

Google Material Design 3 Guidelines

Comprehensive Design System Reference

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Introduction to Material Design 3 {#introduction}

Material Design 3 (Material You) is Google's latest evolution of their design system, launched to create more personal, adaptive, and expressive user experiences. It builds upon the foundation of Material Design while introducing dynamic theming, enhanced personalization, and improved accessibility.

Key Features of Material Design 3

Dynamic Color: Automatically generates color schemes from user wallpapers or preferred colors, creating personalized experiences while maintaining accessibility standards.

Enhanced Expressiveness: More flexible design tokens allow for greater customization while preserving Material Design's core principles.

Improved Accessibility: Built-in support for high contrast modes, better color contrast ratios, and enhanced screen reader compatibility.

Cross-Platform Consistency: Unified design language across Android, Web, Flutter, and other platforms.

Design Principles {#design-principles}

Material Design 3 is built on four foundational principles:

1. Expressive

Material surfaces and edges provide visual cues grounded in reality. The design uses familiar tactile attributes to help users understand and navigate interfaces intuitively.

2. Adaptive

Material Design adapts to user preferences, device capabilities, and contextual needs. The system scales across different screen sizes and input methods.

3. Simple

Material Design removes unnecessary complexity. Clear hierarchy, meaningful motion, and purposeful design decisions guide users through experiences.

4. Inclusive

Material Design supports users of all abilities through accessible color contrast, clear typography, and intuitive navigation patterns.

Color System {#color-system}

Material Design 3 introduces a sophisticated color system centered around dynamic theming and tonal palettes.

Dynamic Color

Dynamic color is the hallmark feature of Material Design 3, automatically generating harmonious color schemes from source colors.

Key Color: The primary color that drives the entire color scheme **Tonal Palette:** A range of 13 tones from the key color (0-100) **Color Roles:** Semantic color assignments for different UI elements

Color Roles

Primary: Main brand color, used for key components like FABs and prominent buttons
Secondary: Accent color that complements primary, used for less prominent components
Tertiary: Contrasting accent color for balance and highlights **Error:** Indicates errors and dangerous actions **Surface:** Background colors for components and containers **Outline:** Borders and dividers

Tonal Palette Structure

Each color role includes multiple tones:

- **Tone 0:** Pure black
- **Tone 10:** Very dark
- **Tone 20:** Dark
- **Tone 30:** Medium dark
- **Tone 40:** Medium
- **Tone 50:** Neutral
- **Tone 60:** Medium light
- **Tone 70:** Light
- **Tone 80:** Very light
- **Tone 90:** Extremely light
- **Tone 95:** Near white
- **Tone 99:** Almost pure white
- **Tone 100:** Pure white

Implementation Guidelines

Light Theme: Uses lighter tones (80-99) for surfaces and darker tones (10-40) for text **Dark Theme:** Uses darker tones (10-30) for surfaces and lighter tones (80-99) for text **High Contrast:** Enhanced contrast ratios for improved accessibility

Typography {#typography}

Material Design 3 typography system provides clear hierarchy and excellent readability across all platforms.

Type Scale

Display Large: 57px, -0.25px letter spacing

- Use for large, short, important text or numerals

Display Medium: 45px, 0px letter spacing

- Use for short, important text or numerals

Display Small: 36px, 0px letter spacing

- Use for short, important text or numerals

Headline Large: 32px, 0px letter spacing

- Use for short, high-emphasis text

Headline Medium: 28px, 0px letter spacing

- Use for short, high-emphasis text

Headline Small: 24px, 0px letter spacing

- Use for short, high-emphasis text

Title Large: 22px, 0px letter spacing

- Use for medium-emphasis text that remains relatively short

Title Medium: 16px, 0.15px letter spacing

- Use for medium-emphasis text that remains relatively short

Title Small: 14px, 0.1px letter spacing

- Use for medium-emphasis text that remains relatively short

Label Large: 14px, 0.1px letter spacing

- Use for text on interactive elements

Label Medium: 12px, 0.5px letter spacing

- Use for text on interactive elements

Label Small: 11px, 0.5px letter spacing

- Use for text on interactive elements

Body Large: 16px, 0.5px letter spacing

- Use for long-form writing

Body Medium: 14px, 0.25px letter spacing

- Use for long-form writing

Body Small: 12px, 0.4px letter spacing

- Use for long-form writing

Font Recommendations

Android: Roboto **Web:** Roboto or system fonts **iOS:** San Francisco (when implementing Material Design)

Typography Best Practices

- Maintain consistent line heights (typically 1.2-1.6x font size)
 - Use appropriate contrast ratios (4.5:1 minimum for normal text)
 - Limit line lengths to 45-75 characters for readability
 - Use font weights purposefully (Regular, Medium, Bold)
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Layout and Spacing {#layout-spacing}

Material Design 3 uses a flexible grid system and consistent spacing principles.

Grid System

Columns: 4 (mobile), 8 (tablet), 12 (desktop) **Gutters:** 16dp (mobile), 24dp (tablet), 24dp (desktop) **Margins:** 16dp (mobile), 24dp (tablet), 24dp+ (desktop)

Spacing Scale

Material Design uses an 8dp base unit for consistent spacing:

- **4dp:** Minimum touch target padding
- **8dp:** Base spacing unit
- **16dp:** Standard component spacing
- **24dp:** Large component spacing
- **32dp:** Section spacing
- **40dp:** Large section spacing
- **48dp:** Maximum recommended spacing

Layout Principles

Responsive Design: Adapt layouts for different screen sizes **Visual Hierarchy:** Use spacing to establish importance **Consistency:** Apply spacing rules uniformly **Breathing Room:** Provide adequate white space

Components {#components}

Material Design 3 provides a comprehensive library of UI components.

Navigation Components

Top App Bar

- Standard: 64dp height, contains title and actions
- Small: 64dp height, compact layout
- Medium: 112dp height, accommodates longer titles
- Large: 152dp height, prominent branding

Bottom Navigation

- 3-5 destinations
- 80dp height
- Clear iconography and labels

Navigation Drawer

- Standard: 360dp width
- Modal: Temporary overlay
- Persistent: Remains visible

Navigation Rail

- 80dp width
- Vertical navigation for larger screens
- 3-7 destinations

Input Components

Text Fields

- Filled: Emphasized with background fill
- Outlined: Defined with stroke outline
- Standard states: Enabled, focused, error, disabled

Buttons

- Elevated: Raised appearance with shadow
- Filled: Solid background color
- Filled Tonal: Softer filled appearance
- Outlined: Stroke outline
- Text: Minimal styling

Floating Action Button (FAB)

- Small: 40dp diameter
- Standard: 56dp diameter
- Large: 96dp diameter
- Extended: Variable width with text

Content Components

Cards

- Elevated: Raised with shadow
- Filled: Background color fill
- Outlined: Stroke outline

Lists

- One-line: 56dp height
- Two-line: 72dp height
- Three-line: 88dp height

Chips

- Assist: Help users take action
- Filter: Enable selection from options
- Input: Represent user input
- Suggestion: Offer suggestions

Feedback Components

Snackbars

- Brief messages about app processes
- 4-6 second duration
- Single line or two lines maximum

Dialogs

- Basic: Simple message with actions
- Full-screen: Complex content on mobile
- Alert: Important warnings or confirmations

Progress Indicators

- Linear: Horizontal progress bar
 - Circular: Circular progress indicator
 - Determinate vs. indeterminate states
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Motion and Animation {#motion-animation}

Material Design 3 uses motion to create smooth, meaningful transitions that guide user attention.

Motion Principles

Informative: Motion provides feedback and guides user attention **Focused:** Motion directs attention to what's important **Expressive:** Motion reflects brand personality and creates delight

Easing Curves

Standard: Most common easing for general use

- CSS: cubic-bezier(0.2, 0.0, 0, 1.0)
- Duration: 300ms

Decelerated: Elements entering the screen

- CSS: cubic-bezier(0.0, 0.0, 0, 1.0)
- Duration: 225ms

Accelerated: Elements leaving the screen

- CSS: cubic-bezier(0.4, 0.0, 1, 1)
- Duration: 195ms

Emphasized: Large or important transitions

- CSS: cubic-bezier(0.2, 0.0, 0, 1.0)
- Duration: 500ms

Common Animations

Fade: Opacity changes (150-300ms) **Scale:** Size changes (200-300ms) **Slide:** Position changes (225-300ms) **Shared Element:** Seamless transitions between screens

Animation Guidelines

- Keep animations under 500ms for most interactions
 - Use consistent easing curves throughout the app
 - Provide animation preferences for accessibility
 - Test animations on lower-end devices
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Accessibility {#accessibility}

Material Design 3 prioritizes inclusive design for users of all abilities.

Color and Contrast

Minimum Contrast Ratios:

- Normal text: 4.5:1
- Large text: 3:1
- UI components: 3:1

Color Considerations:

- Never rely solely on color to convey information
- Provide alternative indicators (icons, text, patterns)
- Support high contrast modes

Typography Accessibility

- Minimum font size: 12sp on mobile
- Sufficient line spacing (1.2x minimum)
- Clear font choices with good character distinction
- Support for user font size preferences

Touch and Interaction

Touch Targets:

- Minimum size: 48dp x 48dp
- Adequate spacing between targets
- Clear visual boundaries

Focus Management:

- Logical tab order
- Visible focus indicators
- Skip links for efficient navigation

Screen Reader Support

- Semantic HTML/markup
- Descriptive labels and headings
- Alternative text for images
- Live regions for dynamic content

Motion Sensitivity

- Respect reduced motion preferences
- Provide animation controls
- Use subtle animations as alternatives

Platform Guidelines {#platform-guidelines}

Material Design 3 adapts to different platforms while maintaining consistency.

Android Implementation

Material Components for Android:

- Use MDC-Android library
- Implement dynamic theming
- Follow Android-specific patterns

Key Considerations:

- Navigation: Use Bottom Navigation, Navigation Drawer
- App Bars: Implement collapsing toolbars
- System Integration: Status bar, navigation bar theming

Web Implementation

Material Web Components:

- Use Material Web library (LitElement-based)
- Implement responsive design patterns

- Progressive enhancement principles

Key Considerations:

- Responsive breakpoints
- Browser compatibility
- Performance optimization
- SEO considerations

Flutter Implementation

Material 3 for Flutter:

- Use Flutter's Material 3 implementation
- Leverage ThemeData.useMaterial3
- Implement adaptive layouts

Key Considerations:

- Cross-platform consistency
- Platform-specific adaptations
- Performance across devices

Implementation Resources {#implementation-resources}

Design Tools

Figma:

- Material 3 Design Kit
- Community resources and plugins
- Prototyping capabilities

Adobe XD:

- Material Design UI kits
- Component libraries
- Design systems management

Sketch:

- Material Design symbols
- Plugin ecosystem

- Design handoff tools

Development Libraries

Android:

- Material Components for Android (MDC-Android)
- Jetpack Compose Material3
- Dynamic theming APIs

Web:

- Material Web Components
- Material Design Lite (legacy)
- CSS frameworks integration

Flutter:

- Material package
- Material 3 theming
- Adaptive components

React:

- Material-UI (MUI)
- React Material Web Components
- Community libraries

Design Tokens

Token Structure:

- Color tokens (semantic and literal)
- Typography tokens (scale and properties)
- Spacing tokens (layout system)
- Shape tokens (corner radius values)

Token Management:

- Design token pipelines
- Multi-platform synchronization
- Version control for tokens

Testing and Validation

Accessibility Testing:

- Automated accessibility scanners
- Manual testing with assistive technologies
- Color contrast analyzers

Cross-Platform Testing:

- Device testing matrices
- Browser compatibility testing
- Performance testing

Design System Governance:

- Component audits
 - Design system documentation
 - Contribution guidelines
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Best Practices Summary

Design Process

1. Start with user needs and accessibility requirements
2. Use Material Design 3 tokens and components as building blocks
3. Customize thoughtfully while maintaining system consistency
4. Test across devices, platforms, and user abilities
5. Document design decisions and maintain design system governance

Implementation Strategy

1. Choose appropriate platform libraries and tools
2. Implement dynamic theming where supported
3. Follow responsive design principles
4. Optimize for performance and accessibility
5. Maintain consistency across platform adaptations

Maintenance and Evolution

1. Keep up with Material Design 3 updates
 2. Gather user feedback and iterate
 3. Monitor accessibility compliance
 4. Update design systems documentation
 5. Train team members on Material Design principles
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Conclusion

Material Design 3 represents a significant evolution in Google's design system, emphasizing personalization, accessibility, and cross-platform consistency. By following these guidelines and utilizing the available resources, teams can create beautiful, functional, and inclusive user experiences that adapt to user preferences while maintaining the familiar Material Design aesthetic.

The key to successful Material Design 3 implementation lies in understanding the underlying principles, using the appropriate tools and libraries for your platform, and maintaining a focus on user needs throughout the design and development process.