

# CAP785:WEB PERFORMANCE OPTIMIZATION

L:3 T:0 P:2 Credits:4

**Course Outcomes:** Through this course students should be able to

CO1 :: understand how to increase web performance by using various techniques

CO2 :: analyze websites for higher conversions and better user satisfaction

CO3 :: evaluate the performance of web resources using various metrics

CO4 :: construct websites for better user engagement and better ranking

## Unit I

**Understanding web performance** : introduction to web performance, getting up and running, auditing the client's website, optimizing the client's website, performing the final weigh-in

**Using assessment tools** : evaluating with Google PageSpeed Insights, using browser-based assessment tools, inspecting network requests, rendering performance-auditing tools, benchmarking JavaScript in Chrome, simulating and monitoring devices, creating custom network throttling profiles

## Unit II

**Optimizing CSS** : introduction to CSS optimization, mobile-first is user-first, performance-tuning your CSS, working with CSS transitions

**Understanding critical CSS** : introduction to critical CSS, implementing critical CSS, weighing the benefit, making maintainability easier, considerations for multipage websites

## Unit III

**Making images responsive** : Introduction to image delivery, understanding image types and their applications, image delivery in CSS, image delivery in HTML

**Going further with images** : using image sprites, reducing images, encoding images with WebP, lazy loading images

## Unit IV

**Faster fonts** : using fonts wisely, compressing EOT and TTF font formats, subsetting fonts, optimizing the loading of fonts

**Keeping JavaScript lean and fast** : affecting script-loading behavior, using leaner jQuery-compatible alternatives, getting by without jQuery, animating with requestAnimationFrame method

## Unit V

**Boosting performance with service workers** : introduction to service workers, writing your first service worker, updating your service worker

**Fine-tuning asset delivery** : compressing assets, caching assets, using CDN assets, using resource hints

## Unit VI

**Looking to the future with HTTP/2** : need for HTTP/2, optimization techniques for HTTP/2, sending assets preemptively with server push, optimizing for both HTTP/1 and HTTP/2

**Automating optimization with gulp** : introduction to gulp, laying down the foundations, writing gulp tasks, working with gulp plugins

## List of Practicals / Experiments:

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- Minifying assets
- Installing Node.js and Git
- Using Google Analytics for bulk reporting
- Benchmarking JavaScript in Chrome
- Debugging websites remotely on Android devices
- Working with SVG images
- Targeting displays in CSS by using media queries
- Using SVG in HTML

- Working with image sprite
- Subsetting fonts
- Animating with requestAnimationFrame method
- Creating a service worker
- Caching assets
- Sending assets preemptively with Server Push
- Creating a gulp task

**Text Books:**

1. WEBSITE OPTIMIZATION: AN HOUR A DAY by RICH PAGE, SYBEX

**References:**

1. HIGH PERFORMANCE WEB SITES by STEVE SOUDERS, O'REILLY
2. WEB PERFORMANCE DAYBOOK by STOYAN STEFANOV, O'REILLY
3. WEB PERFORMANCE IN ACTION: BUILDING FASTER WEB PAGES by JEREMY WAGNER, Manning Publications