

OUR LEARNING EXCLUSIVE

- Custom exam prep software and materials
- **thinQmaster CTS** — 500-question adaptive practice engine mapped to the CTS exam outline, included with tuition
- AV math workbook and timed drills for every calculation type on the exam
- Course-specific thinQtank® Learning publications to make the learning fun and engaging
- **We do not teach the test.** We teach the work — real rooms, real systems, real numbers
- All reading material and study guides sent to you when you register
- Every course taught by certified instructors

TRAINING CAMP FORMAT

Five days, Monday to Friday, instructor-led. Each day pairs lecture with hands-on exercises, AV math drills and a timed practice set in the thinQmaster engine, so progress is measured every day rather than on exam day.

Roughly 65% lecture and 35% exercises, drills and practice exams.

PREREQUISITES

- No formal prerequisites — AVIXA requires no course or experience before the CTS exam
- Recommended: some hands-on exposure to AV systems
- Comfort with basic algebra for the AV math
- Basic familiarity with IT networking is helpful

TARGET AUDIENCE

- AV technicians, installers and field engineers
- AV sales, project coordinators and project managers
- IT and facilities staff supporting meeting rooms, classrooms and event spaces
- Live event, house of worship and campus AV staff
- Service members, veterans and spouses using AF COOL, Army CA, MyCAA or VET TEC 2.0

DELIVERY METHODS

- Instructor-led training
- Immersive live-online training
- On-site and custom delivery

COURSE OVERVIEW

thinQtank® Learning is offering a unique **five-day training camp** comprised of five days of instructor-led learning that gives students the knowledge and skills needed to work as a professional audiovisual technologist.

AV TECHNOLOGY

The camp builds from the science of sound, light and electricity through audio systems, video and display, networked AV, control and conferencing systems — with the AV math that ties them together: decibels, the inverse square law, impedance, image size, throw distance, bandwidth, heat load and circuit loading.

THE AV PROJECT PROCESS

It then works through the job the way AVIXA tests it: customer needs analysis, site survey, project scope and design, integration and project management, performance verification to ANSI/AVIXA 10:2013, and the support, maintenance and troubleshooting that keep a system running.

This course prepares students to take the **AVIXA Certified Technology Specialist (CTS®)** exam.

EXAM INFORMATION

AVIXA CTS® — Certified Technology Specialist

- 115 multiple-choice questions — 100 scored, 15 unscored pilot
- 150 minutes
- Scaled passing score of 350 on a 500-point scale
- Delivered at Pearson VUE test centers — we schedule your attempt with you
- Exam fee set by AVIXA: \$390 USD members / \$490 USD non-members
- Valid three years; renew with 30 AVIXA renewal units (RUs)

The general AV credential. CTS is the foundation for AVIXA's specialist credentials in design (CTS-D) and installation (CTS-I).

EXCLUSIVE TOOLS AND LEARNING PACKAGE

- Comprehensive video training package
- Retake any or all portions of the course, in person or live online, for 24 months
- Six months mentoring access to our engineers after the course

COURSE OBJECTIVES

After taking this course you should be able to:

- Explain the AV industry, its roles, and how ANSI/AVIXA standards shape AV work
- Apply the science of sound, light and electricity to AV systems
- Solve AV math: Ohm's law and power, decibels, inverse square law, impedance, voltage drop
- Size displays and projection: image size, viewing distance, throw distance, brightness and contrast
- Design and set up audio: microphones, mixers, DSP, amplifiers, loudspeakers, gain structure
- Recognise and control feedback, and set levels with pink noise and an SPL meter
- Handle digital video: resolution, bandwidth, EDID, HDCP, HDBaseT and signal extension
- Plan networked AV: IP addressing, VLANs, QoS, multicast, IGMP snooping, PoE, Dante and AV-over-IP
- Describe control systems and conferencing / unified communications rooms
- Conduct a customer needs analysis and a site survey
- Turn needs into a project scope, schedule, budget and equipment list
- Read AV drawings, signal flow diagrams and rack elevations
- Build racks and cable to industry practice: labeling, bend radius, power, grounding, heat load
- Manage an integration: trades coordination, RFIs, change orders, safety and documentation
- Verify system performance to ANSI/AVIXA 10:2013 and hand the system over
- Operate and support AV systems for users and live events
- Maintain AV systems: preventive maintenance, firmware, backups, lifecycle
- Troubleshoot and repair AV systems using a structured, signal-flow method

CTS EXAM OUTLINE — WHAT THE EXAM WEIGHTS

A	Creating AV Solutions	35%
	Conduct customer needs analysis	7%
	Conduct site survey	9%
	Develop AV project scope	9%
	Design AV solutions	10%
B	Implementing AV Solutions	30%
	Integrate AV solutions	15%
	Manage AV integration	15%
C	Supporting AV System Operation	15%
	Provide AV support	15%
D	Servicing AV Solutions	20%
	Supervise AV operations	4%
	Conduct maintenance activities	8%
	Troubleshoot and repair AV solutions	8%

Weights as published by AVIXA in the CTS candidate handbook. Every module in this camp, and every question in thinQmaster CTS, is tagged to one of these ten tasks.

THINQMASTER CTS — INCLUDED WITH TUITION

- 500 original practice questions written to the ten CTS tasks, in the same single-best-answer format as the exam
- Every answer explains why the right answer is right **and** why each wrong answer is wrong
- Adaptive engine weights your next session toward the tasks you miss
- Study, Practice, Timed and Simulation modes, with a progress read-out across the camp and after it

CTS COURSE MODULES INSTRUCTOR-LED

01 The AV Industry and Standards

- Roles in the AV industry and the project team
- ANSI/AVIXA standards and why they matter
- Ethics, customer service and communication
- Jobsite safety fundamentals

02 AV Science

- Sound: frequency, wavelength, amplitude
- Light: brightness, color, reflection
- Electricity: voltage, current, resistance, power
- Analog and digital signals, sampling and bit depth

03 AV Math

- Ohm's law and the power formula
- Decibels: power, voltage and SPL
- Inverse square law
- Impedance in series and parallel
- Voltage drop, BTU/h and circuit loading

04 Audio Systems

- Microphones and polar patterns
- Mixers, DSP, AEC, AGC and EQ
- Amplifiers and loudspeakers; 70/100 V systems
- Gain structure and feedback control
- Room acoustics and coverage

05 Video and Display

- Resolution, aspect ratio and refresh
- Image size and viewing distance (DISCAS)
- Projection: throw ratio, brightness, contrast, screens
- LED walls and pixel pitch
- EDID, HDCP, HDMI and HDBaseT

06 Networked AV

- IP addressing, subnets, DHCP and DNS
- VLANs, QoS and multicast with IGMP snooping
- PoE budgets
- Dante/AES67 and AV-over-IP bandwidth
- Securing networked AV devices

07 Control and Conferencing

- Control processors and user interfaces
- RS-232, IR and IP control
- Conferencing and unified communications rooms
- Cameras, codecs and far-end audio

08 Needs Analysis and Site Survey

- Stakeholders and the program report
- Turning needs into requirements
- Surveying rooms: drawings, power, network, noise, light
- Documenting existing conditions

09 Scope and Design

- Scope of work, deliverables and exclusions
- Schedules, budgets and equipment lists
- Signal flow diagrams and rack elevations
- ANSI/AVIXA 2M design and coordination process

10 Integration

- Cabling, termination, testing and labeling
- Rack building, power and grounding
- Mounting and structural safety
- Device configuration and system setup

11 Managing Integration

- Coordinating trades, RFIs and change orders
- Receiving, staging and bench testing
- Performance verification to ANSI/AVIXA 10:2013
- As-builts, training and closeout

12 Support, Maintenance and Repair

- Operating systems for users and events
- Help desk, remote monitoring and escalation
- Preventive maintenance and firmware
- Structured troubleshooting and repair

13 Exam Readiness

- Full-length timed practice exam
- AV math speed drills
- Weak-task review from thinQmaster results
- Scheduling and sitting the exam

LABS AND EXERCISES

- | | |
|--|---|
| <ul style="list-style-type: none"> 01 Build and document a signal flow diagram for a conference room 03 Size a display for the farthest viewer and calculate projector throw 05 Calculate 70 V tap loads and parallel loudspeaker impedance 07 Plan a Dante network: VLAN, QoS, IGMP snooping and PoE budget 09 Conduct a role-play customer needs analysis 11 Draft a scope of work and equipment list 13 Verify a room against an ANSI/AVIXA 10:2013 checklist 15 Full-length timed CTS practice exam and review | <ul style="list-style-type: none"> 02 AV math drill: dB, inverse square law and SPL at distance 04 Set gain structure through a mixer / DSP / amplifier chain 06 Diagnose EDID and HDCP handshake failures 08 Assign IP addresses and verify devices with ping 10 Run a site survey and write the survey report 12 Lay out a rack: RU, weight, heat load and power 14 Troubleshoot a hum, feedback and no-signal fault by half-splitting |
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FIVE-DAY CAMP AT A GLANCE

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|--------------|--|
| Day 1 | AV industry, AV science and AV math |
| Day 2 | Audio systems; video and display |
| Day 3 | Networked AV; control and conferencing |
| Day 4 | Needs analysis, site survey, scope, design and integration |
| Day 5 | Managing integration, support and service; exam readiness |

TERMS

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