



# Low-Bandwidth Courses

## *Design and Requirements for Rural Access*

55-73% of rural Americans lack access to 25 Mbps broadband. Your course needs to work on 1-3 Mbps connections with 100-300ms latency. You can't see these problems from fast connections - you must test with throttling.

### Guiding Principles

- **Test Under Realistic Conditions:** Simulate rural internet speeds before every launch using Chrome DevTools throttling and custom profiles (e.g., Rural DSL and Rural 3G). Always perform an “Empty Cache and Hard Reload” and validate performance with WebPageTest on mobile Slow 3G settings.
- **Set Clear Size and Performance Targets:** Keep images under 100 KB (preferably 50–80 KB) in WebP format, maintain total page weight under 500 KB for 1 Mbps connections, and limit HTTP requests to 50 per page. PDFs should not exceed 500 KB and enable “Fast Web View” for efficient streaming.
- **Match Media to Bandwidth and Learning Goals:** Use 480p video for demonstrations, audio for conceptual content, and text for reference to maximize accessibility and minimize bandwidth. Provide transcripts and offline-friendly formats to ensure students can access materials under varying conditions.

### Pre-Launch Validation Questions

1. Have you tested every major course page using throttled connections (Rural DSL and 3G profiles) with empty cache reload?
2. Does each page load within 5 seconds on simulated 3G, with total page weight under target thresholds?
3. Are all images compressed under 100 KB, videos encoded at appropriate bitrates, and PDFs under 500 KB with Fast Web View enabled?
4. Have you provided audio alternatives for video lectures and text transcripts for all multimedia content?
5. Is mobile offline access enabled in your LMS, with critical materials downloadable for disconnected students?
6. Have you validated that external video hosting provides adaptive streaming rather than hosting large files directly in the LMS?
7. Are modules structured with 10-15 items maximum, using Pages to consolidate rather than individual file listings?
8. Have you run WebPageTest and achieved Lighthouse Performance scores above 50 for mobile?