

OVER  
**40**  
YEARS  
OF ACADEMIC  
WISDOM



# PRESIDENCY UNIVERSITY

## **CSE3150 – Front-end Full Stack Development**



**Department of Computer Science Engineering**

**School of Engineering**

CSE3150 – Front-end Full Stack  
Development

# Module 2 - Syllabus

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JavaScript – Core syntax, HTML DOM, objects, classes, Async;

Bootstrap for Responsive Web Design;

Ajax and jQuery Introduction.

# Responsive Web Design

---

- Introduction
- Viewport
- Grid View
- Media Queries
- Images
- Videos
- Frameworks
- Templates



# Responsive Web Design

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- The process of building **websites** & **online portals** with a **stronger CX/UX** (customer/user experience) optimal view solutions on a web page with the **best browser compatibility** that can **run** & **operate** in a **variety of devices** is known as **responsive web design**.

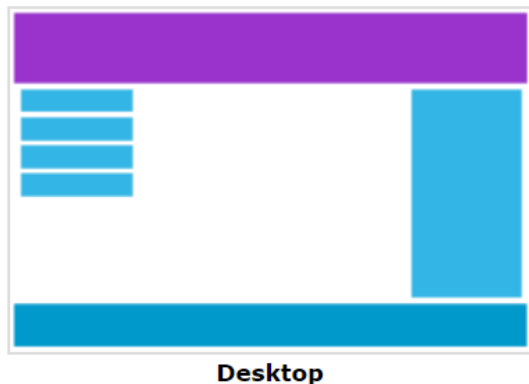
# Responsive Web Design

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- Responsive web design makes your web page look good on all devices.
- Responsive web design uses only HTML and CSS.
- Responsive web design is not a program or a JavaScript.
- Web pages can be viewed using many different devices: desktops, tablets, and phones.
- Your web page should look good, and be easy to use, regardless of the device.

# Responsive Web Design

- Web pages should not leave out information to fit smaller devices, but rather adapt its content to fit any device.



- It is called responsive web design when you use CSS and HTML to resize, hide, shrink, enlarge, or move the content to make it look good on any screen.



# Responsive Web Design

- Responsive web design is a **suitable**, robust, & **fast solution** that enables **lesser efforts** from the **developers' end**.
- **Ethan Marcotte** first described responsive web design as responding to the needs of **people** and the **devices** they are utilizing.
- Depending on the **size** and **capabilities** of the gadget, the layout alters.
- **E.g.:** With a **phone**, consumers might see content presented in a **single column** perspective; on a **tablet**, the same content might be presented in **two columns**.

# Responsive Web Design - Example

## Refer Pgm1

### Chania

The Flight

The City

The Island

The Food

### The City

Chania is the capital of the Chania region on the island of Crete. The city can be divided in two parts, the old town and the modern city.

### What?

Chania is a city on the island of Crete.

### Where?

Crete is a Greek island in the Mediterranean Sea.

### How?

You can reach Chania airport from all over Europe.

Resize the browser window to see how the content respond to the resizing.



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CSE3150 – Front-end Full Stack  
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# Viewport

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- The viewport is the **user's visible area** of a web page.
- The viewport **varies with the device**, and will be smaller on a mobile phone than on a computer screen.



# Setting The Viewport

- HTML5 introduced a method to let web designers take control over the viewport, through the `<meta>` tag.  
`<meta name="viewport" content="width=device-width, initial-scale=1.0">`
- This gives the browser instructions on how to **control** the **page's dimensions** & **scaling**.
- The `width=device-width` part sets the **width of the page** to follow the screen-width of the device (which will vary depending on the device).
- The `initial-scale=1.0` part sets the **initial zoom level** when the page is first loaded by the browser.

```
<meta name="viewport" content="width=device-width" />
```

This makes the viewport as many pixels wide as the device screen width. This means that if the device has a screen that is 320 px wide, the viewport width will be 320 px; if the screen is 480 px, then the viewport width will be 480 px.

# Setting The Viewport

Without the viewport meta tag



With the viewport meta tag



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# Grid View

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- Many web pages are based on a grid-view, which means that the **page is divided into columns**
- Using a grid-view is **very helpful** when designing web pages.
- It makes it **easier to place elements** on the page.
- A responsive grid-view often has **12 columns**, and has a total width of **100%**, and will **shrink & expand** as you resize the browser window.

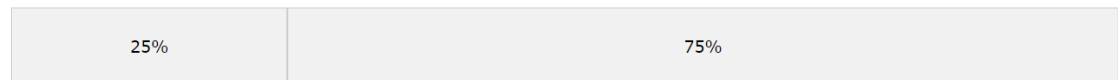


# Building a Responsive Grid-View

- All HTML elements have the **box-sizing** property set to **border-box**.
- This makes sure that the **padding** and **border** are included in the **total width** and **height** of the elements.

```
* {  
  box-sizing: border-box;  
}
```

```
.menu {  
  width: 25%;  
  float: left;  
}  
.main {  
  width: 75%;  
  float: left;  
}
```



# Building a Responsive Grid-View - Example

Refer Pgm2

## Chania

- The Flight
- The City
- The Island
- The Food

## The City

Chania is the capital of the Chania region on the island of Crete. The city can be divided in two parts, the old town and the modern city.

Resize the browser window to see how the content respond to the resizing.



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# Media Queries

- Media query is a **CSS technique** introduced in CSS3.
- A media query is a way to apply style rules based on the medium that is displaying the file.
- It uses the **@media** rule to include a **block of CSS properties** only if a certain condition is **true**.
- **E.g.:** If the browser window is **600px** or **smaller**, the background color will be **lightblue**

```
@media only screen and (max-width: 600px) {  
  body {  
    background-color: lightblue; }  
}
```

# Media Queries

- Use these queries to look at the capabilities of the device, and then define CSS rules.

Example-

`@media only screen and (max-width: 480px) {.....}` // This set of rule is applied when smaller screen is used. Like set font-size, left and right margin etc.

Defines this as  
a media query

Device has to  
be a screen

CSS rules to use if device  
matches these conditions

`@media only screen and (max-width:480px) { ... }`

Only use this style  
if both conditions  
are true

Use this style if width of  
viewport is no wider  
than 480 pixels



# Media Queries

- Use a media query to add a **breakpoint** at **768px**:

```
/* For desktop: */  
.col-1 {width: 8.33%;}  
.col-2 {width: 16.66%;}  
.col-3 {width: 25%;}  
.col-4 {width: 33.33%;}  
.col-5 {width: 41.66%;}  
.col-6 {width: 50%;}  
.col-7 {width: 58.33%;}  
.col-8 {width: 66.66%;}  
.col-9 {width: 75%;}  
.col-10 {width: 83.33%;}  
.col-11 {width: 91.66%;}  
.col-12 {width: 100%;}  
  
@media only screen and (max-width: 768px) {  
  /* For mobile phones: */  
  [class*="col-"] {  
    width: 100%;  
  }  
}
```





# Typical Device Breakpoints

```
/* Extra small devices (phones, 600px and down) */  
@media only screen and (max-width: 600px) {...}
```

```
/* Small devices (portrait tablets and large phones, 600px and up) */  
@media only screen and (min-width: 600px) {...}
```

```
/* Medium devices (landscape tablets, 768px and up) */  
@media only screen and (min-width: 768px) {...}
```

```
/* Large devices (laptops/desktops, 992px and up) */  
@media only screen and (min-width: 992px) {...}
```

```
/* Extra large devices (large laptops and desktops, 1200px and up) */  
@media only screen and (min-width: 1200px) {...}
```

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# Images –

## Using the width & max-width Property

- If the **width property** is set to a **percentage** and the height property is set to "**auto**", the image will be responsive and **scale up and down**

```
img {  
  width: 100%;  
  height: auto;  
}
```

- If the **max-width property** is set to **100%**, the image will scale down if it has to, but **never scale up** to be larger than its original size

```
img {  
  max-width: 100%;  
  height: auto;  
}
```

# Images - Background Images

- Background images can also respond to **resizing** & **scaling**.
- **3 different methods**
  1. If the background-size property is set to "**contain**", the background image will scale, and **try to fit the content area**. However, the image will keep its aspect ratio (the proportional relationship between the image's width and height)
  2. If the background-size property is set to "**100% 100%**", the background image will stretch to **cover the entire content area**.
  3. If the background-size property is set to "**cover**", the background image will scale to **cover the entire content area**. Here, the "cover" value keeps the aspect ratio, and **some part of the background image may be clipped**.



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# Videos - Add a Video

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- When we want to add a video in our web page, the video will be **resized** to always take up all the **available space**





# Responsive Web Design

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# Frameworks

- There are many free CSS Frameworks that offer Responsive Design.
- A popular framework is **Bootstrap**. It uses **HTML** and **CSS** to make responsive web pages.
- Other Frameworks
  - **Tailwind CSS**
  - **Bulma**
  - **Materialize**
  - **Foundation by Zurb**
  - **Pure CSS**
  - **Element**
  - **Skeleton**
  - **Metro UI**
  - **Powertocss**



# Frameworks – Bootstrap – Example

## Refer Pgm3

### My First Bootstrap Page

Resize this responsive page to see the effect!

#### Column 1

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...

#### Column 2

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...

#### Column 3

Lorem ipsum dolor sit amet, consectetur adipisicing elit...

Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris...



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# Templates

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- There are some responsive templates available with the CSS framework.
- You are free to modify, save, share, and use them in all your projects.
- E.g.:
  - Ecommerce
  - Education
  - Restaurant
  - Art Template
  - Architect Template
  - Blog Template
  - CV Template



# Responsive Web Design (Completed)

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# Bootstrap

---

- Introduction
- Create Your First Web Page With Bootstrap 5
- Containers
- Grid System
- Colors
- Tables
- Images
- Buttons
- Elements
- Forms
- Select menu
- Validation
- Components



# Bootstrap

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- **Bootstrap 5** is the newest version of **Bootstrap**, which is the most popular HTML, CSS, and JavaScript framework for creating **responsive, mobile-first websites**.
- Bootstrap is a **free and open-source CSS framework** directed at responsive, mobile-first front-end web development.
- It contains HTML, CSS and JavaScript-based design templates for **typography, forms, buttons, navigation, & other interface components**.
- Bootstrap is a **free front-end framework** for faster and easier web development

# Bootstrap

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- Bootstrap was developed by **Mark Otto** and **Jacob Thornton** at Twitter, and released as an open source product in **August 2011** on **GitHub**.
- It contains **pre-built components** and **design elements** to style HTML content.
- Modern browsers such as **Chrome, Firefox, Opera, Safari, & Internet Explorer** support Bootstrap.
- How to Use :
  - **Download Bootstrap from [getbootstrap.com](http://getbootstrap.com)**
  - **Include Bootstrap from a CDN**

# Bootstrap

---

- Download Bootstrap from [getbootstrap.com](https://getbootstrap.com)
  - If you want to download and host Bootstrap yourself, go to [getbootstrap.com](https://getbootstrap.com), and follow the instructions there.
- Include Bootstrap from a CDN
  - If you [don't want to download](#) and host Bootstrap yourself, you can include it from a **CDN** (Content Delivery Network).
  - MaxCDN provides CDN support for Bootstrap's CSS and JavaScript. You must also include [jQuery](#).



# Bootstrap CDN

- You must include the following **Bootstrap's CSS**, **JavaScript**, and **jQuery** from MaxCDN into your web page.

<!-- Latest compiled and minified **Bootstrap CSS** -->

```
<link rel="stylesheet"href="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/css/bootstrap.min.css">
```

<!-- Latest compiled Bootstrap **JavaScript** -->

```
<script src="https://maxcdn.bootstrapcdn.com/bootstrap/3.3.7/js/bootstrap.min.js"></script>
```

<!-- latest **jQuery** library -->

```
<script src="https://code.jquery.com/jquerylatest.js"></script>
```

# Advantages of Bootstrap

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- **Easy to use:** Anybody with just basic knowledge of HTML and CSS can start using Bootstrap
- **Responsive features:** Bootstrap's responsive CSS adjusts to phones, tablets, and desktops
- **Mobile-first approach:** In Bootstrap 3, mobile-first styles are part of the core framework
- **Browser compatibility:** Bootstrap is compatible with all modern browsers (Chrome, Firefox, Internet Explorer, Safari, and Opera)

# Advantage of using the Bootstrap CDN

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- Many users already have downloaded Bootstrap from **MaxCDN** when visiting another site. As a result, it will be **loaded from cache** when they visit your site, which leads to **faster loading time**.
- Also, most CDN's will make sure that once a user requests a file from it, it will be **served from the server** closest to them, which also leads to **faster loading time**.

# Create Your First Web Page With Bootstrap 5

- Bootstrap 5 uses **HTML elements** and **CSS properties** that require the HTML5 doctype.
- Always include the HTML5 doctype at the beginning of the page, along with the **lang attribute** and the **correct title** and **character set**

```
<!DOCTYPE html>
```

```
<html lang="en">
```

```
<head>
```

```
<title>Bootstrap 5 Example</title>
```

```
<meta charset="utf-8">
```

```
</head>
```

```
</html>
```



# Bootstrap 5 is mobile-first

---

- Bootstrap 5 is designed to be responsive to mobile devices.
- Mobile-first styles are part of the core framework.
- To ensure proper rendering and touch zooming, add the following `<meta>` tag inside the `<head>` element.

```
<meta name="viewport" content="width=device-width, initial-scale=1">
```

- The `width=device-width` part sets the width of the page to follow the screen-width of the device (which will vary depending on the device).
- The `initial-scale=1` part sets the initial zoom level when the page is first loaded by the browser.

# Containers

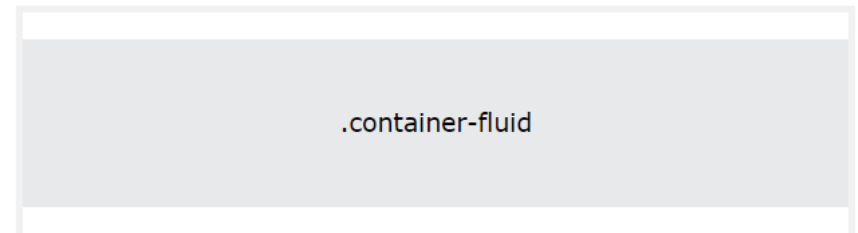
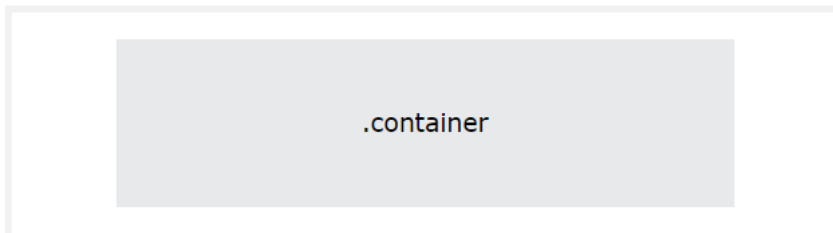
---

- Bootstrap 5 also requires a containing **element to wrap site contents**.
- There are **2 container classes** to choose from:
  1. The **.container class** provides a responsive fixed width container
  2. The **.container-fluid class** provides a full width container, spanning the entire width of the viewport



# Containers

- Bootstrap 5 also requires a containing element to wrap site contents.
- There are 2 container classes to choose from:
  1. The **.container class** provides a responsive fixed width container
  2. The **.container-fluid class** provides a full width container, spanning the entire width of the viewport



# Grid System

- Bootstrap's grid system is built with flexbox and allows up to **12 columns** across the page.
- If you do not want to use all 12 columns individually, you can **group the columns together** to create wider columns

span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1	span 1
span 4				span 4				span 4			
span 4				span 8							
span 6						span 6					
span 12											

# Grid Classes

---

- The Bootstrap 5 grid system has **six classes**:
  - **.col-** (extra small devices - screen width less than 576px)
  - **.col-sm-** (small devices - screen width equal to or greater than 576px)
  - **.col-md-** (medium devices - screen width equal to or greater than 768px)
  - **.col-lg-** (large devices - screen width equal to or greater than 992px)
  - **.col-xl-** (xlarge devices - screen width equal to or greater than 1200px)
  - **.col-xxl-** (xxlarge devices - screen width equal to or greater than 1400px)



# Colors

---

- Bootstrap 5 has some **contextual classes** that can be used to provide "**meaning through colors**".
- The classes for text colors are:
  - .text-muted, .text-primary, .text-success, .text-info,
  - .text-warning, .text-danger, .text-secondary, .text-white,
  - .text-dark, .text-body (default body color/often black)
  - and .text-light

# Colors – Example

---

## Refer Pgm4

### Contextual Colors

Use the contextual classes to provide "meaning through colors":

This text is muted.

This text is important.

This text indicates success.

This text represents some information.

This text represents a warning.

This text represents danger.

Secondary text.

This text is dark grey.

Default body color (often black).

# Tables

- A basic Bootstrap 5 table has a **light padding** and **horizontal dividers**.
  - The **.table** class adds basic styling to a table
  - The **.table-striped** class adds zebra-stripes to a table
  - The **.table-bordered** class adds borders on all sides of the table and cells
  - The **.table-hover** class adds a hover effect (grey background color) on table rows
  - The **.table-dark** class adds a black background to the table
  - Combine **.table-dark** and **.table-striped** to create a dark, striped table
  - The **.table-borderless** class removes borders from the table
  - The **.table-sm** class makes the table smaller by cutting cell padding in half
  - The **.table-responsive** class adds a scrollbar to the table when needed (when it is too big horizontally)



# Images

---

- **Rounded Corners**

- The **.img-rounded** class adds rounded corners to an image (IE8 does not support rounded corners)

- **Circle**

- The **.img-circle** class shapes the image to a circle (IE8 does not support rounded corners)

- **Thumbnail**

- The **.img-thumbnail** class shapes the image to a thumbnail

# Images

---

- **Responsive Images**

- Images comes in all sizes. So do screens. Responsive images automatically adjust to fit the size of the screen.
- Create responsive images by adding an `.img-responsive` class to the `<img>` tag. The image will then scale nicely to the parent element.
- The `.img-responsive` class applies `display: block;` and `max-width: 100%;` and `height: auto;` to the image



# Buttons

- Bootstrap provides seven styles of buttons with the following classes:

**.btn-default**

**.btn-primary**

**.btn-success**

**.btn-info**

**.btn-warning**

**.btn-danger**

**.btn-link**

- **Refer Pgm5**

## Button Outline



# Button Sizes

---

- Bootstrap provides 4 button sizes with the following classes:

**.btn-lg**

**.btn-md**

**.btn-sm**

**.btn-xs**

# Elements

---

- The button classes can be used on the following elements:
  - **<a>**
  - **<button>**
  - **<input>**



# Forms – Stacked Form

- All textual `<input>` and `<textarea>` elements with class **`.form-control`** get proper form styling

- **Refer Pgm6**

## Stacked form

Email:

Password:

☐ Remember me

# Select - Select Menu

---

- Select menu (**select one**)
- **Multiple select** menu (hold ctrl or shift (or drag with the mouse) to select more than one)
- Select menus are used if you want to allow the user to **pick from multiple options**.
- To style a select menu in Bootstrap 5, add the **.form-select** class to the **<select>** element:

# Select - Select Menu

---

- Select menu (**select one**)
- **Multiple select** menu (hold ctrl or shift (or drag with the mouse) to select more than one)
- Select menus are used if you want to allow the user to **pick from multiple options**.
- To style a select menu in Bootstrap 5, add the **.form-select** class to the **<select>** element:



# Select - Select Menu – Example

- Refer Pgm7

## Select Menu

To style a select menu in Bootstrap 5, add the .form-select class to the select element:

Select list (select one):

Mutiple select list (hold shift to select more than one):

Submit

# Validation - Form Validation

- You can use **different validation classes** to provide valuable feedback to users.
- Add either **.was-validated** or **.needs-validation** to the <form> element, depending on whether you want to provide validation feedback before or after submitting the form.
- The input fields will have a **green (valid)** or **red (invalid)** border to indicate what's missing in the form.
- You can also add a **.valid-feedback** or **.invalid-feedback** message to tell the user explicitly what's missing, or needs to be done before submitting the form.



# Validation - Form Validation

- Refer Pgm8

## Form Validation

Try to submit the form.

Username:

Valid.

Password:

Please fill out this field.

☐ I agree on blabla.

Check this checkbox to continue.

Submit

# Components (Self study topics)

- Accordion
- Alerts
- Badge
- Breadcrumb
- Buttons
- Button group
- Card
- Carousel
- Close button
- Collapse
- Dropdowns
- List group
- Modal
- Navs & tabs
- Navbar
- Offcanvas
- Pagination
- Popovers
- Progress
- Scrollspy
- Spinners
- Toasts
- Tooltips



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# THANK YOU



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