to Avoid Shock Loads”. They are to imagine that they are writing these Instructions for their apprentice, who is relatively new on the job site. (They can imagine that they’ve written other sets of instructions for many other tasks, and that all of these are in a binder for an apprentice’s easy reference.)

Each group’s set of Instructions for “How to Avoid Shock Loads” must be written in verb-first format: e.g. Carefully watch.... and Do NOT allow....” The set of Instructions must also expand on the information on page 36. For example, potentially confusing terms, such as “fouled” and how a rope “takes it on the pick up” need to be explained in words and/or drawings. The set of instructions should also include relevant safety information, including appropriate “Cautions” and “Warnings”.

After writing the instructions, each student practices explaining the importance of these Instructions to his/her apprentice, citing two imagined but realistic specific examples of dangerous situations resulting from the occurrence of shock loads.

Essential Skills: A, B, C, E, F, G, and H.

Time Hrs	DAY 2	Instructor Activities	Student Essential Skills Based Activities	References and Resources	Evaluation: Written Practical
2.5 1.8 2.0	7:00 a.m. – 9:30 a.m. 9:45 a.m. – 11:30 a.m. 12:00 p.m. – 2:00 p.m.	<ul style="list-style-type: none"> Review of Chapter 1, 2 and 3 Assignment Answers. These answers could be posted or circulated to create more time for Day 2 ES activities, including Oral Presentations on Fiber Rope Research (described on Day 1). Shop: Do Knots Required for Rigging Practical Chapter 4: Slings Chapter 5: Helicopter Hoists (Possibly show different types of hitches used with manufactured slings) <p>Assign Homework: Assignments Chapters 4 and 5</p>	<p>See ES #2 Practice Activity for Knot and Hitch Skills, which is detailed on page 2 of Day 1 Lesson Plan.</p> <p>See below for details on ES Activities #4 and #5.</p>	<ul style="list-style-type: none"> U.A. Rigging Manual Classroom Laptops 	

ES Activity #4: Loads, Slings, and Hardware

Purpose: To review, reinforce, and integrate the information in Chapter 4, on “Slings”, and in Chapter 8, on “Rigging Hardware”.

Method: Each student pair is given a different, realistic, concise and thorough description of a load, which has been designed and written by their instructor. Their task is to accurately choose a sling type for moving this load. Students make point form notes and do necessary research. They present the load scenario, and their rationale for their sling type(s) to the class.

Note: ALL Work Done on ES Activity #4 must be saved (e.g. in Table format), because relevant Hardware choices (Chapter 8) and Safety Check information will be added on Day 4 (see Activity #7 on page 7).

Essential Skills: A: Reading Text; B: Document Use; C: Writing; E: Oral Communication; F: Thinking Skills; G: Working with Others; and I: Continuous Learning

Day 2 continued....

ES Activity #5: Helicopter Hoisting Hand Signals

Purpose: To reinforce the importance of hand signals during helicopter hoisting and to practice the 10 hand signals, without any verbal accompaniment.

Method: There are likely several ways to design this activity with many possible materials, including toy helicopters. And there are likely ways to make this more fun and even competitive (e.g. teams start off with 10 points and each team is observed microscopically by other teams and the instructor. Teams lose points for any talking; being too quick or taking too long; giving too much or not enough signals, or wrong signals, etc.)

Basic Method :

1. Students work in pairs, and alternate between the roles of hand signaller and helicopter operator.
2. The student role playing the helicopter operator could hold an inverted and enlarged wire coat hanger upside down, with a load (e.g. key from a key chain) suspended from the hanger’s “c” hook.
3. Two X’s (e.g. with black electrical tape) are marked on table, bench, or chair tops to illustrate helicopter take-off and final load destination areas. These two X’s should have different elevations, and all of the paired X’s should be equidistant.
4. The student role playing the helicopter operator places the load on one X.
5. The student role playing the hand signaller begins by using the signal for “Takeoff”.
6. The helicopter operator moves the load towards the second X, giving the hand signaller realistic hesitation and accuracy challenges so that the signaller can adequately practice all 10 hand signals.

Basic Method + Safety Focus: At appropriate times during the signalling process, the signaller could verbally explain the 12 Safety Rules related to helicopter hoisting. For example, before giving the signal to *Takeoff*, s/he could say something like “At this point, notice these important safety rules:

1. I haven’t got my back to the load.
2. I’m not between the load and another object.
3. I have lots of room to move around, to ensure that I won’t be directly under the load once it’s airborne—which is also the responsibility of the helicopter operator.
4. I’ve checked the load for any damage, and I know the signal for *Emergency Stop* (Chapter 6, page 81) if something goes wrong.”

The other safety rules can be described at other relevant points during the hoist.

Essential Skills: A, B, E, F, and G.

Time Hrs	<u>Day 3</u> Learning Tasks	Instructor Activities	<u>Student Essential Skills</u> <u>Based Activities</u>	References and Resources	Evaluation: Written Practical
2.5	7:00 a.m. – 9:30 a.m.	<ul style="list-style-type: none"> • Shop Practical on Knots • Review of Chapter 4 and 5 Assignment Answers 	<p>ES Skills were not specifically developed for use during the Day 3 class because</p>	<ul style="list-style-type: none"> • U.A. Rigging Manual 	
1.8	9:45 a.m. – 11:30 a.m.	<ul style="list-style-type: none"> • Chapter 6: Cranes and Crane Signals 	<ol style="list-style-type: none"> 1. Classroom time may be limited as a result of the <i>Practical on Knots</i> 		
2.0	12:00 p.m. – 2:00 p.m.	<ul style="list-style-type: none"> • Chapter 7: Hoisting and Jacking Equipment <p>Assign Homework:</p> <ul style="list-style-type: none"> • Chapter 6 and 7 Assignments • <u>Essential Skills Activity #6: Online Research of Jacks</u> <p>Each student makes a table citing 2-3 plumbing-related safe load applications for each of the 4 types of jacks: ratchet, screw, hydraulic with integral pump, and hydraulic ram with separate pump. Each student creates a second table with comparative on-line research on two manufacturers of jacking equipment. On Day 4, each student presents his or her recommendation of one jacking equipment manufacturer over another, using comparative jack specifications, website ease, company profiles, cost, and any other relevant criteria.</p> <p><u>Essential Skills:</u> A: Reading Text; B: Document Use; C: Writing; D: Numeracy; E: Oral Communication; F: Thinking Skills; H: Computer Use; and I: Continuous Learning</p>	<ol style="list-style-type: none"> 2. Crane signal practice could be accomplished in the same way that Helicopter Hoisting signals were practiced on Day 2, as described in ES Activity #5 on the previous page. Alternately, the Instructor could role play a crane operator who also gives verbal descriptions of certain conditions (e.g. so they can practice the Emergency Stop signal), while all students give accurate hand signals to facilitate moving the crane’s load from point A to point B. <p>Please note the ES Online Research Homework Activity in the column to the left.</p>		

Time Hrs	Day 4 Learning Tasks	Instructor Activities	Student Essential Skills Based Activities	References and Resources	Evaluation: Written Practical
2.0	7:30 a.m. – 9:30 a.m.	<ul style="list-style-type: none"> Review Answers for Chapter 6 and 7 Assignments Student Presentations on Jacking Equipment 	<ul style="list-style-type: none"> See Presentations in the column to the left. 	<ul style="list-style-type: none"> U.A. Rigging Manual Class Laptops 	
1.8	9:45 a.m. – 11:30 a.m.	<ul style="list-style-type: none"> Chapter 8: Rigging Hardware 	<ul style="list-style-type: none"> See below for possible ES Activities #7 and #8 		
2.0	12:00 p.m. – 2:00 p.m.	<ul style="list-style-type: none"> Chapter 9: Determining Load Weights; Reviewing Math Concerning Volumes <p>Assign Homework:</p> <ul style="list-style-type: none"> Chapter 8 and 9 Assignments 			

ES Activity #7: Expands on the tabled information completed for ES Activity #4 (on page 4), to also include Hardware choices (perhaps from specific manufacturers) and specific Safety Checks, recorded as point form instructions.

Essential Skills Used:

- A: Reading Text
- B: Document Use
- C: Writing
- E: Oral Communication
- F: Thinking Skills
- G: Working with Others
- H: Computer Use
- I: Continuous Learning

ES Activity #8: Preparation for Day 5 Station Work on Chapter 8 “Rigging Hardware”

Purposes:

1. To ensure curriculum coverage of all 10 hardware devices listed on page 103 of Chapter 8.
2. To fully engage students in being more responsible for their own learning and for that of others, such as apprentices.

Method: “Station Work” based on a class size of 16 students. Six “Expert” Groups of 2 or 3 students research this hardware and its specific applications:

- **Group 1 (2 students):** Eyes and Thimbles
- **Group 2 (3 students):** Clips
- **Group 3 (3 students):** Wedge Sockets and Hooks
- **Group 4 (3 students):** Shackles
- **Group 5 (3 students):** Rings, Links and Swivels
- **Group 6 (2 students):** Turnbuckles

In 6 different “Station” areas of the classroom, expert groups present their information in oral and visual form: using spoken descriptions and explanations, and point form handouts, drawings, photos, props (e.g. borrowed hardware), laptop PowerPoint presentations, and/or posters, etc.

Using an equitable rotation basis, one or more students from each expert group provide the information at their specific station, while the other(s) in their group join their peers to learn from the other student experts at the other stations. While students are visiting each station, they could record answers on an instructor-generated assignment question sheet. The instructor could distribute this question sheet before the day of the Station Work, to help students determine the technical content and detail at their stations, and to reinforce specific numeracy and fact finding skills.

All 9 Essential Skills Used:

- A: Reading Text
- B: Document Use
- C: Writing
- D: Numeracy
- E: Oral Communication
- F: Thinking Skills
- G: Working with Others
- H: Computer Use
- I: Continuous Learning

Time Hrs	<u>Day 5</u> Learning Tasks	Instructor Activities	Student Essential Skills Based Activities	References and Resources	Evaluation: Written Practical
2.5	7:00 a.m. – 9:30 a.m. <ul style="list-style-type: none"> • Review Answers to Chapter 8 and 9 Assignments • Knot Tying Exam • Theory Exam 		<ul style="list-style-type: none"> • Any Remaining Student Pair Presentations 	<ul style="list-style-type: none"> • U.A. Rigging Manual 	
1.8	9:45 a.m. – 11:30 a.m. <ul style="list-style-type: none"> • Shop: 1-2-3 Point Lifts 		<ul style="list-style-type: none"> • Station Work for Chapter 8’s information on “Rigging Hardware” 	<ul style="list-style-type: none"> • Class Laptops 	
2.0	12:00 p.m. – 2:00 p.m. <ul style="list-style-type: none"> • Shop: 1-2-3 Point Lifts <p>Assign Homework:</p> <ul style="list-style-type: none"> • Study for Final Rigging Exam 				