Complete SEO & Lighthouse 100 Score Guide

SEO Essentials (10 Requirements)

1. Basic Meta Tags

```html
<!DOCTYPE html>
<html lang="pt-br">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Página Única e Descritiva - Sua Marca</title>
  <meta name="description" content="Descrição única de 150-160 caracteres que resume o conteúdo da página
</head>
```

2. Canonical Tag

```html
<link rel="canonical" href="https://seusite.com.br/pagina-atual">
```

3. Crawlable Navigation & Headings

```html
<!-- Navigation with real links, not JS-only -->
<nav>
  <a href="/sobre">Sobre</a>
  <a href="/servicos">Serviços</a>
  <a href="/contato">Contato</a>
</nav>

<!-- Proper heading hierarchy -->
<h1>Título Principal Único da Página</h1>
  <h2>Subtítulo Importante</h2>
    <h3>Subseção</h3>
```

4. Robots & Sitemap

```html
```

```html
<!-- In <head> -->
<link rel="sitemap" type="application/xml" href="/sitemap.xml">
```

robots.txt:

```
User-agent: *
Allow: /
Sitemap: https://seusite.com.br/sitemap.xml
```

sitemap.xml:

```xml
xml

<?xml version="1.0" encoding="UTF-8"?>
<urlset xmlns="http://www.sitemaps.org/schemas/sitemap/0.9">
  <url>
    <loc>https://seusite.com.br/</loc>
    <lastmod>2024-01-15</lastmod>
    <changefreq>weekly</changefreq>
    <priority>1.0</priority>
  </url>
</urlset>
```

5. Descriptive Link Text

```html
html

<!-- ❌ Avoid -->
<a href="/produtos">Clique aqui</a>

<!-- ✅ Correct -->
<a href="/produtos">Veja nossos produtos exclusivos</a>
```

6. Optimized Images

```html
html
```

```html
<img
  src="/images/hero.webp"
  alt="Descrição específica da imagem"
  width="1200"
  height="600"
  loading="eager"
>
```

7. Structured Data (JSON-LD)

```html
html

<script type="application/ld+json">
{
  "@context": "https://schema.org",
  "@type": "WebSite",
  "name": "Seu Site",
  "url": "https://seusite.com.br",
  "potentialAction": {
    "@type": "SearchAction",
    "target": "https://seusite.com.br/busca?q={search_term_string}",
    "query-input": "required name=search_term_string"
  }
}
</script>

<!-- Optional: FAQPage -->
<script type="application/ld+json">
{
  "@context": "https://schema.org",
  "@type": "FAQPage",
  "mainEntity": [{
    "@type": "Question",
    "name": "Pergunta frequente?",
    "acceptedAnswer": {
      "@type": "Answer",
      "text": "Resposta detalhada à pergunta."
    }
  }]
}
</script>
```

8. Open Graph & Twitter Tags

```html
html

<!-- Open Graph -->
<meta property="og:title" content="Título da Página">
<meta property="og:description" content="Descrição atrativa para compartilhamento">
<meta property="og:image" content="https://seusite.com.br/images/og-image.jpg">
<meta property="og:url" content="https://seusite.com.br/pagina-atual">
<meta property="og:type" content="website">
<meta property="og:locale" content="pt_BR">


<!-- Twitter Card -->
<meta name="twitter:card" content="summary_large_image">
<meta name="twitter:title" content="Título da Página">
<meta name="twitter:description" content="Descrição para Twitter">
<meta name="twitter:image" content="https://seusite.com.br/images/twitter-card.jpg">
```

9. Mobile Optimization

```css
css

/* Minimum tap target size */
button, a {
    min-height: 48px;
    min-width: 48px;
    padding: 12px;
}

/* High contrast */
body {
    color: #212121;
    background: #ffffff;
}

/* WCAG AA compliance: contrast ratio 4.5:1 for normal text */
```

10. Clean Internal Links

- Verify all internal links return 200 status
- No resources blocked by robots.txt
- Regular link audits with tools like Screaming Frog

Performance Optimization

Critical CSS Inline

```html
<style>
/* Inline only critical above-the-fold CSS */
body{margin:0;font-family:system-ui,-apple-system,sans-serif}
.hero{min-height:100vh;display:flex;align-items:center}
/* ... minimal critical styles ... */
</style>

<!-- Load non-critical CSS asynchronously -->
<link rel="preload" href="/css/main.css" as="style" onload="this.onload=null;this.rel='stylesheet'">
<noscript><link rel="stylesheet" href="/css/main.css"></noscript>
```

JavaScript Optimization

```html
<!-- Defer all non-critical JS -->
<script src="/js/main.js" defer></script>

<!-- Or async for independent scripts -->
<script src="/js/analytics.js" async></script>
```

System Font Stack

```css
body {
    font-family: -apple-system, BlinkMacSystemFont, "Segoe UI", Roboto,
            "Helvetica Neue", Arial, sans-serif, "Apple Color Emoji",
            "Segoe UI Emoji", "Segoe UI Symbol";
}
```

Hero Image Optimization

```html
```

```html
<!-- Preload hero image -->
<link rel="preload" as="image" href="/images/hero.webp" type="image/webp">

<!-- Responsive hero image -->
<picture>
    <source srcset="/images/hero-mobile.webp 480w,
                /images/hero-tablet.webp 768w,
                /images/hero-desktop.webp 1200w"
        sizes="100vw"
        type="image/webp">
    <img src="/images/hero-desktop.jpg"
        alt="Hero description"
        width="1200"
        height="600"
        loading="eager">
</picture>
```

Lazy Loading Non-Hero Images

```html
html

<img
    src="/images/content-image.webp"
    alt="Content description"
    width="800"
    height="400"
    loading="lazy"
>
```

CDN Headers Configuration

```
# .htaccess or server config
<IfModule mod_expires.c>
    ExpiresActive On

    # Images
    ExpiresByType image/jpeg "access plus 1 year"
    ExpiresByType image/webp "access plus 1 year"
    ExpiresByType image/png "access plus 1 year"

    # CSS and JavaScript
    ExpiresByType text/css "access plus 1 month"
    ExpiresByType application/javascript "access plus 1 month"

    # Fonts
    ExpiresByType font/woff2 "access plus 1 year"
</IfModule>

# Cache-Control headers
<IfModule mod_headers.c>
    # Immutable resources
    <FilesMatch "\.(jpg|jpeg|png|webp|ico|pdf|flv|swf|woff2)$">
        Header set Cache-Control "public, immutable, max-age=31536000"
    </FilesMatch>

    # CSS and JS
    <FilesMatch "\.(css|js)$">
        Header set Cache-Control "public, max-age=2592000"
    </FilesMatch>
</IfModule>
```

Complete HTML Template

```
html
```

```html
<!DOCTYPE html>
<html lang="pt-br">
<head>
  <meta charset="UTF-8">
  <meta name="viewport" content="width=device-width, initial-scale=1.0">
  <title>Título Único e Descritivo - Sua Marca</title>
  <meta name="description" content="Descrição única de 150-160 caracteres">

  <!-- Canonical -->
  <link rel="canonical" href="https://seusite.com.br/">

  <!-- Preload hero image -->
  <link rel="preload" as="image" href="/images/hero.webp" type="image/webp">

  <!-- Critical CSS inline -->
  <style>
    body{margin:0;font-family:system-ui,-apple-system,sans-serif}
    .hero{min-height:100vh;display:flex;align-items:center}
  </style>

  <!-- Open Graph -->
  <meta property="og:title" content="Título da Página">
  <meta property="og:description" content="Descrição para compartilhamento">
  <meta property="og:image" content="https://seusite.com.br/images/og.jpg">
  <meta property="og:url" content="https://seusite.com.br/">

  <!-- Twitter Card -->
  <meta name="twitter:card" content="summary_large_image">
  <meta name="twitter:title" content="Título da Página">

  <!-- Async CSS -->
  <link rel="preload" href="/css/main.css" as="style" onload="this.onload=null;this.rel='stylesheet'">
  <noscript><link rel="stylesheet" href="/css/main.css"></noscript>

  <!-- Schema.org -->
  <script type="application/ld+json">
  {
    "@context": "https://schema.org",
    "@type": "WebSite",
    "name": "Seu Site",
    "url": "https://seusite.com.br"
  }
  </script>
```

```html
  </head>
  <body>
    <!-- Navigation with real links -->
    <nav>
      <a href="/">Início</a>
      <a href="/sobre">Sobre Nós</a>
      <a href="/servicos">Nossos Serviços</a>
      <a href="/contato">Entre em Contato</a>
    </nav>

    <!-- Hero section -->
    <section class="hero">
      <h1>Título Principal Único</h1>
      <picture>
        <source srcset="/images/hero.webp" type="image/webp">
        <img src="/images/hero.jpg" alt="Descrição do hero" width="1200" height="600">
      </picture>
    </section>

    <!-- Content -->
    <main>
      <h2>Subtítulo Importante</h2>
      <p>Conteúdo otimizado...</p>

      <!-- Lazy loaded images -->
      <img src="/images/content.webp" alt="Descrição" width="800" height="400" loading="lazy">
    </main>

    <!-- Deferred JavaScript -->
    <script src="/js/main.js" defer></script>
  </body>
</html>
```

Checklist Final

SEO (Lighthouse SEO 100)

- [ ] `<html lang>` definido
- [ ] `<meta viewport>` presente
- [ ] `<title>` único em cada página
- [ ] `<meta description>` única em cada página
- [ ] Canonical tag em todas as páginas
- [ ] Links navegáveis sem JavaScript

- [ ] Hierarquia de headings correta (um `<h1>`)
- [ ] robots.txt e sitemap.xml disponíveis
- [ ] Textos de links descritivos
- [ ] Todas imagens com `alt`, `width` e `height`
- [ ] Structured data válido
- [ ] Open Graph e Twitter tags
- [ ] Tap targets móveis adequados
- [ ] Contraste WCAG AA
- [ ] Sem recursos bloqueados ou links 404

Performance (Lighthouse Performance 95-100)

- [ ] CSS crítico inline
- [ ] JavaScript com `defer` ou `async`
- [ ] System font stack
- [ ] Hero image com preload
- [ ] Imagens em WebP/AVIF
- [ ] `srcset` e `sizes` responsivos
- [ ] Lazy loading em imagens não-hero
- [ ] Scripts third-party mínimos
- [ ] Headers de cache CDN configurados
- [ ] Zero render-blocking resources
- [ ] CLS < 0.1
- [ ] FCP < 1.8s
- [ ] LCP < 2.5s
- [ ] TBT < 300ms