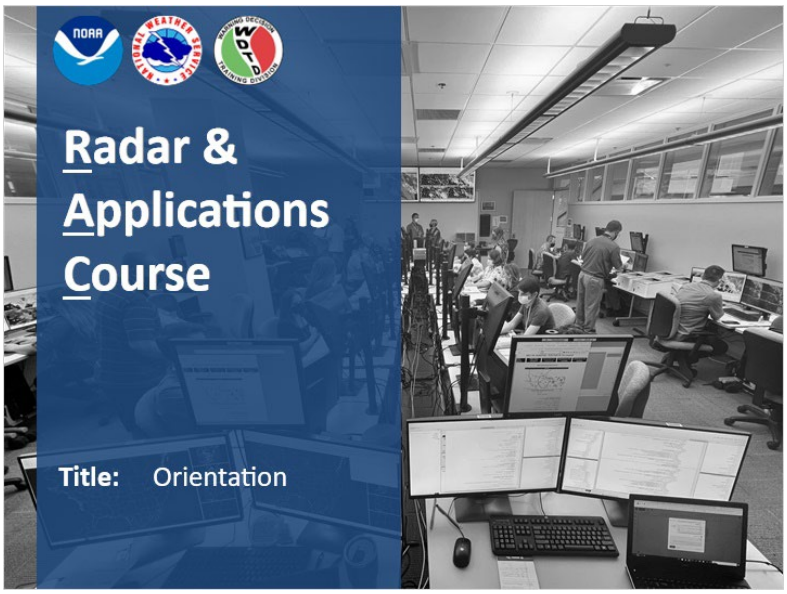
Radar & Applications Course (RAC): Orientation

1. Overiew, Motivation, History

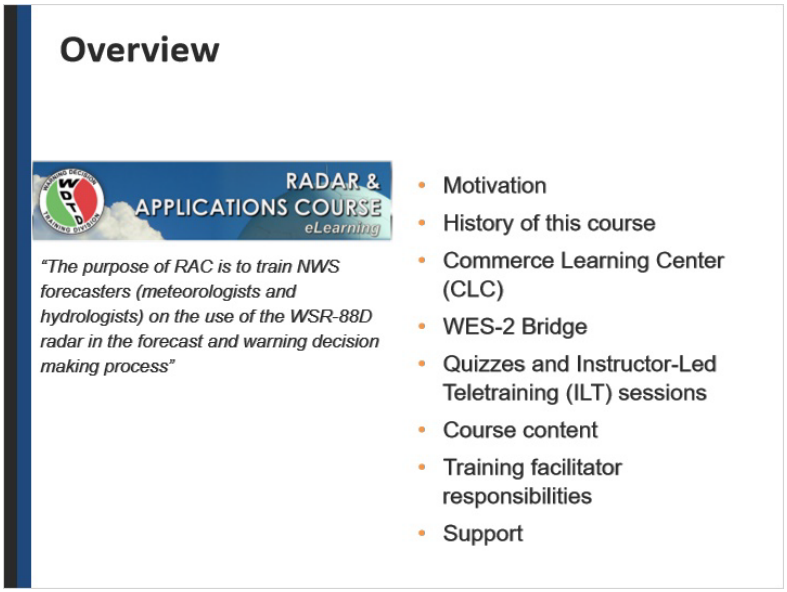
1.1 Title



Notes:

Welcome to the Radar & Applications Course (RAC) conducted by the National Weather Service (NWS) Warning Decision Training Division (WDTD).

1.2 Overview

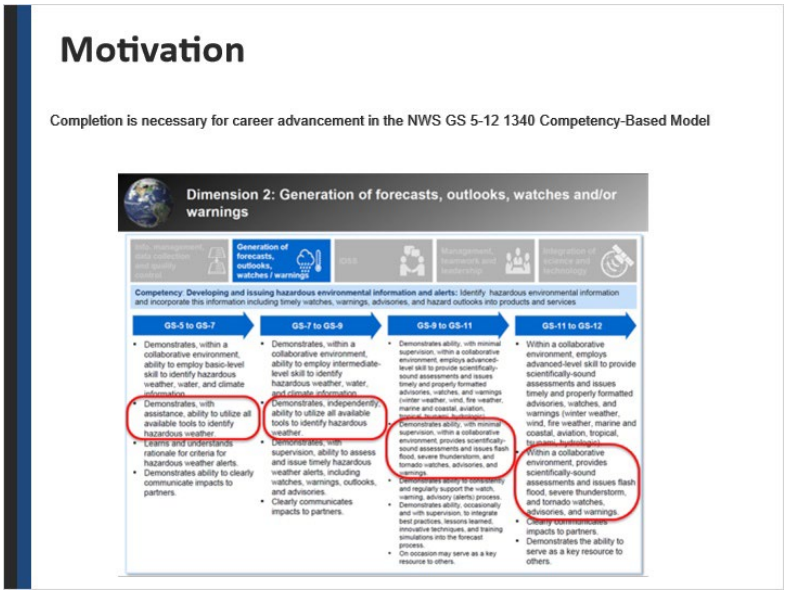


Notes:

The purpose of RAC is to train NWS forecasters (meteorologists and hydrologists) on the use of the WSR-88D radar in the forecast and warning decision making process.

Here is an overview of this presentation. Please take a moment to review it.

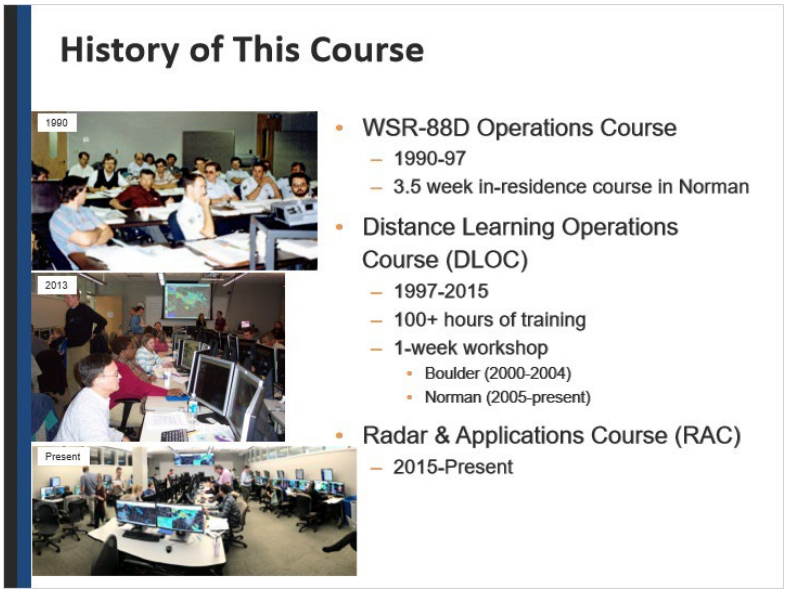
1.3 Motivation



Notes:

RAC is important because its training is necessary for career advancement in the National Weather Service's GS 5-12 1340 Competency-Based Model.

1.4 History of This Course

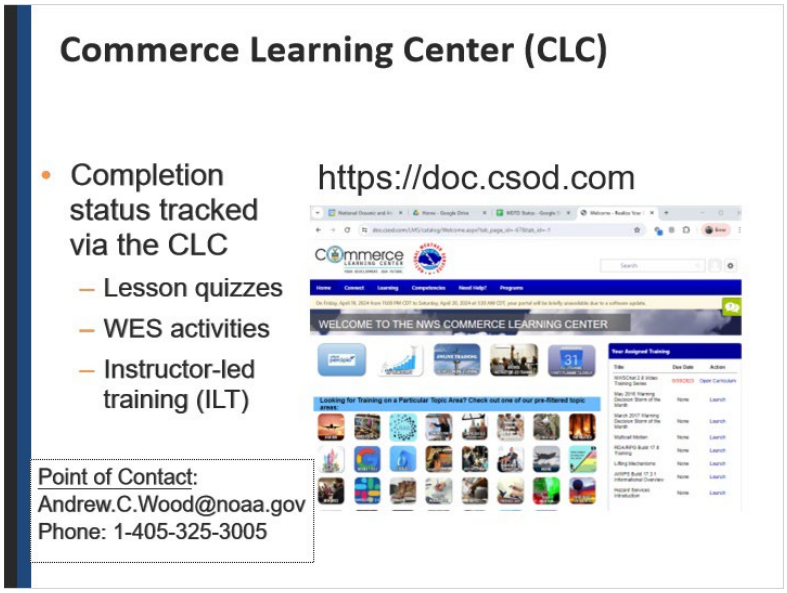


Notes:

This course has steadily evolved over the years, but the focus has always been on the use of the WSR-88D in operations, particularly warning operations. It began in 1990 as the WSR-88D Operations Course which was taught as a 3 & 1/2 week in-residence course in Norman, Oklahoma. In 1997, it transitioned into the Distance Learning Operations Course (DLOC) and provided a blended learning approach which included web-based training, on-line modules, teletraining, and a 1-week workshop delivered at its conclusion. The name was changed to the Radar & Applications Course (RAC) in 2015 to provide a more accurate and meaningful description of the course, but it maintains the same format as DLOC.

2. CLC & WES-2 Bridge

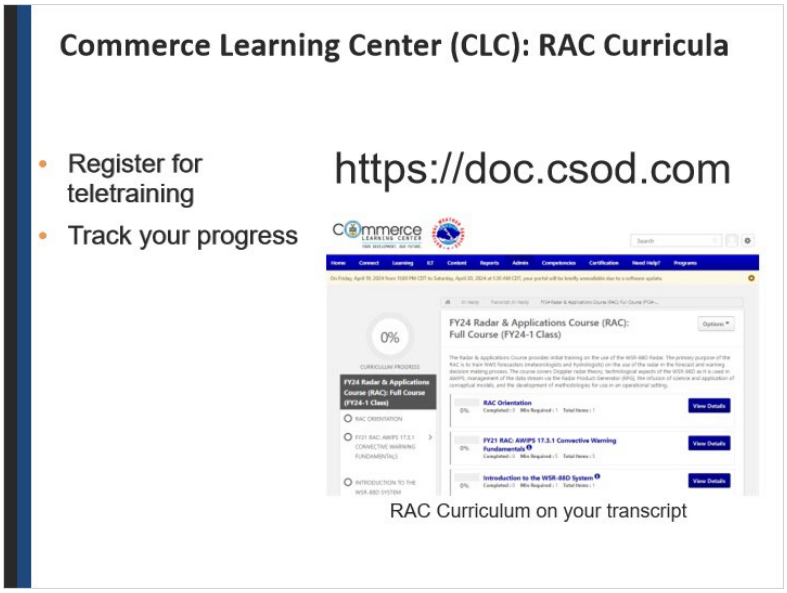
2.1 Commerce Learning Center (CLC)



Notes:

We use the Commerce Learning Center (CLC) to track your completion of each part of the RAC: Lesson quizzes, WES activities, and ILTs. We recommend you bookmark the web address https://doc.csod.com. Most of the lessons are on-line training that you will launch directly from the CLC. Other training (such as AWIPS Warning Fundamentals) will be taken on your local WES machine, but you will need to come back to the CLC and take some action in order to show up as complete. Your point of contact is Andy Wood.

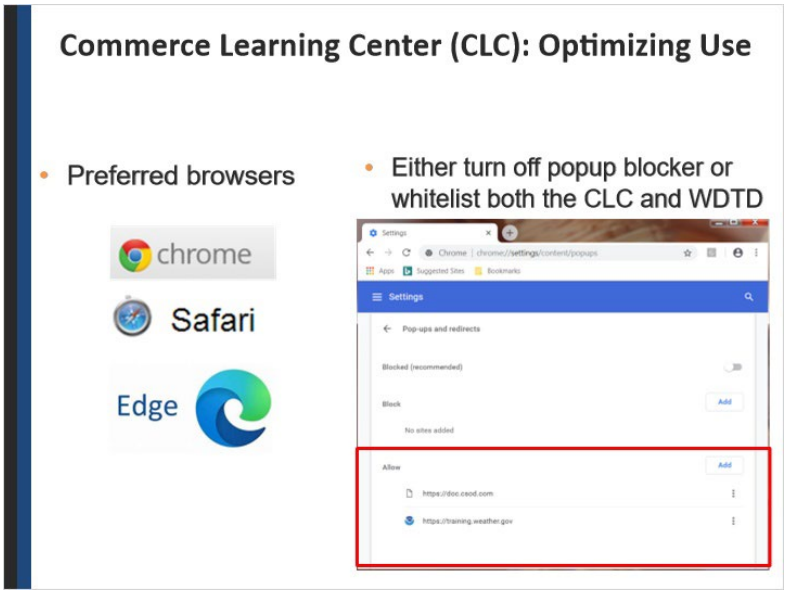
2.2 Commerce Learning Center (CLC): RAC Curricula



Notes:

Your RAC Curriculum is your path to course completion. Use it to register for teletraining sessions and track your progress.

2.3 Commerce Learning Center (CLC): Optimizing Use



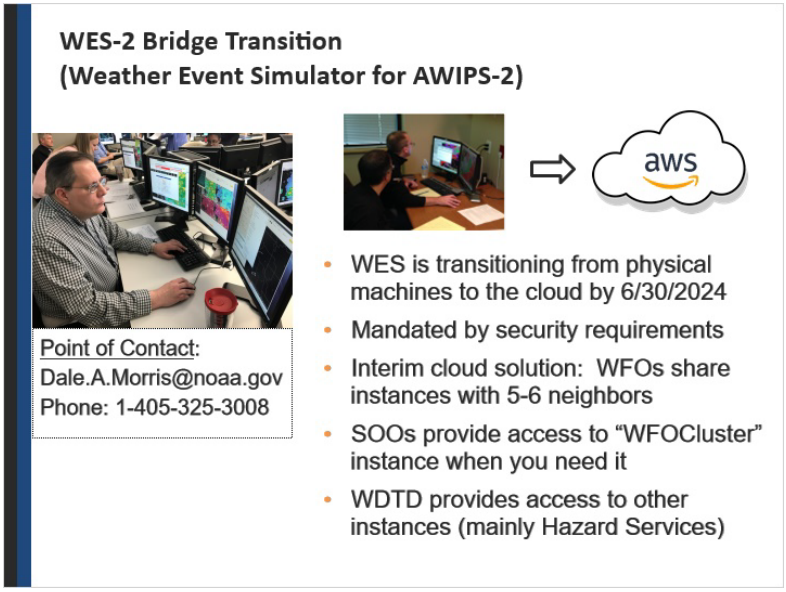
Notes:

Google Chrome, Microsoft Edge, and Safari should all work effectively with the CLC.

If you have popup blockers on, you will not see the presentations appear when you select them unless you create an exception for the CLC and WDTD web sites.

2.4 WES-2 Bridge Transition

(Weather Event Simulator for AWIPS-2)



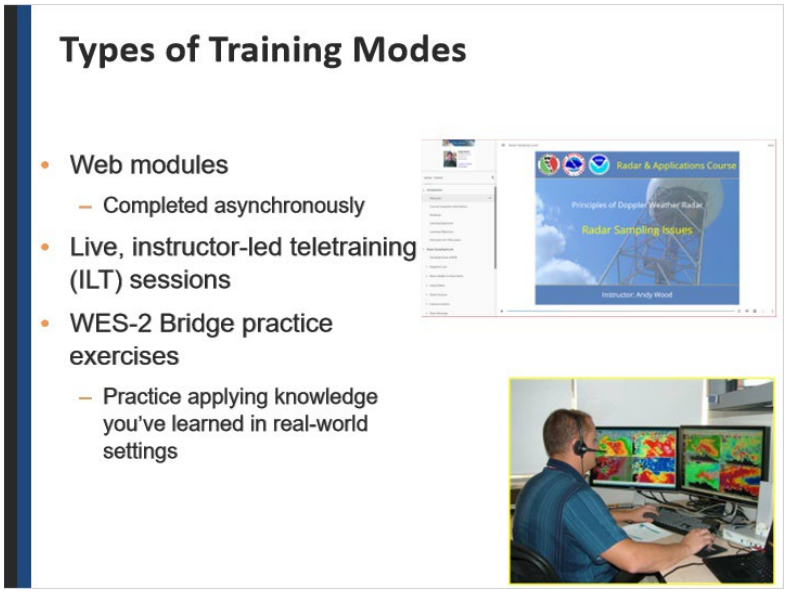
Notes:

WES-2 Bridge is a weather event simulator for AWIPS-2. You will use it during both the distance learning and in-residence Workshop lab portions of RAC. Your point of contact for WES-2 Bridge support is Dale Morris.

The WES is transitioning to the cloud, and WFOs share a "WFOCluster" instance for taking the majority of the WES training in RAC. Your training facilitator provides access to your "WFOCluster" machine when you need it, and WDTD will provide access to other instances for mainly Hazard Services-related training.

3. Quizes and ILTs

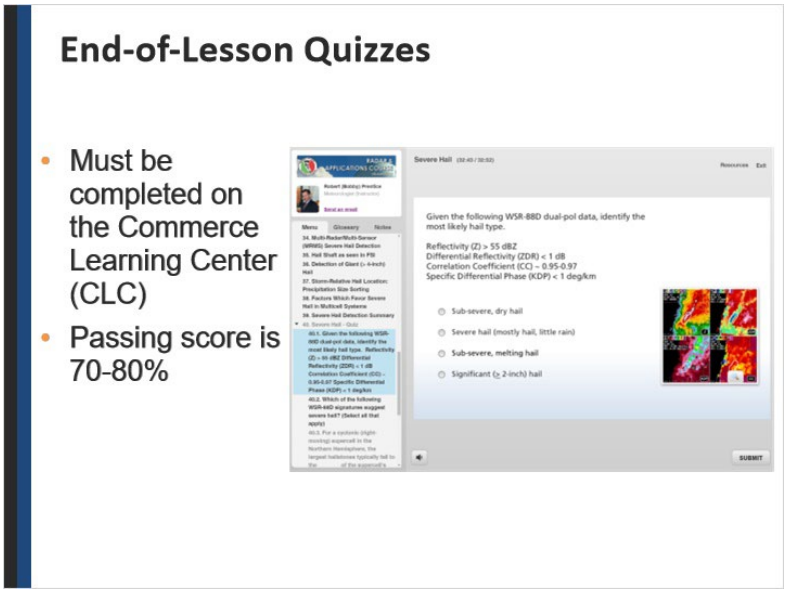
3.1 Types of Training Modes



Notes:

RAC presents training material in various ways. Some are self-paced modules on the Internet. Others are recorded "Articulate" modules where the instructor's voice is paired with the relevant images. Another method is via live teletraining session where you and your classmates go through material together with a WDTD instructor. You must pre-register for each teletraining session via the RAC curriculum in the CLC and take it at the scheduled time.

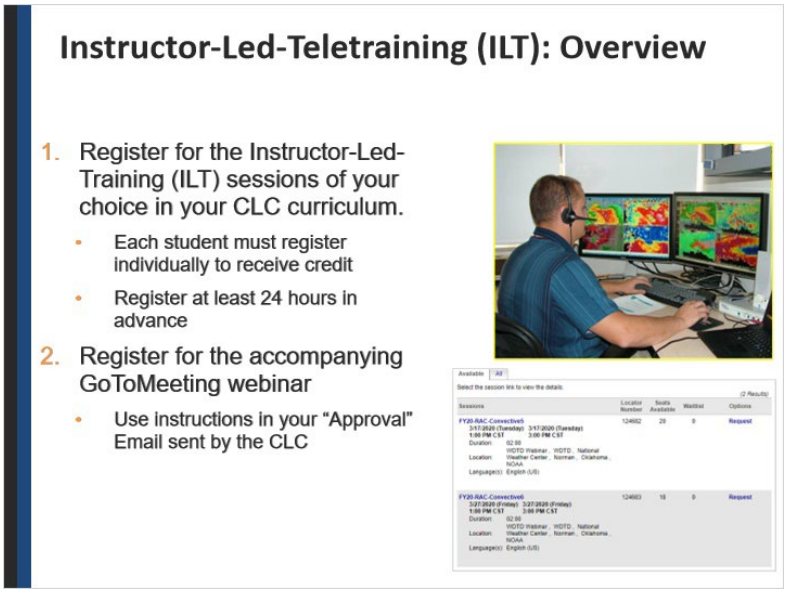
3.2 End-of-Lesson Quizzes



Notes:

Even though RAC lessons are available via our WDTD web page, End-of-Lesson Quizzes must be completed on the Commerce Learning Center (CLC) to receive completion credit. Passing score is 70-80%.

3.3 Instructor-Led-Teletraining (ILT): Overview

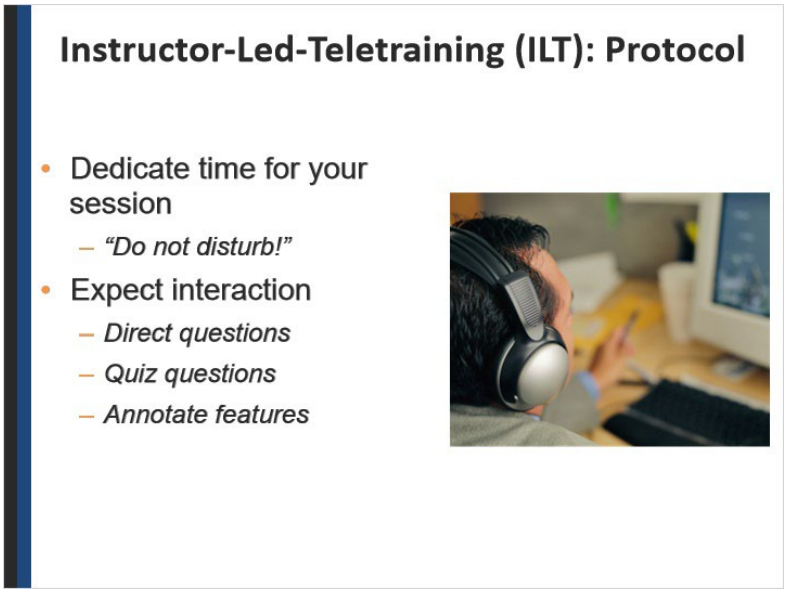


Notes:

Teletraining means we train live over the internet. The registration steps are:

1. Register for the instructor-led training (ILT) session of your choice in your Commerce Learning Center (CLC) curriculum. Each student must register individually to receive credit in the CLC, even if multiple students from the same office attend the same session. Register at least 24 hours in advance.
2. Register for the accompanying GoToMeeting webinar using instructions in your "Approval" Email sent by the CLC. Contact WDTD (nws.wdtd.rachelp@noaa.gov) if the Email hasn't arrived within 24 hours (should come in just a few minutes)

3.4 Instructor-Led-Teletraining (ILT): Protocol

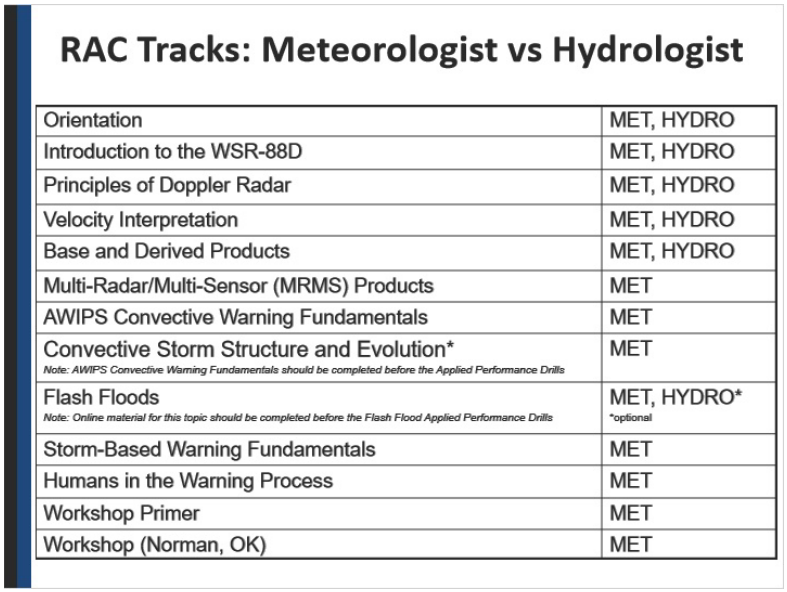


Notes:

During teletraining sessions, dedicate undisturbed time for your session and expect interaction.

4. Course Content

4.1 RAC Tracks: Meteorologist vs Hydrologist



RAC Tracks: Meteorologist vs Hydrologist

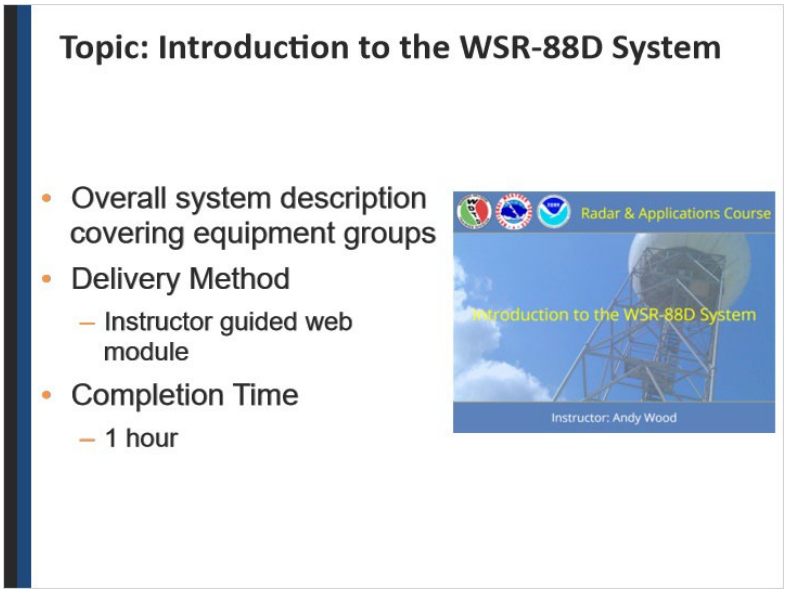
Orientation	MET, HYDRO
Introduction to the WSR-88D	MET, HYDRO
Principles of Doppler Radar	MET, HYDRO
Velocity Interpretation	MET, HYDRO
Base and Derived Products	MET, HYDRO
Multi-Radar/Multi-Sensor (MRMS) Products	MET
AWIPS Convective Warning Fundamentals	MET
Convective Storm Structure and Evolution* *Note: AWIPS Convective Warning Fundamentals should be completed before the Applied Performance Drills*	MET
Flash Floods *Note: Online material for this topic should be completed before the Flash Flood Applied Performance Drills*	MET, HYDRO* *optional
Storm-Based Warning Fundamentals	MET
Humans in the Warning Process	MET
Workshop Primer	MET
Workshop (Norman, OK)	MET

Notes:

Let's discuss the RAC topics. You should complete them in order since they build on each other.

Most RAC students are Meteorologists who have been assigned to the Meteorologist Track, but a few are Hydrologists who have been assigned to the Hydrologist Track.

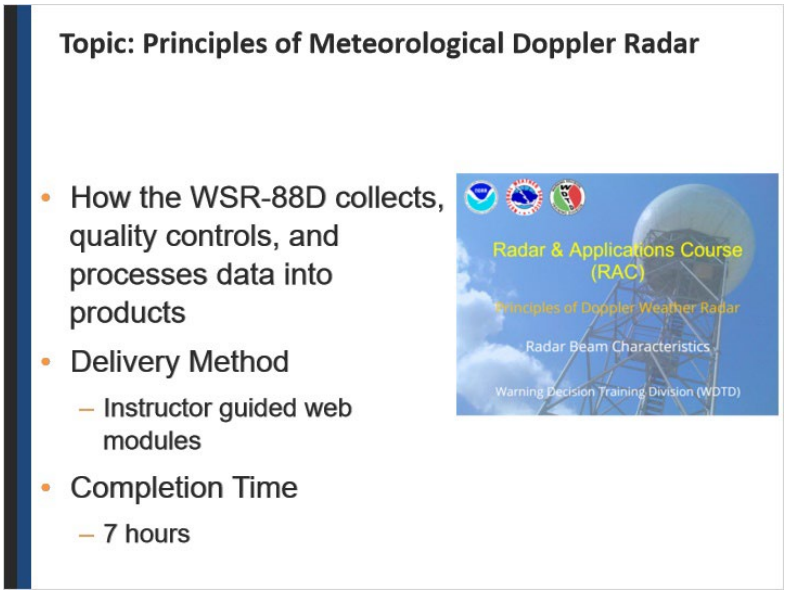
4.2 Topic: Introduction to the WSR-88D System



Notes:

The Introduction to the WSR-88D System topic is a self-guided, narrated, web module that discusses the overall system description and covers the equipment groups. Completion time is about one hour.

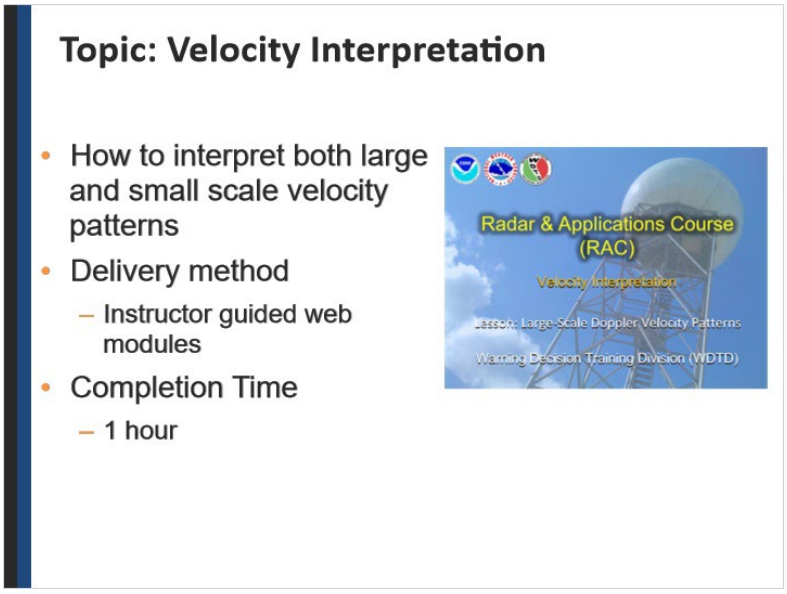
4.3 Topic: Principles of Meteorological Doppler Radar



Notes:

The Principles of Meteorological Doppler Radar topic consists of instructor guided web modules which cover how the WSR-88D collects, quality controls, and processes data into products. Completion time is about seven hours.

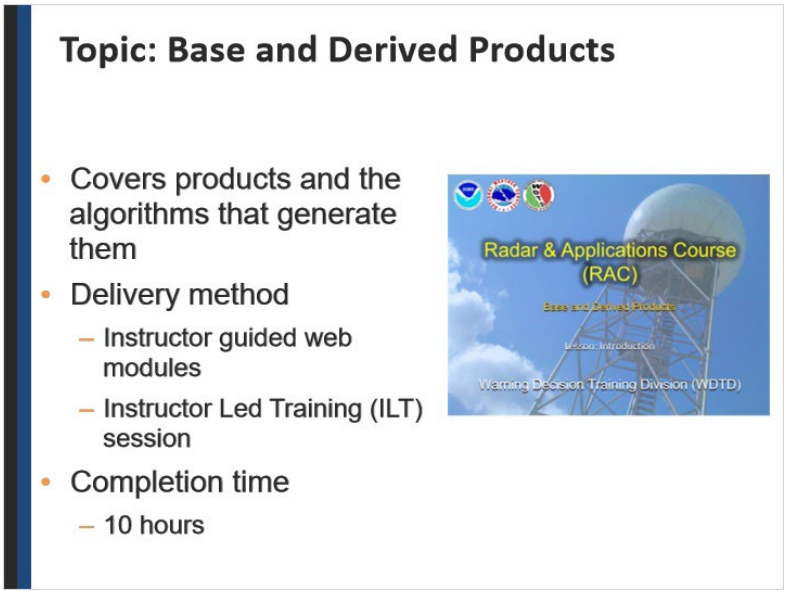
4.4 Topic: Velocity Interpretation



Notes:

The Velocity Interpretation topic consists of instructor guided web modules which cover how to interpret both large and small scale velocity patterns. Completion time is about one hour.

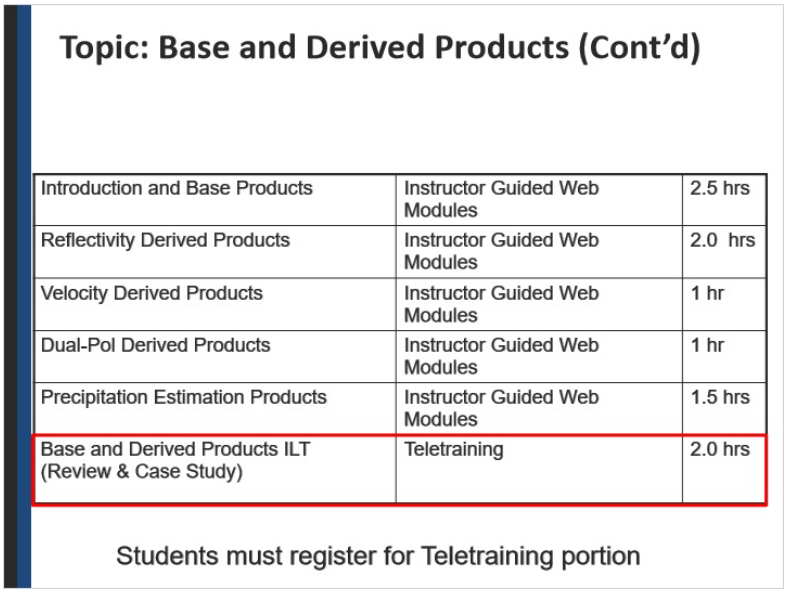
4.5 Topic: Base and Derived Products



Notes:

The Base and Derived Products topic covers products and the algorithms that generate them. Delivery method consists of both instructor guided web modules and an instructor led training session. Completion time is about ten hours.

4.6 Topic: Base and Derived Products (Cont'd)

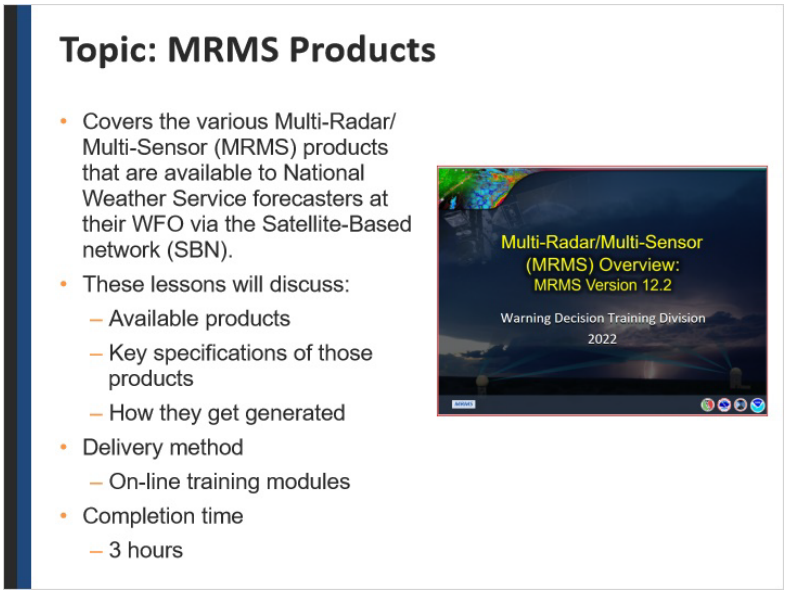


Notes:

The lessons in this topic are organized into sections.

The final lesson "Products Review & Case Study" is an Instructor-Led Teletraining session. You must pre-register in the CLC for one of the sessions.

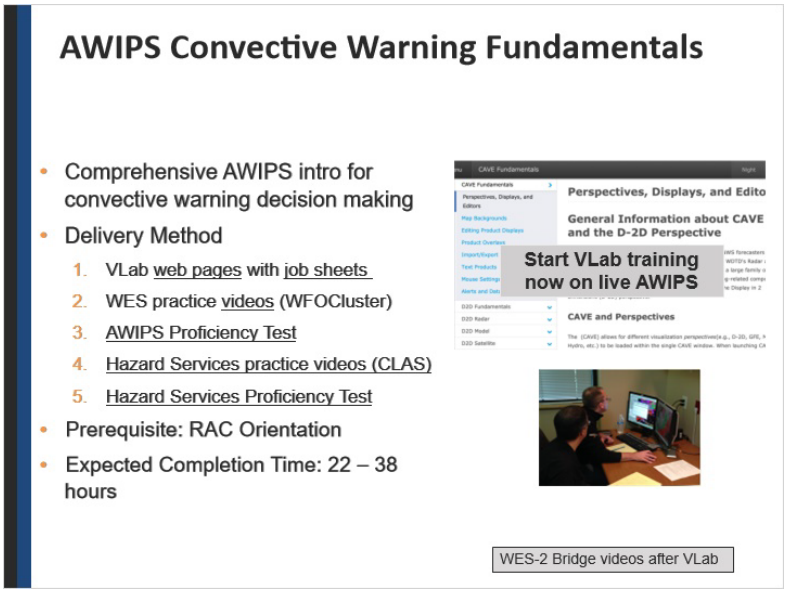
4.7 Topic: MRMS Products



Notes:

The MRMS Products topic covers the various Multi-Radar/Multi-Sensor (MRMS) products. These lessons will discuss the available products, key specifications of those products, and some relevant information on how they get generated. Delivery method is on-line training modules. Completion time is three hours.

4.8 AWIPS Convective Warning Fundamentals



Notes:

The AWIPS Convective Warning Fundamentals is a comprehensive introduction to all the AWIPS convective warning-related tools. All RAC students must take it, including "experienced" forecasters, because it's important that everyone have the same WDTD approved skill set and be on the same page when they work together as a warning team in our Workshop simulations.

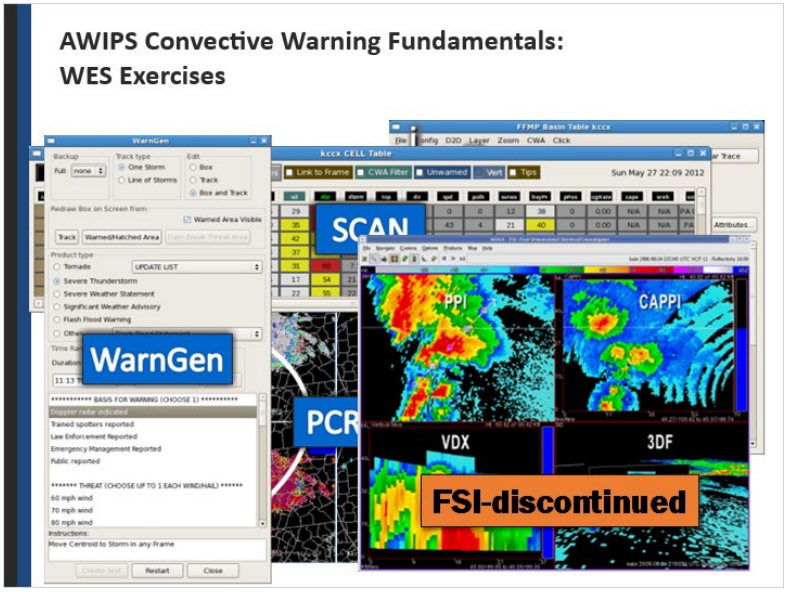
The delivery method is a blend of VLab, WES-2 Bridge practice videos, and proficiency exams. Most of the VLab web pages and job sheets are taken on the live AWIPS. The initial practice videos must be taken on each WFO's WES-2 Bridge WFOCluster cloud instance. Most of the content is independent of AWIPS builds, but there will be notes about any different AWIPS builds in the cloud. The VLab job sheets and WES videos will prepare you to take an AWIPS proficiency test that is proctored by your local facilitator.

Hazard Services training is a significant part of the course and has its own proficiency exam and special cloud instances that are scheduled through WDTD's Cloud Automated Scheduler, or CLAS, that we will discuss later in this presentation.

You can start the AWIPS Convective Warning Fundamentals immediately once RAC begins. Expect all this training to take 22-38 hours depending on how much you like to explore while you learn.

4.9 AWIPS Convective Warning Fundamentals:

WES Exercises



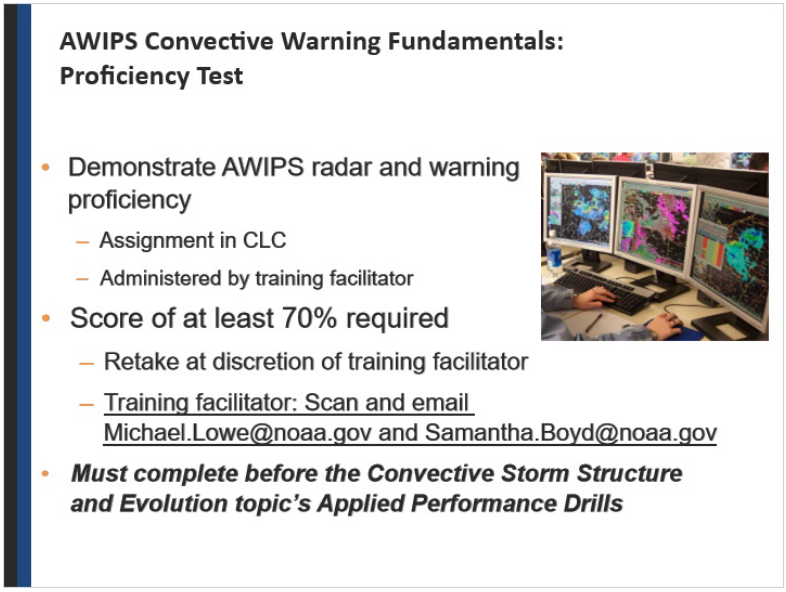
Notes:

The WES Exercises cover AWIPS applications that you will use during warning decision making in your job.

It is important for you to develop a basic proficiency with these different AWIPS tools even if your current office doesn't use all of them because you will likely use some of these at different offices in your career and you need the latest exposure to all these tools to make an informed decision about what tools ultimately work best for you. Because FSI has had some recent performance problems and is slated to be removed later in AWIPS build 23.4.1, we have discontinued training on that. You will see references for FSI in some of our materials.

4.10 AWIPS Convective Warning Fundamentals:

Proficiency Test

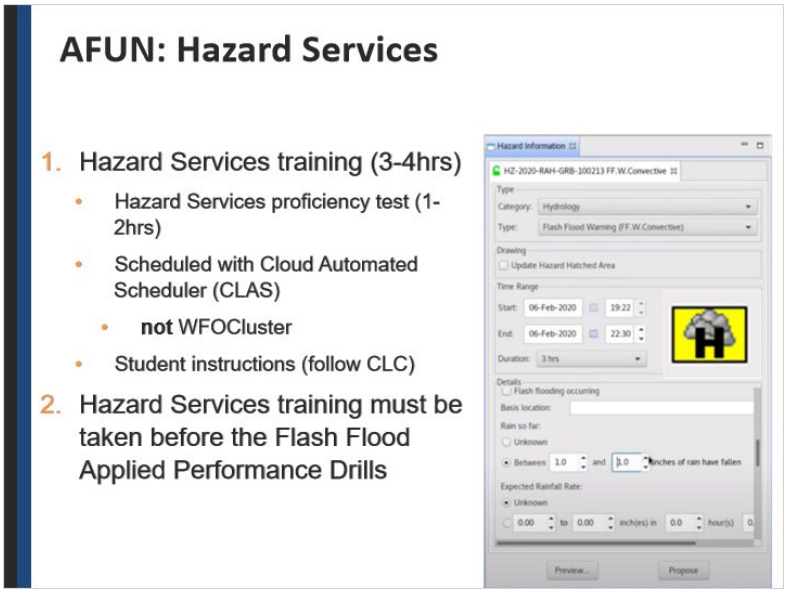


Notes:

You will see the AWIPS Proficiency Test listed as an assignment in the CLC. It is a timed, paper exam administered by your training facilitator. The facilitator will observe your performance of specific AWIPS tasks. You will need to achieve a passing score of at least 70% on the test to receive credit. You may retake the test at the discretion of your training facilitator. After completing the exam your training facilitator simply scans the graded test and email it to Mike Lowe and Samantha Boyd. They will then enter the score in the CLC.

Note: You must complete the AWIPS Proficiency Test before the Convective Storm Structure and Evolution topic's Applied Performance Drills.

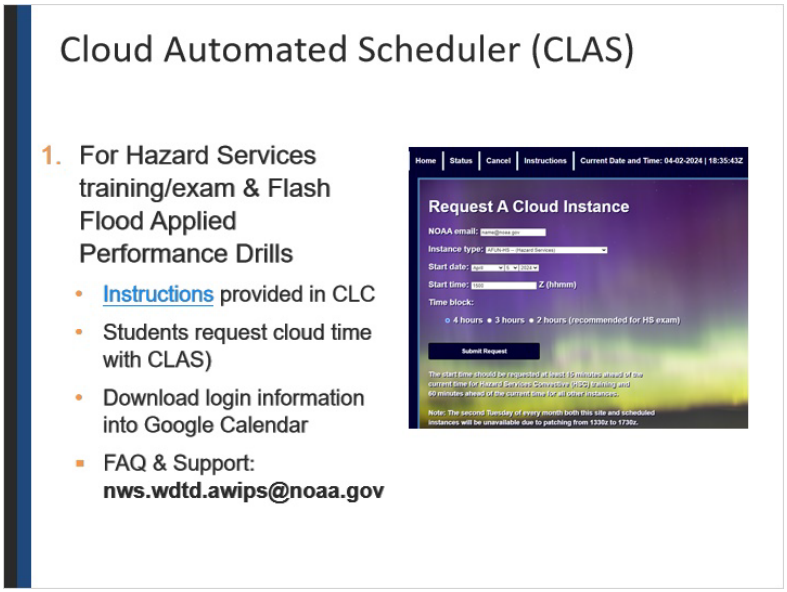
4.11 AFUN: Hazard Services



Notes:

The Hazard Services training and proficiency test are taken after the main AWIPS training as a separate course in the CLC. The Hazard Services proficiency test is similar to the AWIPS proficiency test and will be proctored by the facilitator. The test will take about 1-2hrs.
The cloud instances for Hazard Services-related training do NOT use your WFOCluster cloud machine. They are scheduled by the student using WDTD's Cloud Automated Scheduler (CLAS). See your email and your transcript for the links to the student instructions doc.
Because the Flash Flood Applied Performance Drills uses Hazard Services to issue a flash flood warning, the Hazard Services training needs to be taken before the Flash Flood Applied Performance Drills.

4.12 Cloud Automated Scheduler (CLAS)

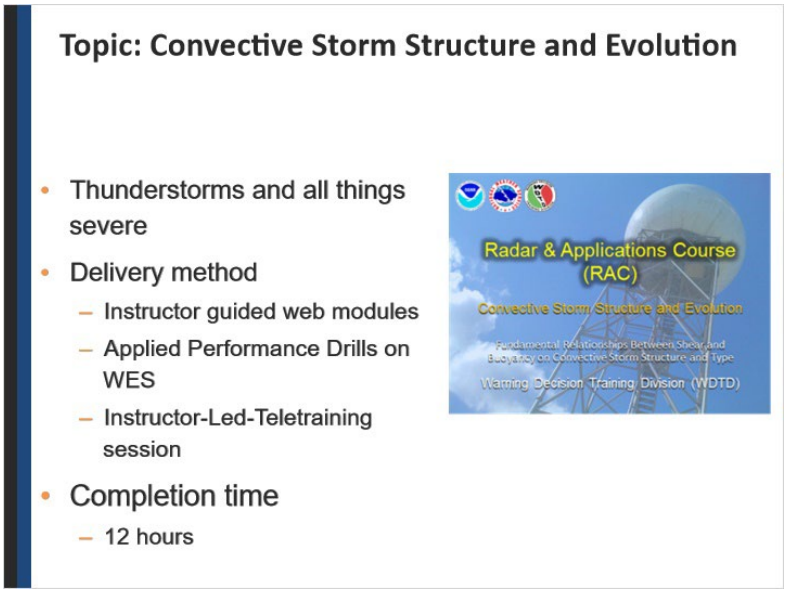


Notes:

WDTD will serve certain Hazard Services-specific training using WDTD's Cloud Automated Scheduler (CLAS). This will be for the Hazard Services training, exam, and the Flash Flood Applied Performance Drills that use Hazard Services to issue a flash flood warning. Students follow their CLC instructions to request cloud time with CLAS and download the login information to take the training and practice with CAVE.

There is a frequently asked questions doc for troubleshooting common cloud/WES problems, and if you run into any problems not solved by the FAQ, email nws.wdtd.awips@noaa.gov for support.

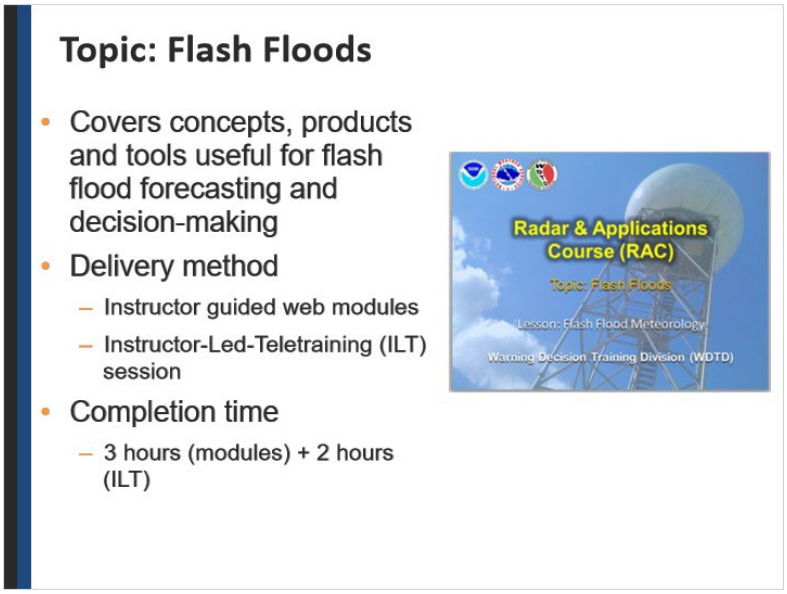
4.13 Topic: Convective Storm Structure and Evolution



Notes:

The Convective Storm Structure and Evolution topic covers thunderstorms and all things severe. Delivery method is instructor guided web modules, Applied Performance Drills taken on the Weather Event Simulator (WES-2 Bridge), and an Instructor-Led-Teletraining (ILT) session. This is the longest topic; completion time is about twelve hours.

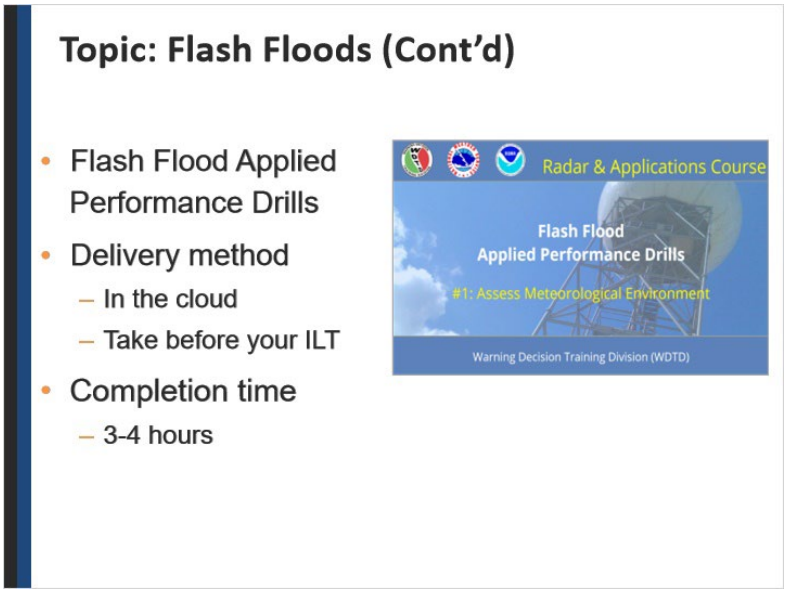
4.14 Topic: Flash Floods



Notes:

The Flash Floods topic consists of instructor guided web modules which cover concepts, products and tools useful for flash flood forecasting and decision-making. There will also be an Instructor-Led-Teletraining (ILT) session. Completion time is approximately three hours for the modules and 2 hours for the ILT.

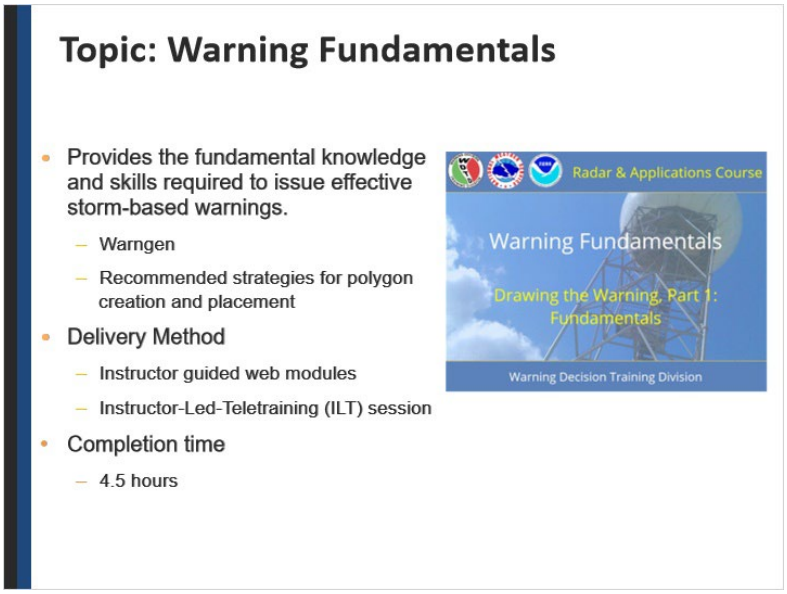
4.15 Topic: Flash Floods (Cont'd)



Notes:

Along with the Hazard Services training, we have Flash Flood Applied Performance Drills that are taken in the cloud. These should be taken before your ILT. The completion time for the Flash Flood APDs is between 3 to 4 hours.

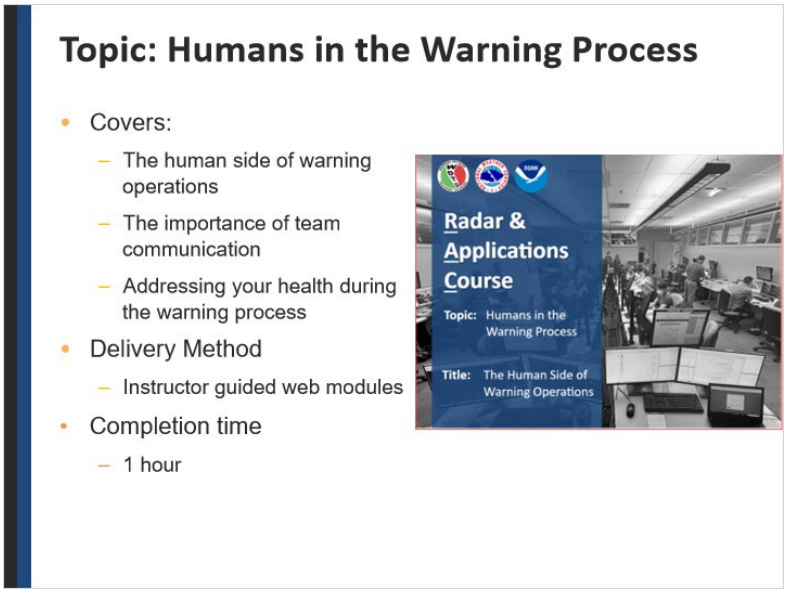
4.16 Topic: Warning Fundamentals



Notes:

The Warning Fundamentals topic provides the fundamental knowledge and skills required to issue effective storm-based warnings. Training includes skills for basic proficiency in using some AWIPS storm analysis applications such as WarnGen and recommended strategies for polygon creation and placement. Delivery method is instructor guided web modules and an Instructor-Led-Teletraining session. Completion time is about five and a half hours.

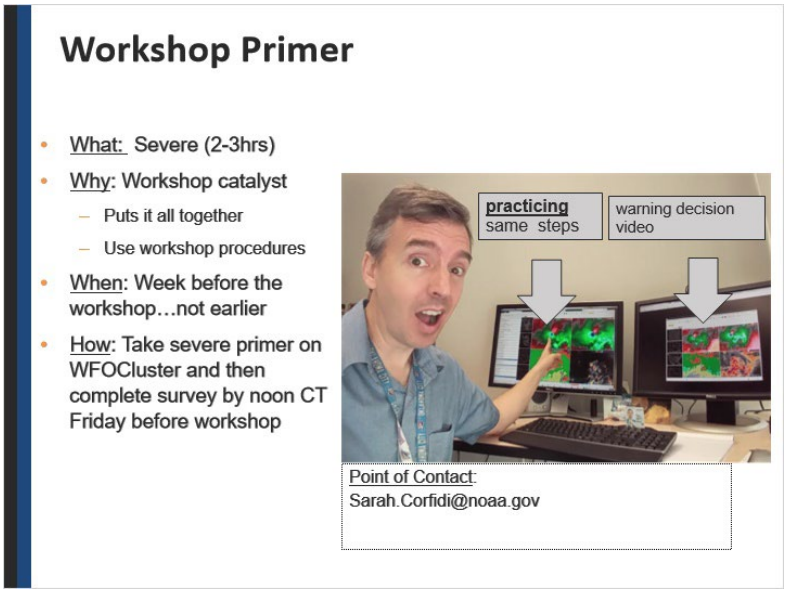
4.17 Topic: Humans in the Warning Process



Notes:

The Humans in the Warning Process lesson covers the human side of warning operations, the importance of team communication, and addressing your health during the warning process. Delivery Method is Instructor guided web modules. Completion time is one hour.

4.18 Workshop Primer



Notes:

One very important exercise that will help prepare you for the week of simulation nirvana at the workshop is the 2-3hr Severe Workshop Primer.

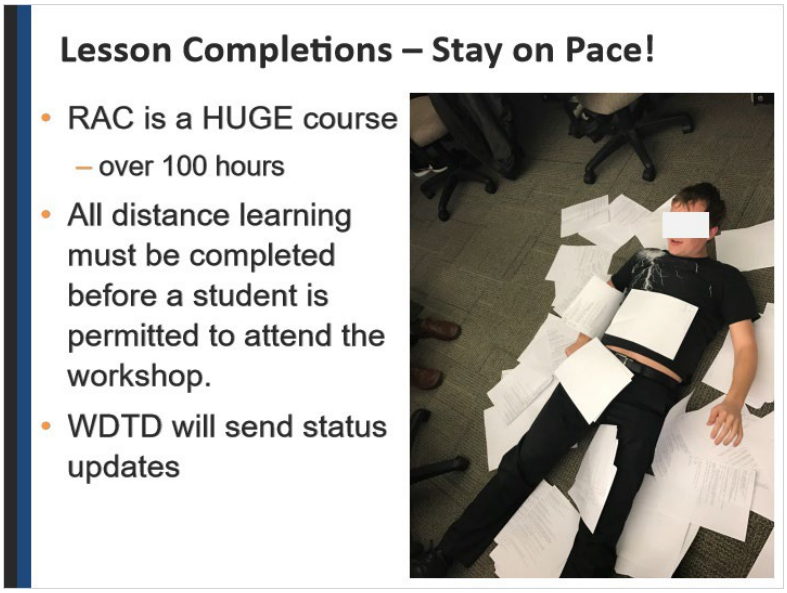
In this catalyst for the workshop, you will start to put everything together to issue warnings using WES-2 Bridge and get a head start on using the same AWIPS procedures you will use at the workshop.

The Workshop Primer should be completed any time in the week before the workshop (or as near as you can; NOT too early), so you refresh your skills right before you come to the workshop. That way you can focus on your higher-order learning skills, instead of remedial training at the workshop.

The Workshop Primer features demonstration videos playing on one monitor while you practice the same steps on the other monitor.

Students will be marked complete in the CLC after they finish the RAC Primer Lessons. Afterwards, complete a survey in the Commerce Learning Center (CLC) by noon Central Time the Friday before your workshop.

4.19 Lesson Completions – Stay on Pace!



Notes:

Please be aware that RAC is a **HUGE** course (over 100 hours) and all distance learning must be completed before a student is permitted to attend the workshop. Thus, it's important to stay on pace. It takes a big time commitment from the student and support for that time commitment from co-workers and the management team.

The RAC Project Leader (Bobby Prentice) will send status updates which include the latest "RAC Training Completion Report" and a course completion timeline in order to help keep you on pace.

5. Workshop

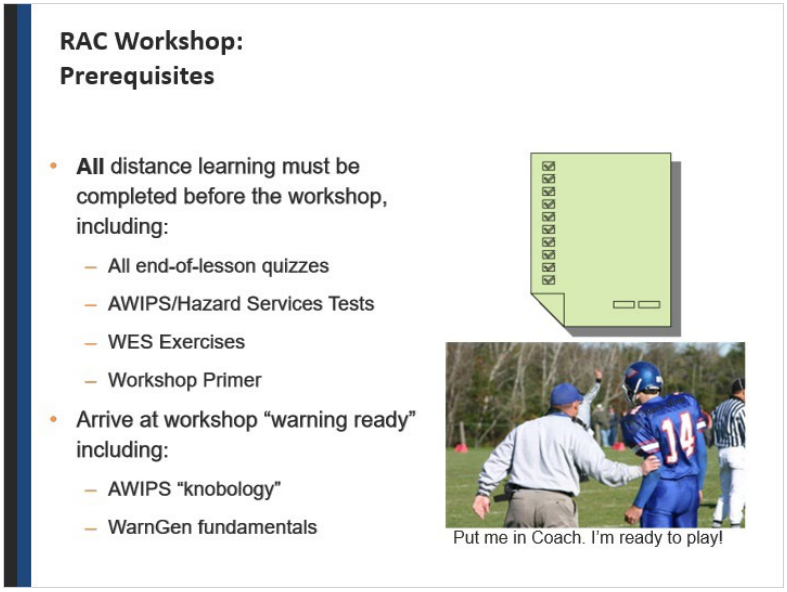
5.1 RAC Workshop

Notes:

The Workshop is the culmination of RAC. It brings together everything you've learned, and more, into a laboratory and simulation environment. Most of your time at the workshop will be in the lab. Typically, you'll work with two (2) other forecasters and go through events in displaced real-time mode together.

5.2 RAC Workshop:

Prerequisites



Notes:

You must complete all distance learning components before you may attend the workshop including: Lessons quizzes, AWIPS and Hazard Services Proficiency Tests, WES exercises, and the Workshop Primer. Students must arrive at the workshop "warning ready" including AWIPS "knob-ology" and WarnGen fundamentals. We want you to get the basics out of the way so we can work on your higher order warning forecaster skills at the workshop.

5.3 RAC Workshop:

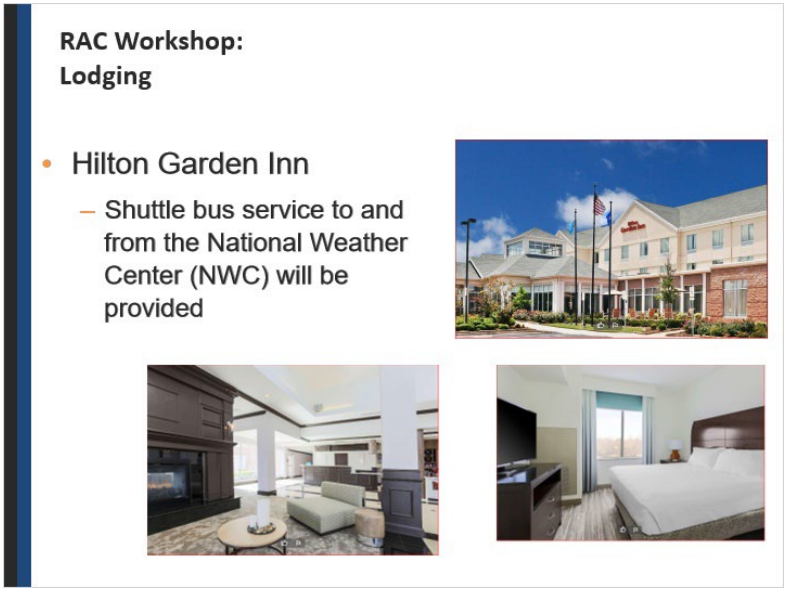
Delivery Method

Notes:

The RAC Workshop delivery method is In-residence at the National Weather Center (NWC). You will be automatically registered in the CLC. Completion time is 40 hours for the week, 8 am Monday through 5 pm Friday. Due to flight schedules, many students will be unable to fly home until Saturday!

5.4 RAC Workshop:

Lodging

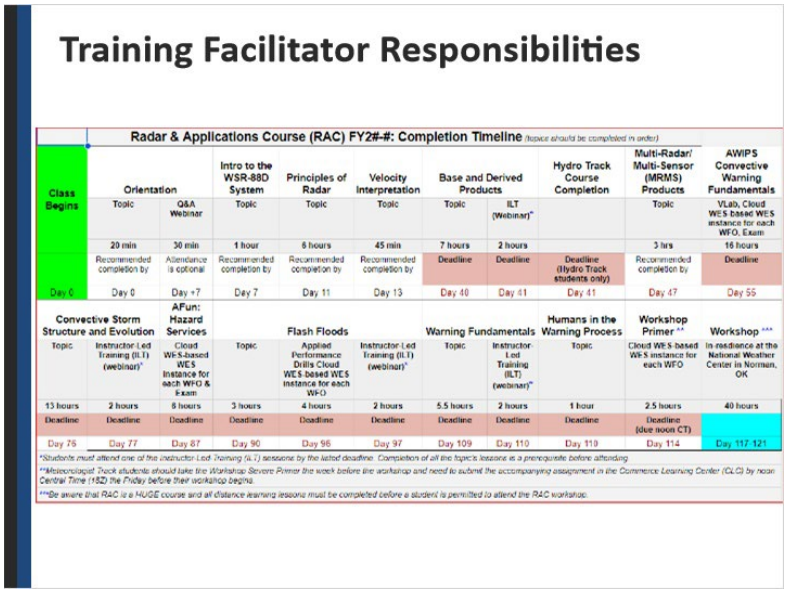


Notes:

Workshop lodging will be at the Hilton Garden Inn located near Interstate 35 in west Norman. This is a twelve (12) minute drive from the National Weather Center (NWC). Shuttle bus service to and from the NWC will be provided.

6. Training Facilitator Responsibilities

6.1 Training Facilitator Responsibilities



Training Facilitator Responsibilities

Radar & Applications Course (RAC) FY2#-#: Completion Timeline *(topics should be completed in order)*

Class Begins	Orientation		Intro to the WSR-88D System	Principles of Radar	Velocity Interpretation	Base and Derived Products		Hydro Track Course Completion	Multi-Radar/ Multi-Sensor (MRMS) Products	AWIPS Convective Warning Fundamentals
	Topic	Q&A Webinar	Topic	Topic	Topic	Topic	ILT (Webinar)*		Topic	VLab, Cloud WES based WES instance for each WFO, Exam
	20 min	30 min	1 hour	6 hours	45 min	7 hours	2 hours		3 hrs	16 hours
	Recommended completion by	Attendance is optional	Recommended completion by	Recommended completion by	Recommended completion by	Deadline	Deadline	Deadline (Hydro Track students only)	Recommended completion by	Deadline
Day 0	Day 0	Day +7	Day 7	Day 11	Day 13	Day 40	Day 41	Day 41	Day 47	Day 55

Convective Storm Structure and Evolution		AFun: Hazard Services	Flash Floods			Warning Fundamentals		Humans in the Warning Process	Workshop Primer **	Workshop ***
Topic	Instructor Led Training (ILT) (webinar)*	Cloud WFS-based WES Instance for each WFO & Exam	Topic	Applied Performance Drills Cloud WES based WES instance for each WFO	Instructor Led Training (ILT) (webinar)*	Topic	Instructor-Led Training (ILT) (webinar)*	Topic	Cloud WES based WFS instance for each WFO	In residence at the National Weather Center in Norman, OK
13 hours	2 hours	8 hours	3 hours	4 hours	2 hours	5.5 hours	2 hours	1 hour	2.5 hours	40 hours
Deadline	Deadline	Deadline	Deadline	Deadline	Deadline	Deadline	Deadline	Deadline	Deadline (due noon CT)	
Day 76	Day 77	Day 87	Day 90	Day 96	Day 97	Day 109	Day 110	Day 119	Day 114	Day 117-121

*Students must attend one of the Instructor Led Training (ILT) sessions by the listed deadline. Completion of all the topics lessons is a prerequisite before attending.

**Meteorologist Track students should take the Workshop Severe Primer the week before the workshop and need to submit the accompanying assignment in the Commerce Learning Center (CLC) by noon Central Time (18Z) the Friday before their workshop begins.

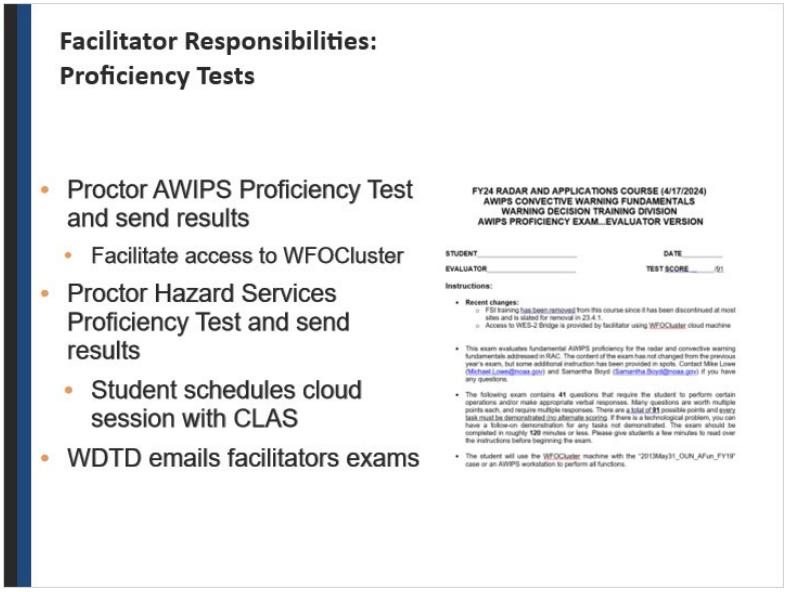
***Be aware that RAC is a HUGE course and all distance learning lessons must be completed before a student is permitted to attend the RAC workshop.

Notes:

Your training facilitator plays a critical role. He/she must ensure you have adequate training time built into your work schedule, monitor your progress to ensure you stay on pace, and provide support and guidance.

6.2 Facilitator Responsibilities:

Proficiency Tests

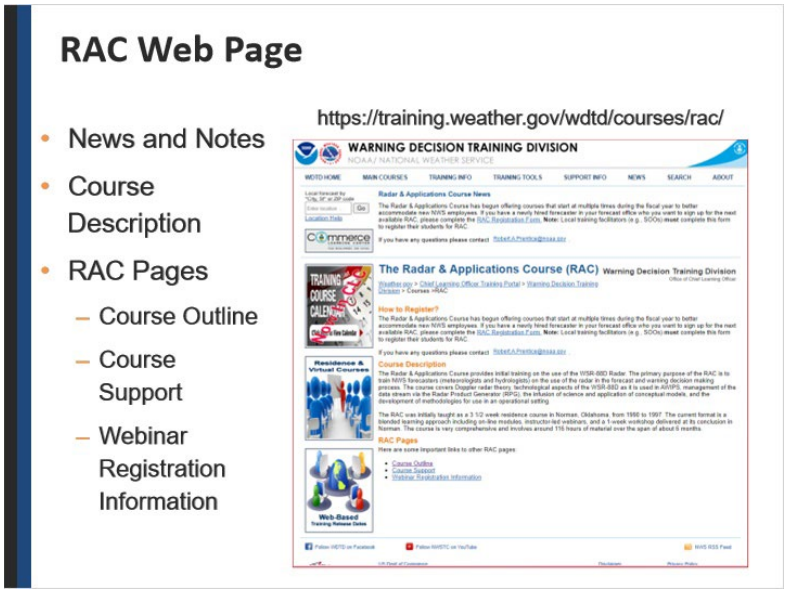


Notes:

In terms of facilitator responsibilities for proctoring the Proficiency Tests, the facilitator needs to provide access to the WFOCluster machine for most of the RAC WES training and the AWIPS Proficiency Test.
The facilitator also needs to proctor the Hazard Services Proficiency Test, though the student will schedule the cloud session for that with CLAS.
WDTD will send an email to facilitators with exam access at the start of the course.

7. Support

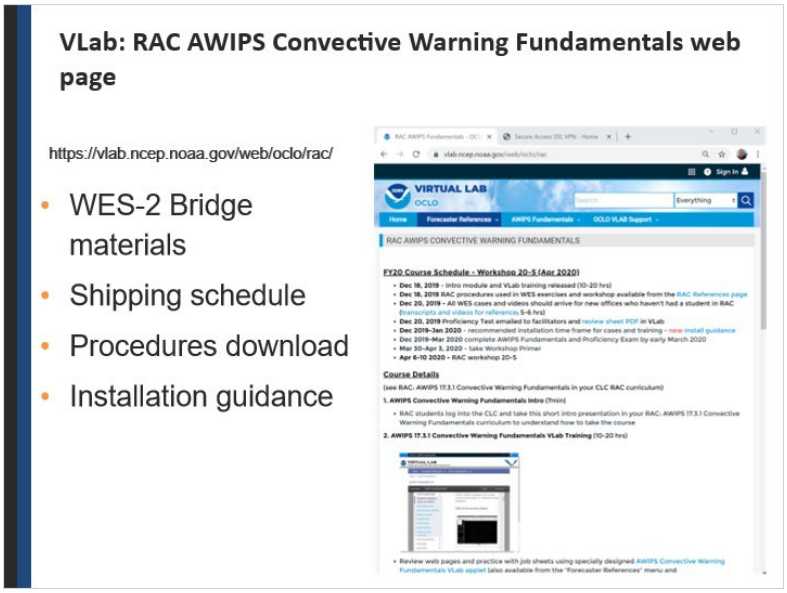
7.1 RAC Web Page



Notes:

The RAC web page is a good source for course information and support. Note…although the course outline has links to lessons on our WDTD web site and the CLC, you must access the lessons from your RAC curriculum on the CLC to receive credit.

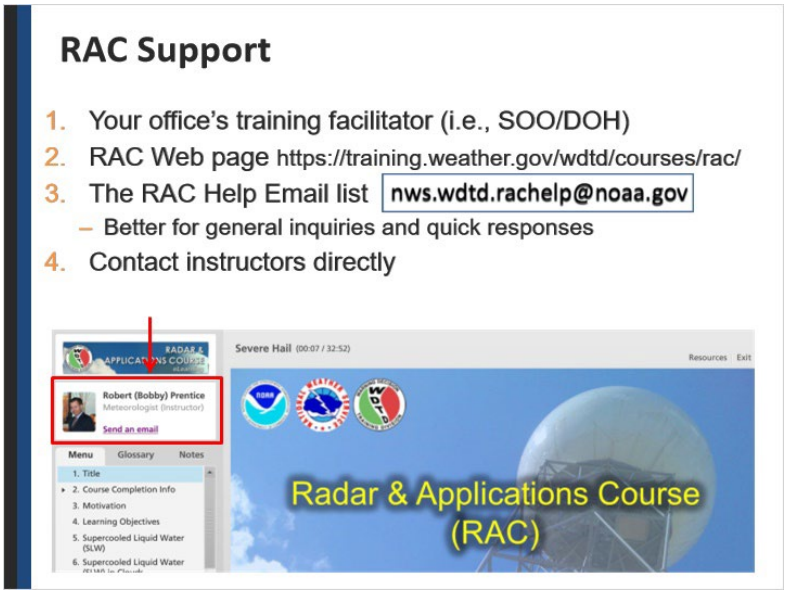
7.2 VLab: RAC AWIPS Convective Warning Fundamentals web page



Notes:

The VLab's AWIPS Convective Warning Fundamentals web page has all the documentation about WES-2 Bridge materials, shipping schedule, procedures download, and installation guidance. It should answer most of your AWIPS and WES-2 Bridge questions.

7.3 RAC Support



Notes:

There are four sources of RAC support:

1. Your office's training facilitator (usually your SOO or DOH).
2. RAC Web page
3. The RAC Help Email list which contacts the entire WDTD RAC Team. This is better for general inquiries and quick responses (for example, instructor is out of the office).
4. Contact instructors directly

The RAC Project Manager (Bobby Prentice) will also send RAC status updates via e-mail.

7.4 Questions?

Notes:

If you have questions about this orientation, contact the RAC Help list (nws.wdtd.rachelp@noaa.gov) or ask them verbally during the Orientation's Question and Answer webinar.