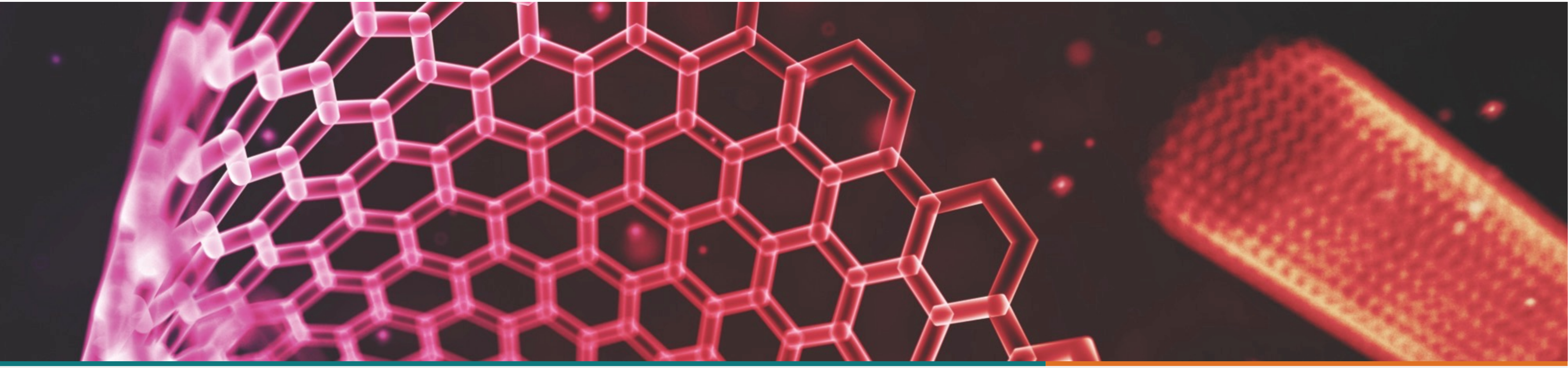
STEVENS INSTITUTE *of* TECHNOLOGY

Schaefer School of Engineering & Science

# CS 546 – Web Programming I
# Course Introduction and Policies



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# About Me

***Education:***

- Associate in Applied Science in Computer Programming and Systems from LaGuardia Community College.
- Bachelor of Business Administration w/ concentration in Computer Information Systems (minor in Psychology) from Baruch College.
- Master of Science in Computer Science from Stevens Institute of Technology.

***Professional:***

- Professional programmer since 1998 (worked at various companies throughout the years, from small/mid-sized startups to large law firms and corporations).
- Director of Engineering and CTO for startups.

***Teaching***:

- 2017-2018: Started as a TA in CS 546, CS 223, and CS 810.
- 2017-2018: Stevens Pre-College Program.  Taught Intro to Computer Science and was a TA for the Cybersecurity program.
- Fall 2018-2022: Became an Adjunct Professor at Stevens teaching CS 546, CS 554.
- Fall 2022-Present: Became a full-time Lecturer at Stevens.

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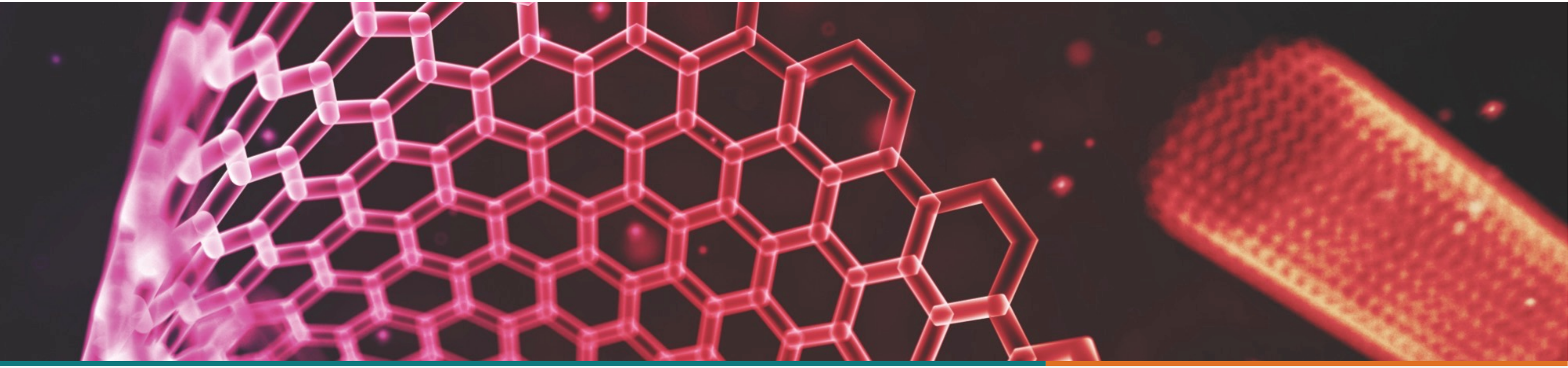
# Course Logistics and Policies



# Who Is This Course For

- This is **NOT** an introduction to programming course. This course assumes you have prior programming experience with at least one high-level programming languages and know the fundamentals of programming.
- You should have **practical** experience with programming fundamentals like:
  - Defining variables
  - Working with different datatypes
  - Defining and calling functions
  - Working with and manipulating arrays
  - Using loops and knowing when to use which loop
  - Using conditional statements
  - Working with objects (sometimes referred to as dictionaries in other languages)

# Course Communication - Slack

- We will be using Slack for most communication in the course. You will find an invitation link in the course modules on canvas.
- Every student should be in the slack workspace in the #cs-546 channel for course related questions.  #general is used for general chat related to CS, #random is for any off-topic chat. **Do not ask any course related questions in any other channel other than #cs-546 channel.**
- **Please do not direct message TA's or myself unless invited to, keep all communication in the chat channel.**
- Even if you do not chat much in the channel, it is advised that you read the channel frequently for clarifications on assignments that other students may have asked.
- TA's are only required to monitor Slack Mondays-Fridays from 9am-9pm. They may respond outside of these hours but are not required to so if you have a question outside these hours, please be patient for a response.

# Course Codebase

The lecture code as well as all lecture slides for the course can be found on GitHub:

- https://github.com/stevens-cs546-cs554/CS-546

You are allowed to use the lecture code as reference for your assignments.

# Grade Breakdown

**Labs: 30%**

- Labs will be weighted evenly.
- Labs will be given most weeks and will cover content covered that week.

**Quizzes: 10%**

- Most weeks we will have a quiz.
- **Quizzes are open book so you can use the lecture slides and/or your class notes while you take the quiz**

**Final Project Proposal: 5%**

- Groups will propose a final project to work on throughout the semester.

**Final Project Database Proposal: 5%**

- Each group will submit a database proposal with their collections and schema.

# Grade Breakdown

### Final Project Pitch Presentation: 5%

- Each group will give a non-technical presentation about their project, explaining what use case it solves, who the audience is, and why it’s a worthwhile project.

### Final Project Walkthrough Presentation: 5%

- You will give a technical presentation showcasing your project’s features and technological decisions.

### Final Project Result and Code: 40%

- Each group will submit their project code and a database seed file to be reviewed and graded based on what was promised in their proposal and delivered.
- The grade for this will be split. 20% will be graded based on the project as a whole and the other 20% will be based on an individual’s contribution to the project.

# Attendance

- While I do not require attendance, however, you are **HIGHLY** advised to attend class.
- Even though I do not require attendance, you are responsible for all information that is communicated in the lectures.
- I may clarify or communicate important information about the coursework during the lectures. If you miss a class, you will miss that information, but you will still be responsible for it.

# Course Responsibility & Assignment Extensions

- I do not grant assignment extensions unless you can provide a doctor’s note, or you are officially excused from the college.
- When you register for a class, you are taking responsibility to follow the course schedule, complete the work, and complete it by the deadlines set.

# Late Assignments

You will have ample time to complete each assignment, so lateness will be harshly penalized:

- **Late labs will receive a 15-point penalty PER DAY. A lab is considered late 5 minutes after the due date/time (You have a 5-minute grace period).**
- **For final project components, the penalty is 25-points per day and a final project component is considered late 5 minutes after the due date/time (You have a 5-minute grace period).**

**There are NO exceptions to these policies unless a verifiable doctor's note is provided, or you are officially excused from the college(they only get involved if it's something big though).**

# Plagiarism and Cheating

- **I have a ZERO tolerance policy when it comes to sharing code with each other and cheating. Lab assignments are to be done INDIVIDUALLY and not with any other students.**
- Moss is run against every student's lab submissions to detect plagiarism in code, and it is VERY VERY good at what it does. Moss is not only run against all current student submissions but also against ALL student submissions from previous semesters if a similar lab was used in previous semesters.
- **If Moss detects plagiarism between your work and another student's or previous student's, you will receive an automatic 0 for that lab the first time you are caught. If you are caught cheating a second time, your grade for that assignment will be -10% and if you get caught a third time, you will fail the course with a grade of F. All instances of cheating will be reported to the college as required.**
- **You CANNOT use any code from a previous student found online on GitHub, any other online code repository etc. For your labs or your final project!**

**DO NOT POST YOUR LAB ASSIGNMENTS ON GITHUB! IF YOU DO, YOU WILL BE HARSHLY PENALIZED. Not to mention if another student finds it and uses the code, and we run moss, it appears like you both cheated!**

# Plagiarism and Cheating

- **If you get caught cheating on the final project, it will result in an automatic F as a final grade in the course.**

- **I AM REQUIRED TO REPORT ALL INSTANCES OF CHEATING TO THE COLLEGE AND I WILL DO SO WITHOUT HESITATION!**

- **YOU ARE NOT ALLOWED TO USE ANY AI TO WRITE YOUR CODE FOR YOU. IF YOU USE AI AND WE FIND OUT, IT WILL COUNT AS PLAGERISM AND THE PLAGERISM PENALTY WILL APPLY! NO USING GITHUB COPILOT, CHATGPT, OR ANY OTHER AI CODE GENERATION SERVICE/APP**

# What Will We Be Covering in This Course?

In this course, we will be going through many fundamental web concepts and learning technologies related to them.

1. You will learn how to install and configure a modern web programming environment, from server to database. In our case, we will be using Node.js, MongoDB, and Express as our programming environment, database, and server, respectively. You will also learn about many tools that you will be using as a web developer, such as Git.

2. You will learn how to do server-side programming. In our case, that means you will learn the JavaScript language, as well as good coding patterns in order to structure a web application. You will learn how to separate your code in logical ways that make sense and follow modern conventions.

3. You will learn how to use a modern database; in our case, this is MongoDB. You will learn what this database’s strengths are, what its weaknesses are, and how to utilize it effectively.

4. You will learn how to code for the client. Learning HTML and CSS will enable you to create a document that makes sense, both semantically and meaningfully to the human eye.

# What Will We Be Covering in This Course?

6. You will learn how to use JavaScript to make your applications respond to your users' input and experience.

7. You will learn about web accessibility and the major hurdles that many people face using the web as it is today, how to identify issues that exist in a web page, as well as how to correct them.

8. You will learn advanced client-side programming techniques and how to leverage frontend tools that allow you to create incredibly dynamic web experiences.

9. You will learn about security issues in the web and how to minimize their risks.

10. You will create a market-ready database driven web-application, from start to finish, involving technical presentations

# What Are the Labs Like?

- There are eleven labs, designed to make you practice the material that we will go over in class that week.

- The labs will give you a good foundation for your assignments and final projects.

- Labs are focused on small, approachable goals.

- Most of your labs will be incremental: they will build on the solutions from the previous week.

# How Are the Labs Graded?

- The TA’s will run various test cases against your code, if it fails any of those tests, points will be deducted. You will be responsible to make sure you cover any edge cases and make your code as bug-free as possible.
- It is VERY important that you follow EVERY detail to a T in the lab spec requirements.
- A programmer's job is not just coding but also following spec sheets and paying CLOSE attention to the details. **Any deviation** from what the assignment states will result in a penalty no matter how small of a deviation.
- **If you submit a lab that does not run because of syntax errors etc., it will result in an automatic 0. It’s not our job to fix your code just to get it to run to grade it.**
- **If you upload an incorrect file, i.e. upload lab 1 when you should have uploaded lab 2 or upload a corrupt file, the full late penalty will apply if there is even any time left to resubmit it without it being a 0 because of late penalties. Mostly likely it will result in a 0**
- Once your lab is graded, that is your grade. **You do not get to resubmit it after it’s been graded**. Your lab grades are **NON-NEGOTIABLE**. The only time lab grades will change after they have been graded is if there is a grading error.

# What is the Final Project Like?

For your final project, you will create a **market-ready**, database-driven application as part of a team. Your application will incorporate aspects from the entirety of the course. The final project has several components to it, both technical and non-technical.

- You will be assigned groups and then submit a project proposal.
- You will submit a proposed format for your database.
- You will be required to use GitHub so individual contributions can be monitored.
- You will give a non-technical presentation detailing what your product is, who the user would be, and why the project is worthwhile to take on. (this will be a screencast).
- You will give a technical presentation detailing your features and the technical decisions you made (this will be a screen cast where one group member goes over the various functions and features of the system and will be submitted with your final code).
- You will submit your codebase and a database seed file and deliver the actual product.

# How is the Final Project Graded?

You will be graded based on many factors for the final project.

- You will be graded on the functionality of your core features and will also lose points for any core feature not implemented or not fully working.
- You will be deducted points for any bugs, issues with routing, logging in or anything that makes the application not function as intended as well as not fulfilling any of the final project requirements.
- You will be deducted points if you do not contribute as much as your teammates.
- You will get extra points for any extra feature you complete that is fully functional(up to 15 points extra).
- **If you submit a project that does not run because of errors, it is an automatic 0**
- **If you upload an incorrect file, or corrupt file, it will result in a 0 for the project.**

# How to Succeed in This Course

**If your grade is important to you, you will follow these instructions.**

- Attend the lectures, read the slides and read the recommended readings.
- Start your labs early and do not wait until last minute. If you wait until last minute, you cannot assume there will be a TA available to help if you get stuck.
- Start the group project early and do not wait until last minute!
- Make sure you meet ALL your core features listed in your final project proposal.
- Follow every detail on the lab assignment specs fully. Once you think you are done with a lab, go over the requirements twice and make sure you have met them all.
- Test, debug, test, debug and test again. Step through your code using breakpoints when debugging!!!!
- Attend the TA’s office hours.
- Be committed and consistent
- Take notes!!
- ASK QUESTIONS!

# My Office Hours

- My in-person office hours will be on Wednesdays from 3pm-6pm in my office in Gateway South, Room 243
- My online office hours will be on Thursdays from 1pm-3pm via Zoom

# Teaching Assistants

- Each TA hold a 2-hour office hours every week via Zoom or in-person to answer your questions and they will also be in the Slack channel to answer any of your questions
- They will be making their introductions and posting their office hours soon.
- **I am very protective over my TA's therefore rudeness, pushiness, hostility etc. will not be tolerated.**
- The TA's have no authorization to change your lab grades without discussing it with me first. They also do not set the number of points you get deducted for an issue.
- If you have a question, please reach out to the TA's first, if they are unable to address your issue then reach out to me.

# Readings

- In lieu of a textbook, assignments will require you to research the topics in order to complete them. I will point you to resources for each assignment.
- Most weeks, I will provide recommended readings and other resources regarding the content that will be covered.
- It is **highly beneficial** to read those readings before class as a form of preparation.
- For many labs and parts of your final project, you will be expected to read some form of documentation in order to learn how to use a particular technology or package.

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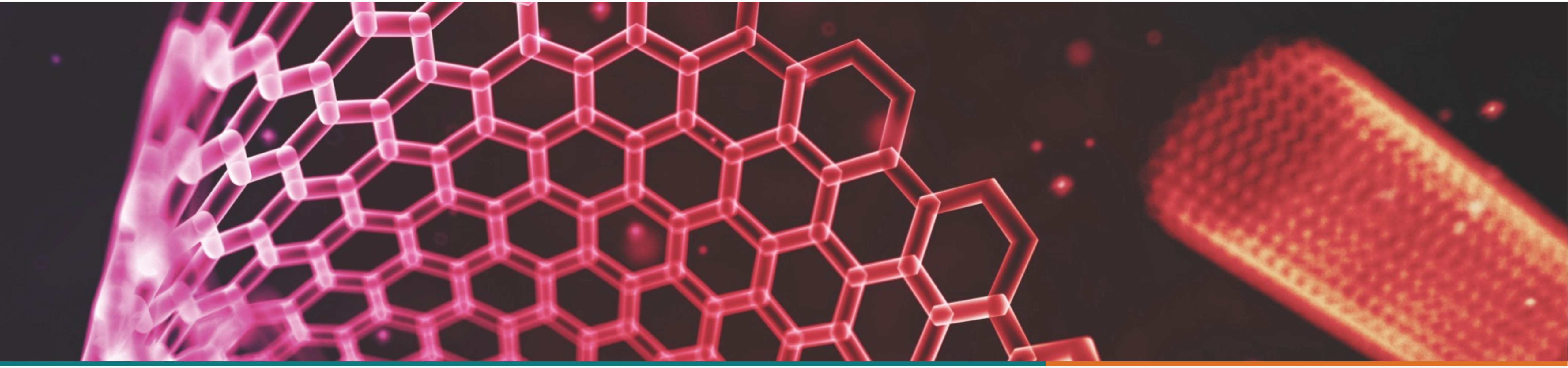
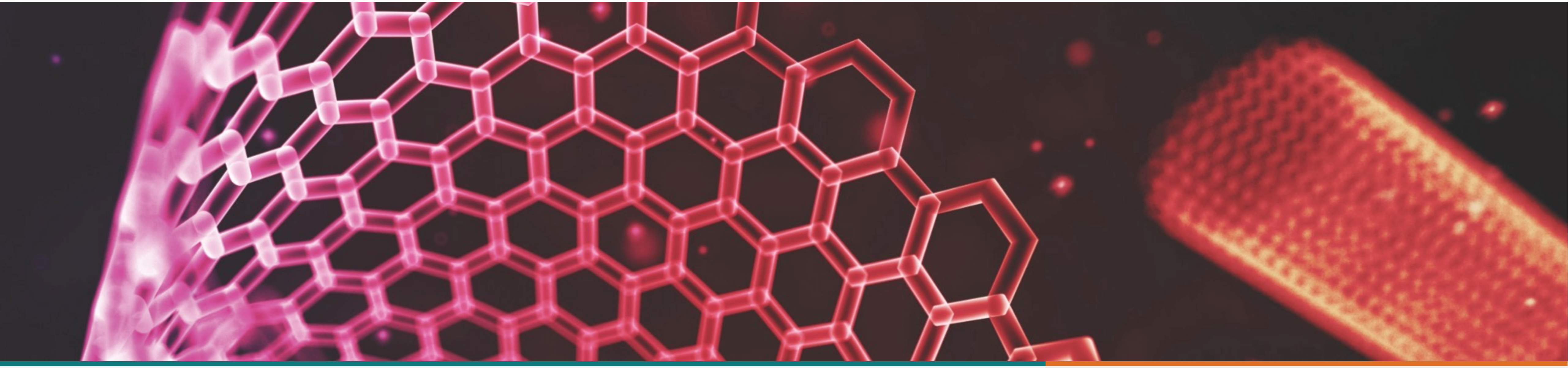
# Course Intro



# What is Web Development?



# What Is Web Development?

Simply put, web development is the the very broad field of creating and building websites and web applications.

There are many opinions out there on what the best technology is and what the best practices are: this course is not about opinions and proclaiming what the best technology, but rather arming you with the skillset needed to work in any web technology.

# What Is Special About Web Development?

There are many aspects of web development that are not different than non-web development

- You will break complex problems down to smaller, approachable issues.
- There are a slew of programming languages and technologies to choose from.

There are some unique problems, as a web developer, that you must care greatly about

- In some way or another, your product is about transmitting information; you must worry about the actual delivery of that information.
- Technology on the web moves fast! Change is constant!

# Why Is Web Development So Important?

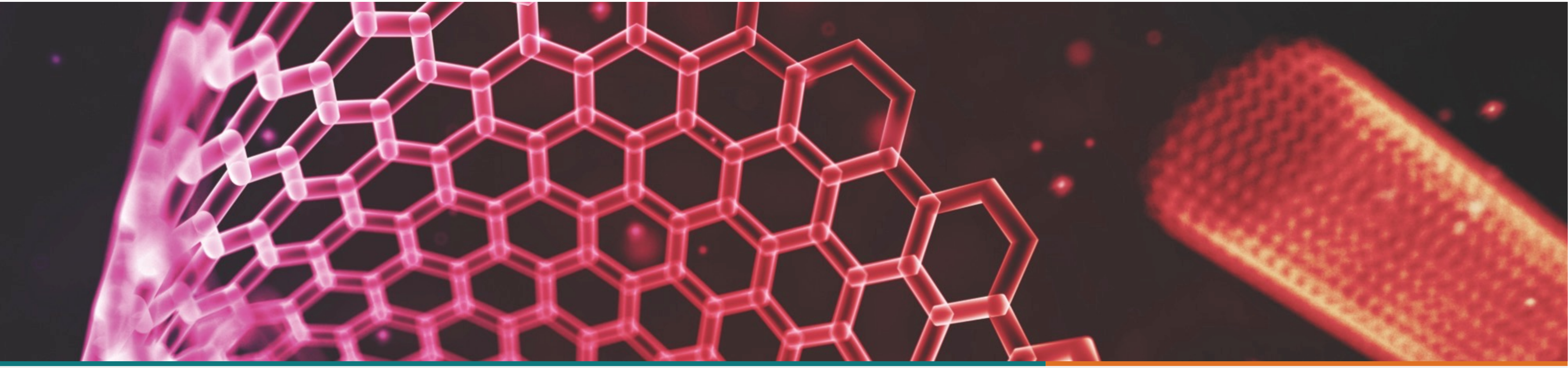
Web development has allowed the internet to bring forth a new era for technology

- Lower barrier of entry; you can start without a compiler; all you need is a text editor and a browser!

Web development has ushered in a new era of communication, where ideas and content can be transmitted in new and exciting ways.

Web Development allows information to be spread much more rapidly through many mediums.

# Technologies and Tools



# Git for Version Control

If you are unfamiliar with Git, it is a versioning control software. We will cover it in lecture 8.

- Versioning control allows us to take periodic snapshots at code and save a reference to it at a certain point in time.
- Allows many developers to work on the same files and push their changes to an online repository.

You can download Git here:

https://git-scm.com/downloads

**You will be required to use Git for the final project so that contributions can be monitored**

# Node.js: Server-Side JavaScript

Node.js is a JavaScript runtime environment that allows you to write JavaScript without a browser. It also exposes several system operations that allow you to manipulate files, make servers, etc.

Node.js has a huge community and large package repository, making it easy to build applications without having to re-engineer the wheel.

You can download Node.js here:

- https://nodejs.org/en/
- Make sure to download the most current LTS version

# MongoDB

MongoDB is a document-based database.

You can download MongoDB here: https://www.mongodb.com/download-center/community

We will not need this until lecture 4 but you are advised to set it up ASAP.

# Tota11y

The tota11y tool is an accessibility testing tool created by Khan Academy for the sake of identifying accessibility issues.

You can install it via a bookmarklet from the tota11y website

- http://khan.github.io/tota11y/

# HTML and CSS

HTML and CSS are the markup and styling languages of the web, respectively.

HTML describes the format of a document, while CSS is a set of specifications as to how a document is styled.

You will write HTML and CSS to make web pages and web applications.

# Design in the Course

CS 546 is a web programming course, not a web design course so we do not dive deeply into CSS and design.

You will not be graded on the design or how “pretty” you make your applications. You will be graded though on your knowledge how to apply CSS to your HTML elements using ID’s, Classes etc. and write some basic CSS.

We will also go into using Bootstrap which is very simple to learn and allows you to apply styles in the Bootstrap framework and create a visually appealing and consistent look throughout your web application

While some web developers do both programming and design, in a professional environment, most of the time web developers work with designers and apply the designs/styling that the designers design.

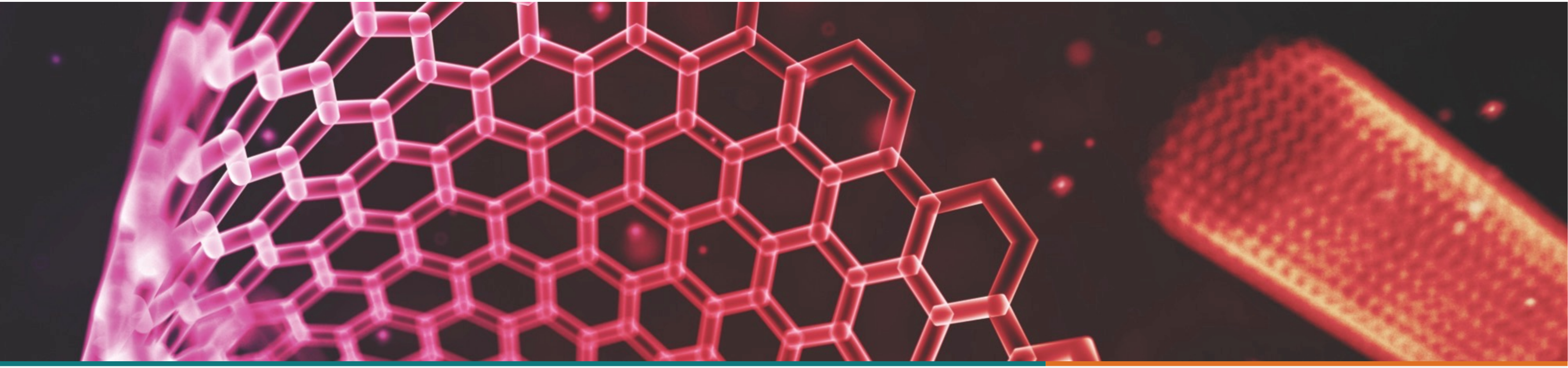
# Client-Side JavaScript

JavaScript originated as a programming language that was only run in a web browser.

You will not only be writing JavaScript to run on Node.js, but you will also be writing it to run in your web browser on the client-side.

In a browser environment, you will not have access to a user’s file system; instead, you will have access to several browser APIs, such as a limited use of a user’s history, their screen size, and so on. This will allow you to create robust web applications.

# Preparing for CS 546



# Install Node.js, NPM and MongoDB

You will need Node.js now

please download the **LTS** version on Node:

https://nodejs.org/en/download/

You will not need MongoDB for a few weeks, but it does well to install it and test it now.

# IDE

The IDE we will be using for this class is Visual Studio Code.

- https://code.visualstudio.com

It runs on Windows, Mac and Linux and is a very lightweight yet powerful IDE that supports a ton of languages and technologies and has many installable extensions to make development easier.

I will show you some neat things about using VSCode for node development.  You're free to use another IDE but I highly advise using VS code. It has great debugging features, git version control, integrated terminal and many other nice features.

You can also download an alternate version of VS code that was built from their source code but with their telemetry/tracking removed. It's called VSCodium and can be found here: https://vscodium.com

It has all of the same features as the normal VSCode.

# Download a Developer-Friendly Browser

While you can use any browser you want on a day-to-day basis, you’re going to want to develop using a browser that has a great developer tool panel:

Mozilla Firefox Developer Edition

https://www.mozilla.org/en-US/firefox/developer/

Google Chrome

http://www.google.com/chrome/

It’s always a good idea to have multiple browsers installed on your development machine so that you can test your application in different browsers to find any browser compatibility issues.

# Read up on the Fundamentals of JavaScript

Mozilla, the maintainers of the Firefox browser, are excellent resources for all thing's frontend; for now, you can start by looking at JavaScript basics.

https://developer.mozilla.org/en-US/Learn/Getting_started_with_the_web/JavaScript_basics

W3 Schools is also a great resource for all thing's web development related: https://www.w3schools.com

And here is their JavaScript page. https://www.w3schools.com/js/default.asp

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# Questions?