Figure 1 College Student (pixabay.com)

Software Engineering Project

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Student Ids: W20093613 & W20025214

Year: 3

Course: Multimedia Applications Development

Title: SETU Creative Development

Url: https://setucreativedevelopment.ie

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1. Introduction

We will be software engineering a software product. We will be designing and developing our product following the agile approach. This document will contain our research and screenshots of us following our schedule using **Azure Opps**. There will be sections where we, as developers, know what kind of personas, scenarios and user stories would be associated with our product.

Our software product is a college website like our own college website https://www.setu.ie/. A website that promotes a course in SETU and the greater Waterford area. We chose the three-year course, **BSc in Multimedia Applications Development.**

Figure 2 Developer (www.pixabay.com)

1.1 Problem of Context

Although the official SETU website is great, it can be overwhelmed with the amount of information. Some people would like to get info straight to the point without figuring out which information belongs to which of the many pages on that site.

1.2 Purpose of the system

We choose this idea because we believe picking an undergraduate course and the right college can be daunting. A more **user-friendly** site where anyone can access the information that they need to know about this specific course. Hence our **target audience** is leaving cert students and mature adults (23 – 99 years of age, including parents).

Figure 3 Union of People (www.pixabay.com)

1.2.1 Current System

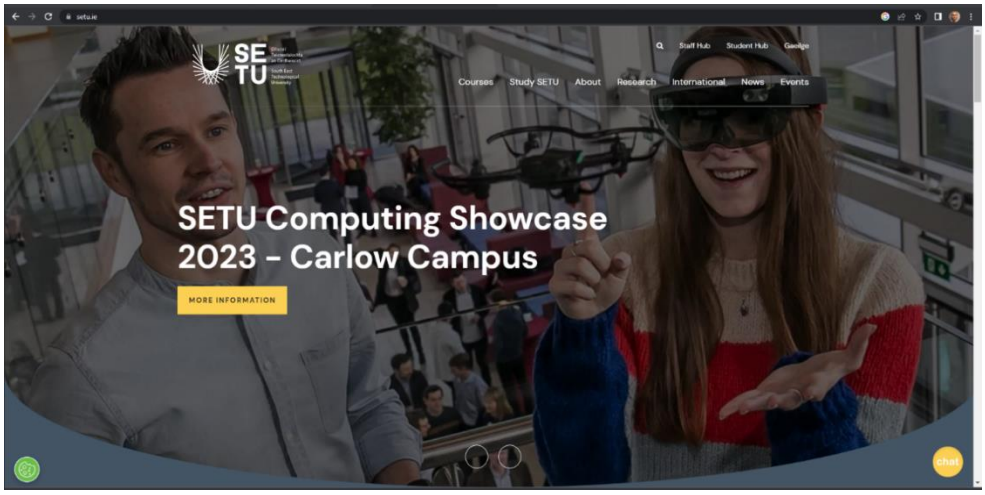


Figure 4 Official SETU Homepage (www.setu.ie)

It is essential to check other products, like our vision for our product. The official SETU site gives us a good comparison and gives us ideas on how we would change it ourselves and relay that to our website. The SETU website is labelled nicely, with large text and images used in the background. The presentation looks professional but looks like it belongs to a business page.

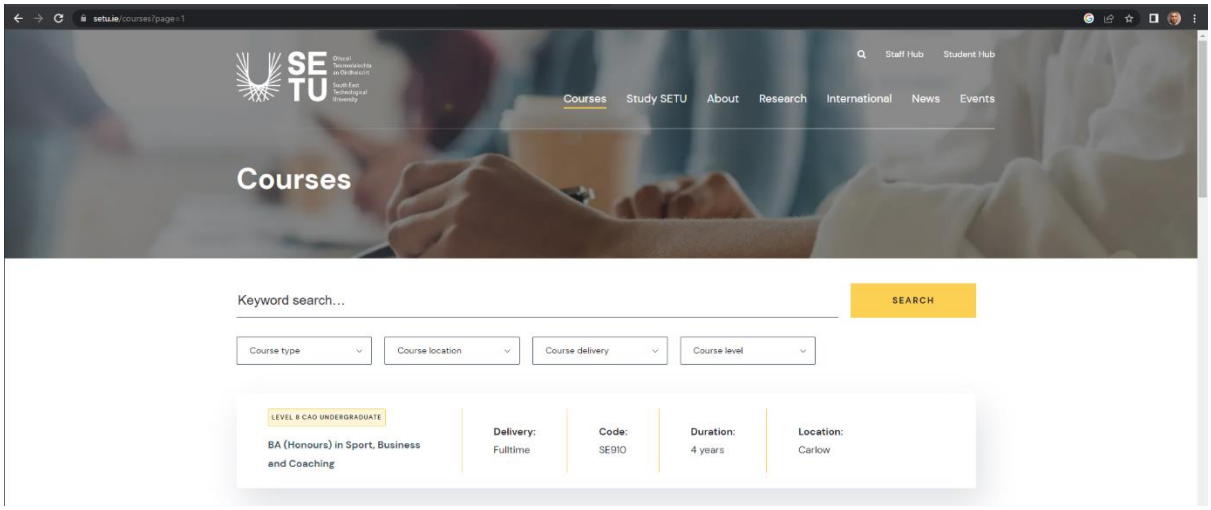


Figure 5 SETU Course Search Page (www.setu.ie)

Once we get to the Course search page, we discover an issue in the search filter. It does not have a search filter for the course department. So, if they want to look at the course “Multimedia Applications Development”, they must manually flick through the pagination or use the search bar. On that note, they will not know how many courses belong to which department if they consider other options.

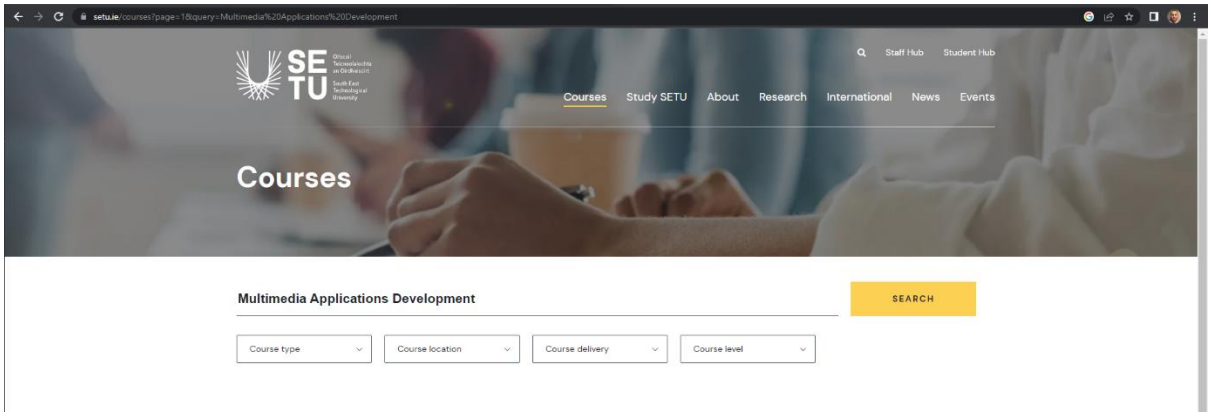


Figure 6 Typing Search Bar (www.setu.ie)

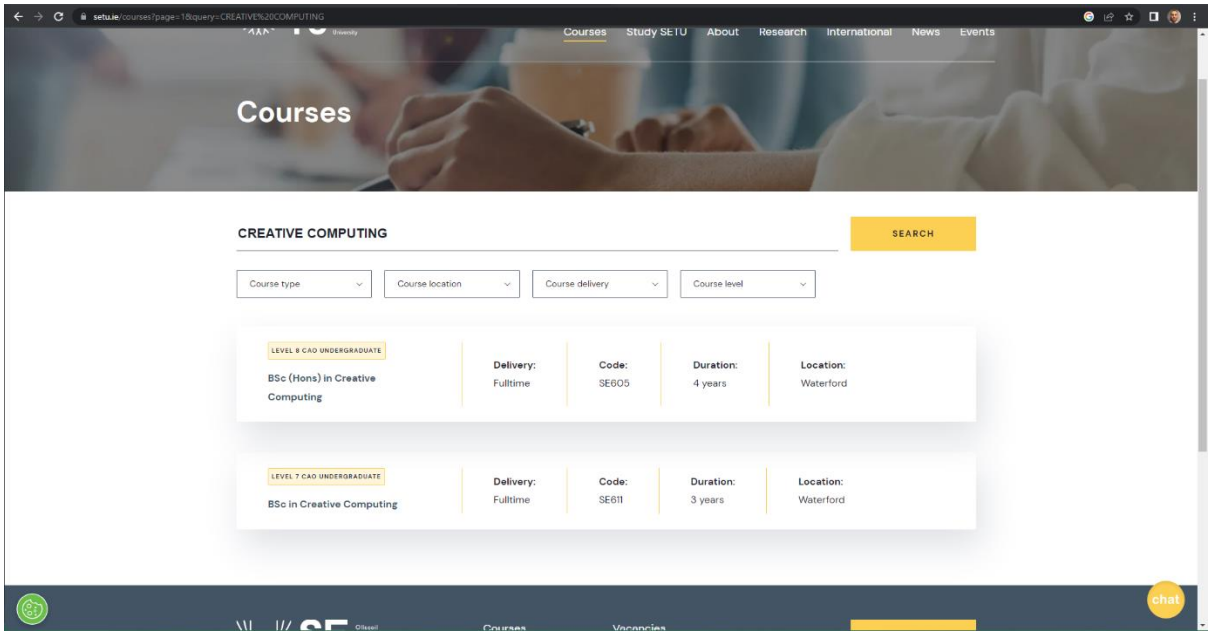


Figure 7 Creative Computing Search (www.setu.ie)

What is odd is that if we type out and search for "Multimedia Applications Development" course, **no results appear**. It is only when we type it in "Creative Computing," which is the honours 4-year course attach to that course. Two results show up. When we select the 3-year creative course, the page renders the "Multimedia Applications Development" details page. This could be a typo, or the college is considering changing the name of the course.

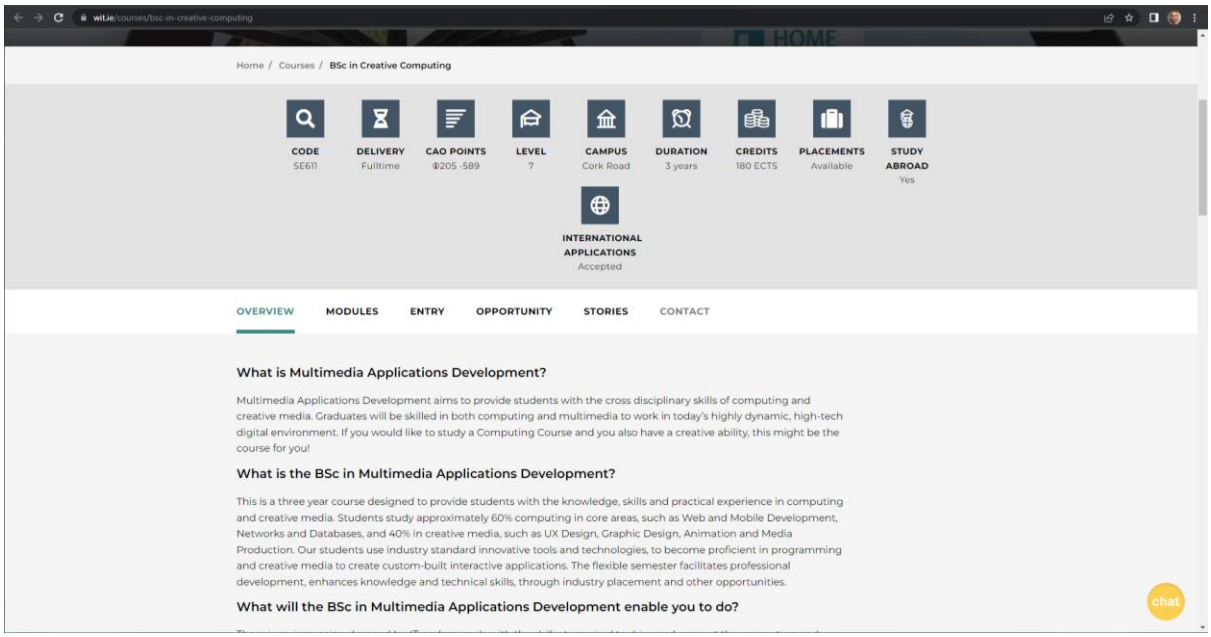


Figure 8 SETU Course Detail Page (www.wit.ie)

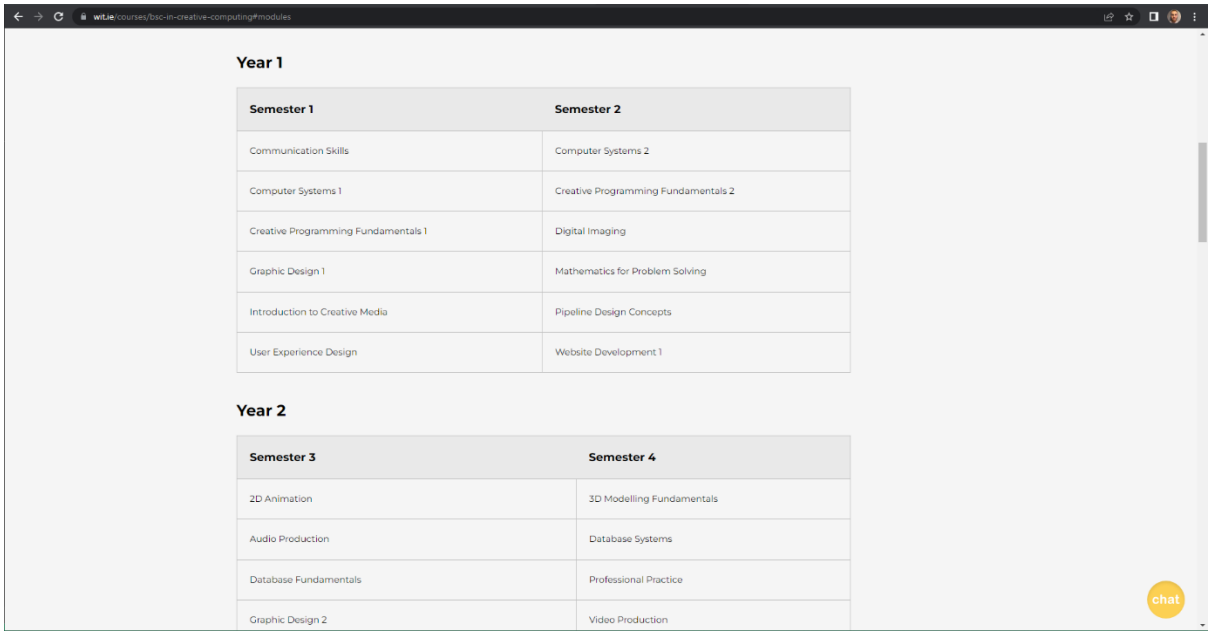


Figure 9 Semester Details (www.wit.ie)

Still, on the same course page, we notice that the semester details are quite vague and **do not have any descriptions** or how long each semester lasts. Our system will have this section more user-friendly.

1.2.2 Proposed System

The system we proposed is a more user-friendly website **showcasing one course from SETU**. The course being "BSc in Multimedia Applications Development. We may change the name of the course modules to make them simpler to understand.

There is also too much white colour in the background in the current system. This could irritate users looking at night-time. We could use more colours in the background, like **"dark purple"** to make it easier to navigate through.

For the semesters section, we are going break them down by a **tab menu**. For example, they be several categories such as **“Creative”.** It will display the creative modules in the course and examples of past students’ projects displayed too. To give the user an idea of the type of work produces in the course.

1.3 Product Vision

The product vision is a **mission statement** from the team developing the software. To describe the future state of the product and to give stakeholders an idea of what our product is. Along with the **goals** of the developing team too.

“To Showcase New Creative Computing Opportunities, While Learning About Yourself.”

2. Design Overview

2.1 Personas

Persona 1: Tim White

Figure 10 Tim White Representation (www.pixabay.com)

Personalization	He lives in a small town called Kilmacthomas, co. Waterford. He is a very outgoing person and loves to hang out with friends. He lives with his parents and does not drive a car. He just finished his leaving cert, so he is now ready to start the next chapter in his young adult life. He wishes to do a three-year undergraduate course.
Job-Related	He does not have a considerable income and has a part-time job in his local Centra. He walks to his job from home.

Education	Recently finished his Leaving Cert.
Relevance	He has an interest in graphic design and poster design, so he wants to do a course that focuses on these. While attending college, he wants to hang out in the town with his new classmates. He is looking into a way of travelling to and back from the college.

Persona 2: Shauna Roche

Figure 11 Shauna Roche Representation (www.pixabay.com)

Personalization	She is a parent living with family in Waterford City. She loves her family and wishes her only son to go to a good college and have an undergraduate degree. She has an interest in fitness and loves doing marathons, and her family shares the same passion. As a digital immigrant, she recently got used to using her smartphone and the internet.
Job-Related	Works full-time in Dunnes Stores, Waterford City.

Education	Did her leaving cert 30 years ago, she has been working full-time since then. No college experience.
Relevance	She wants to find info about the SETU for her son, as she never attended that college. Her son has a big interest in programming and website design. Would like to know if the college offers any sports clubs for her son.

2.2 Scenarios

Scenario 1: Citylife in Waterford (*Tim White*)

Tim wishes to learn more about **things to do in Waterford City** as a student. What **activities** could he do with friends? However, he doesn't leave his hometown as much, so he doesn't know what activities to do as a student in Waterford City as he doesn't drive and often walks to his workplace or cycles.

For our app, I think the best solution to Tim's problem is to give him a list of various **activities** in Waterford City. Promote places that have **student discounts**. We could also **showcase things outside the city**, such as Tramore Coast.

Figure 12 Friends Hanging Out (www.pixabay.com)

Scenario 2: A New Digital World *(Shauna Roche*)

As a parent, Shauna wants to find **more information** on the Multimedia course. Such as **how long** the course is, and if they offer any places for her to eat lunch during the day.

For our app, we should indicate straight away on the home page the **essential links** relating to the course, such as course details and food facilities. That way, Shauna doesn't feel turned off and doesn't need to navigate through unnecessary pages. If she is on a page such as **"course details"**, we should have a way of returning to the home page. Then she can move on to the section of information she is interested in. We should use big text to make it clearer to read the page and divide the information into paragraphs.

Figure 13 Woman Using Laptop (www.pixabay.com)

2.3 User Story

It is a **statement** from a user of the software. In that, it is a **single thing** a user wants from a software system. The goal of User Stories is to make a task with the system more detailed and structured.

E.g., As an author, I need a way to organize the book I'm writing into chapters and sections.

Tim's White User Story

*"As a **leaving cert** student, I **want** to find what Waterford City has to offer. The **reason** being I need to find ways of socialising with any new college friends."*

The role for Tim is that he is leaving cert student, and he desires to find more student information at the college. He is a social person; therefore, if he gets his info, he will get a good idea of how to make new friends at the college.

Figure 14 College Friends (www.pixabay.com)

Shauna's Roche User Story

*"As a **parent**, I **want** to find important information about the Multimedia course in SETU. This is **because** my son is looking for an undergraduate course that involves computing. I'm **hopeful** the website is easy to read and gets straight to the point because I'm not used to technology unlike my son."*

The role for Shauna is that she is a parent. She wants to find the necessary information about the course our website is promoting. Her son has interest in computing so she feels this could the college for him since its local to her family. As she didn't grow up with technology, she desires that the website is easy to navigate through and not overwhelming.

Figure 15 Woman Questioning (www.pixabay.com)

4. Wireframes

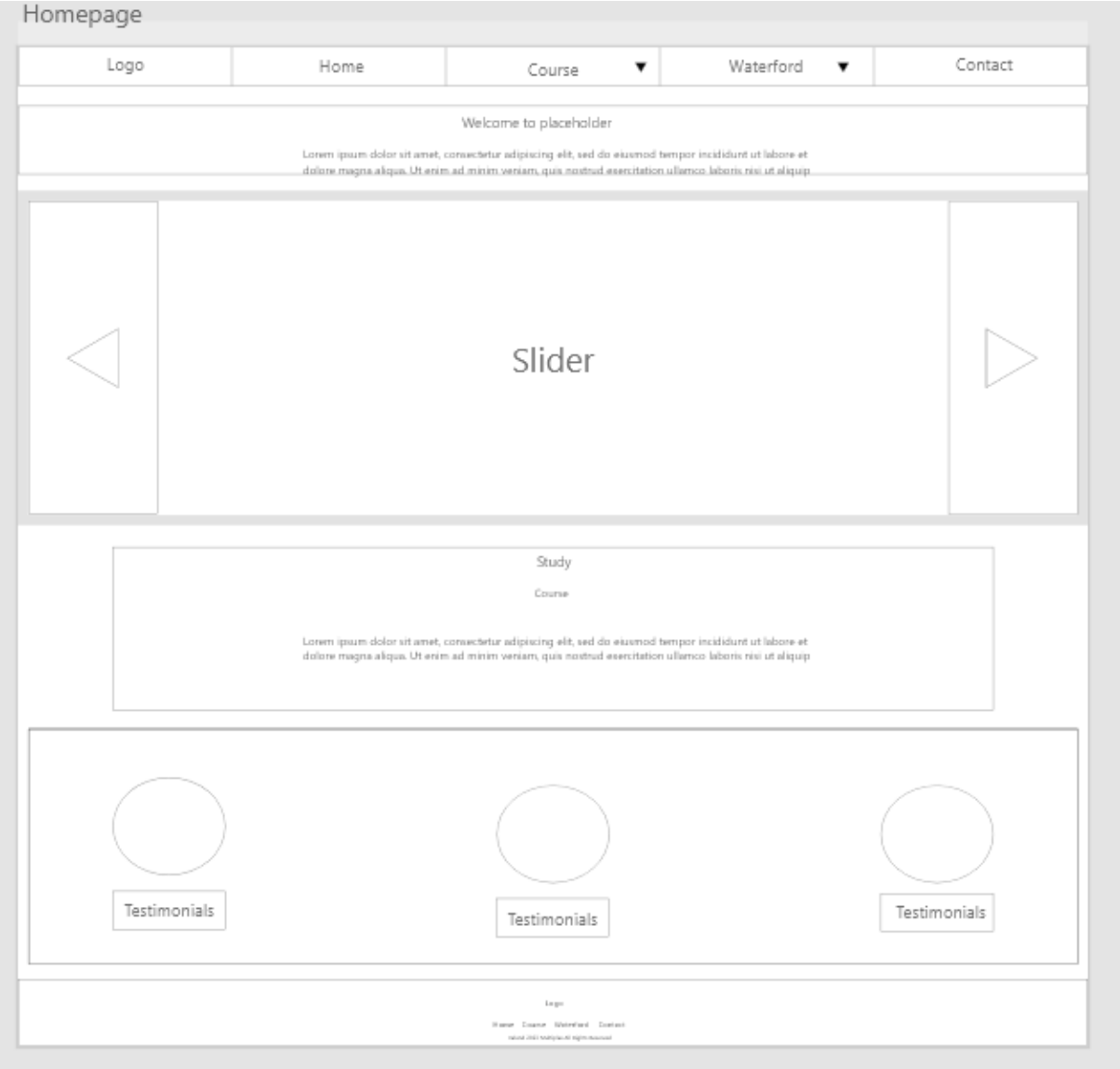


Figure 16 Wireframe Home Page

For the prototype, I (Mark) designed the wireframes and prototype within Adobe XD. For the homepage, I wanted to include a slider to show the user exterior shots of the college.

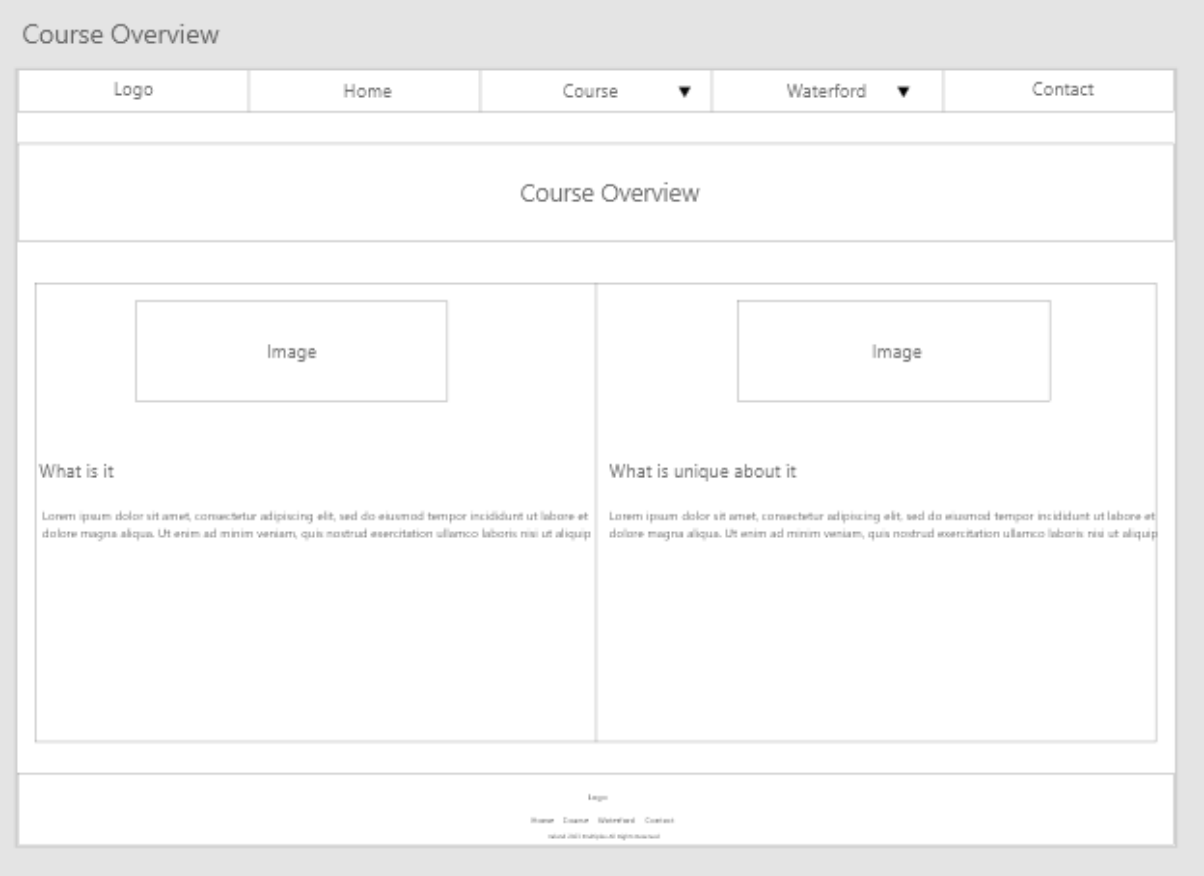


Figure 17 Wireframe Course Overview

For the course overview page, I wanted to include information regarding what the course entails and what is unique about it.

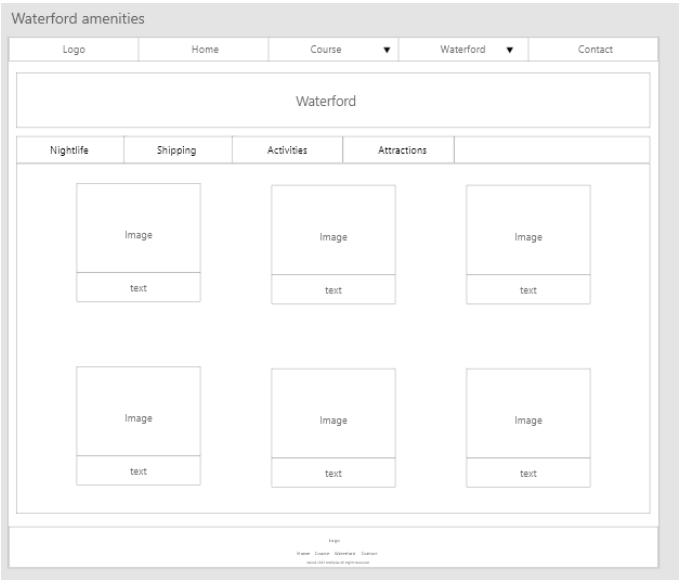


Figure 18 Wireframe Waterford City Page

I wanted to have a sub-navigation tab to switch between content for the amenities page.

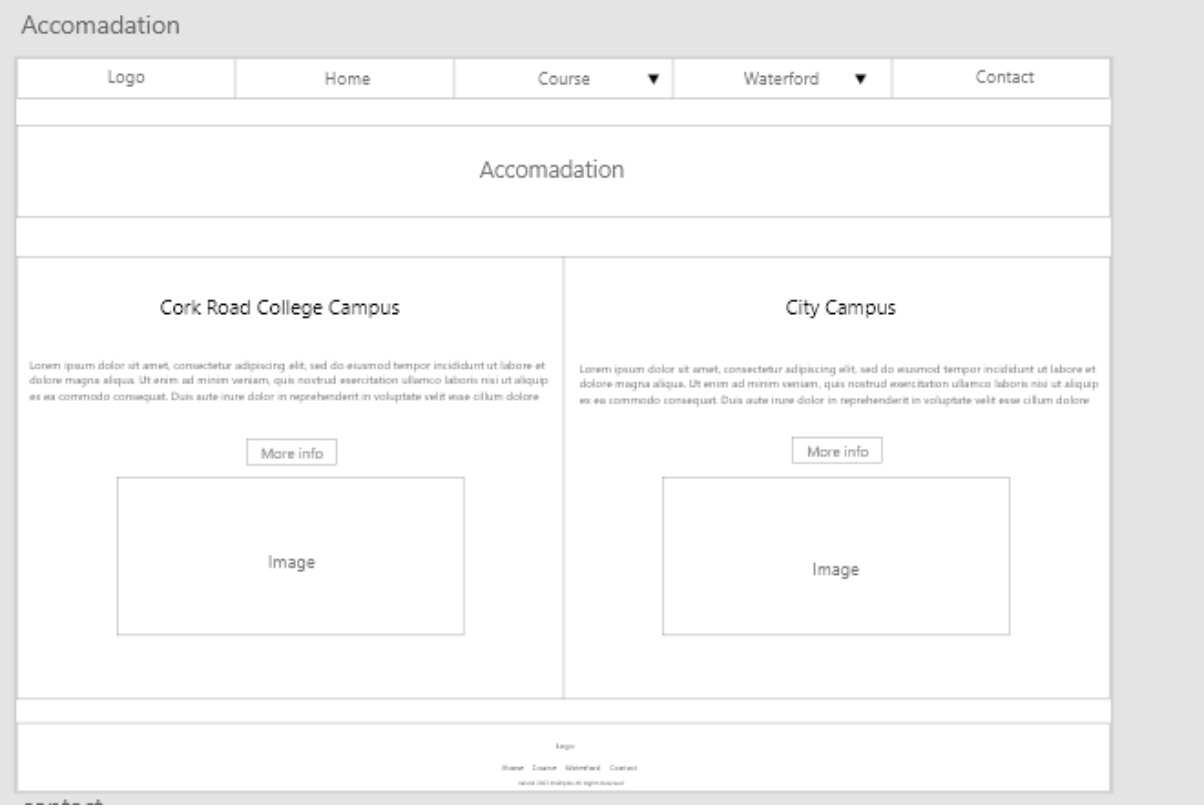


Figure 19 Wireframe Accommodation Page

For the accommodation page, I wanted to include info on the kinds of accommodation available to students, with a short paragraph on each one with the bulk of the info linked to an external page connected to the more info buttons.

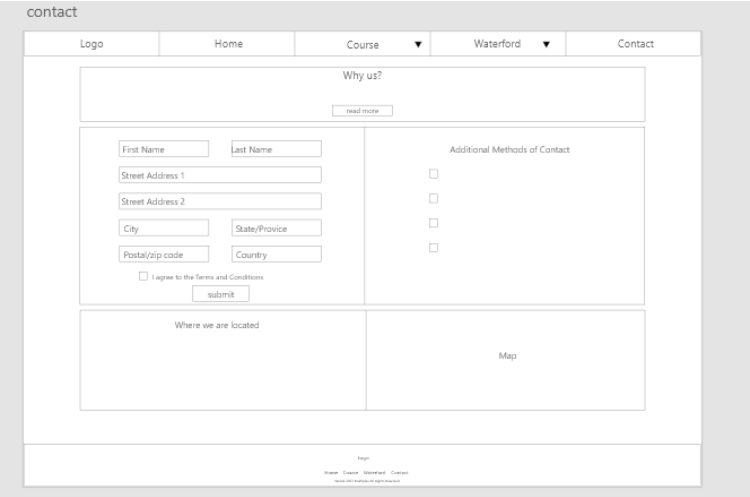


Figure 20 Wireframe Contact Page

For the contact page, I wanted to include a form, social media links, the address of the college and an image of the location for it on google maps.

5. Mockups

Figure 21 Logo Version 1

Figure 22 Logo Version2

I (Mark) reused a logo design for “Digital Graphic Design,” I used version 1 for the navigation bar and version 2 for the footer to add contrast to the prototype.

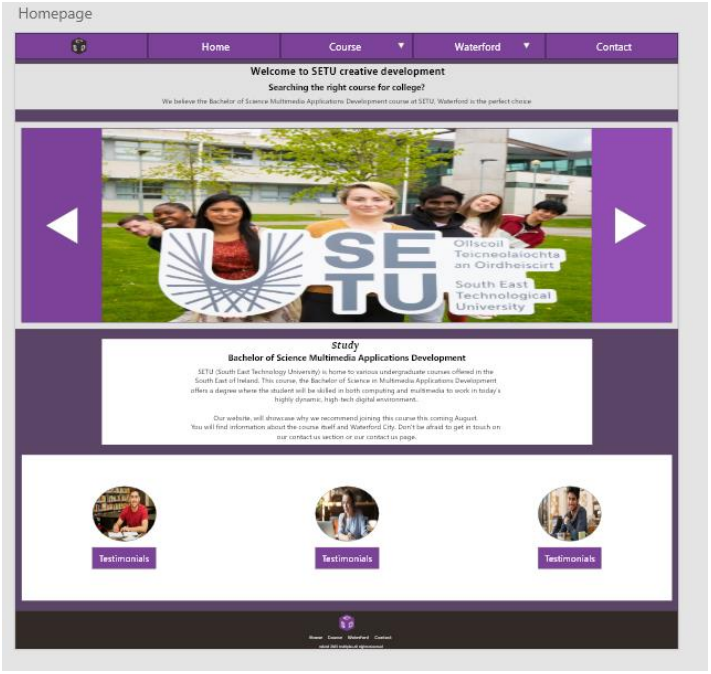


Figure 23 Home Page Mockup

For the prototype, I got the slider to work by grouping the images and placing them side by side to each other then, I grouped them and placed a rectangle shape over what would be the first image in the slider and selected both the

group of images and the rectangle. Then you right-click on the selected items and select the mask object option, which will hide the other images in the slider except for the first image. I then grouped the buttons and slider into a component and made two states to represent the other two images within the slider, then linked the buttons to each state within the slider.

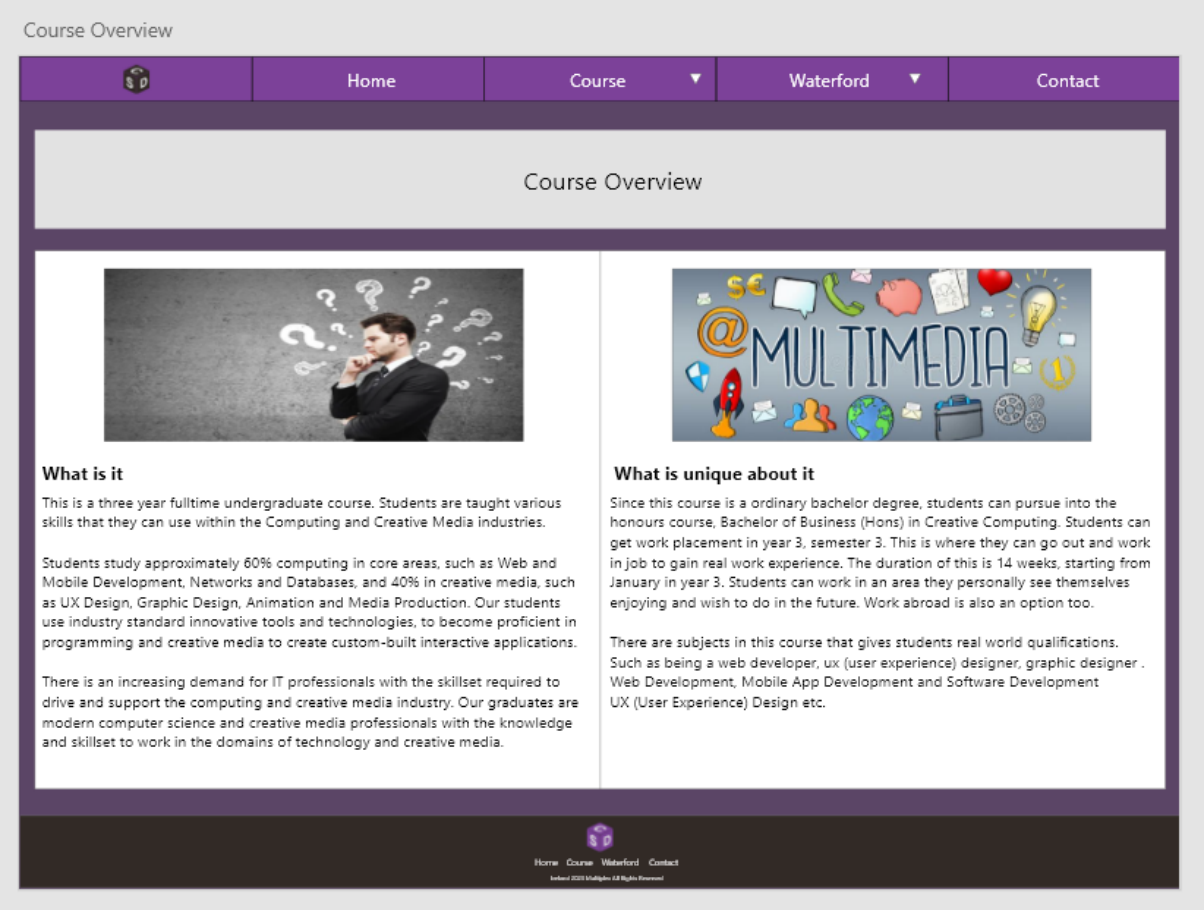


Figure 24 Course Overview Mockup

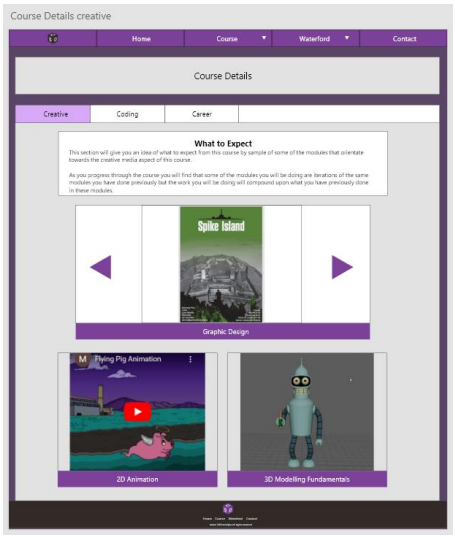


Figure 25 Course Details Mockup

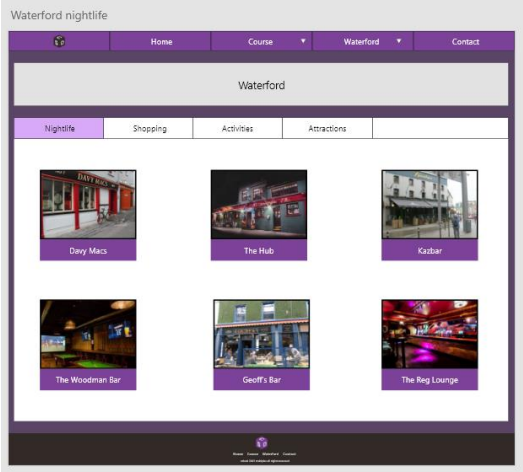


Figure 26 Waterford Page (Nightlife)

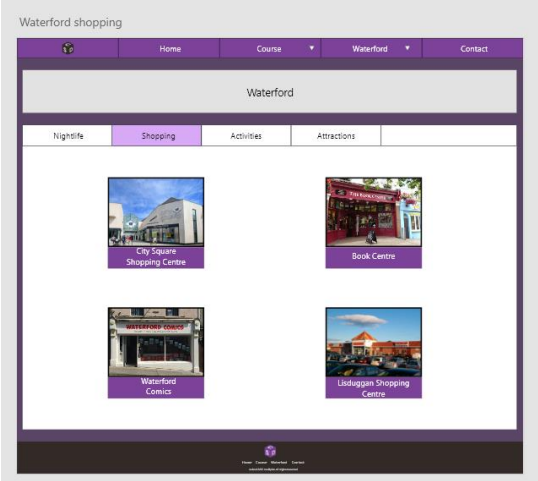


Figure 27 Waterford Page (Shopping Tab)

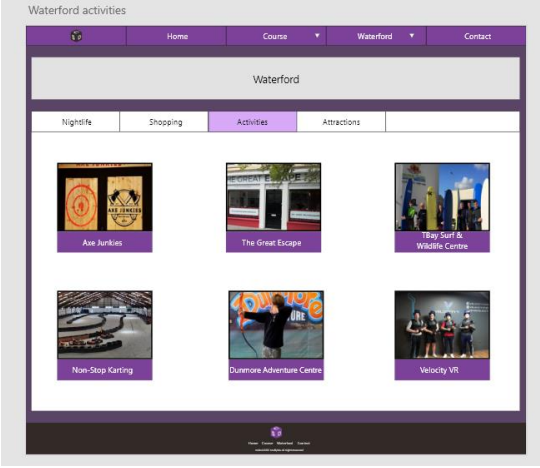


Figure 28 Waterford Page (Activities Tab)

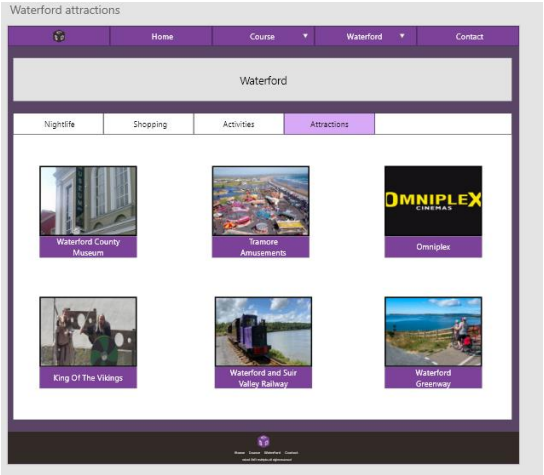


Figure 29 Waterford Page (Attraction Tab)

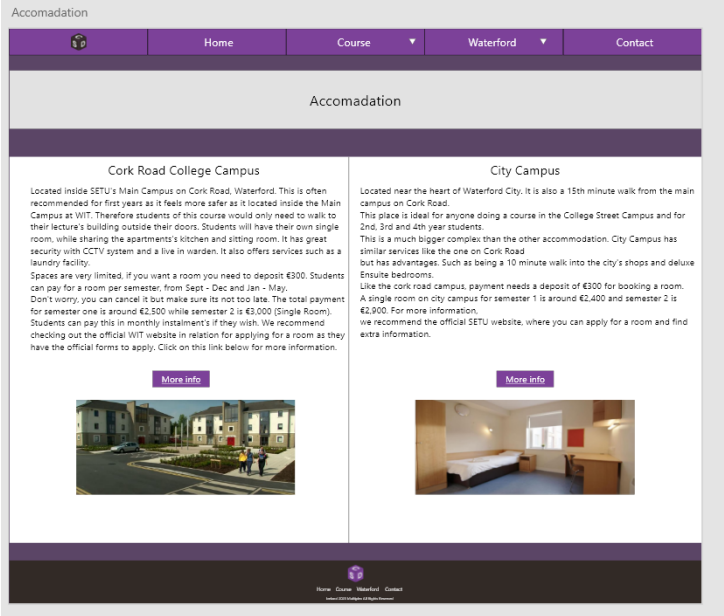


Figure 30 Accommodation Page

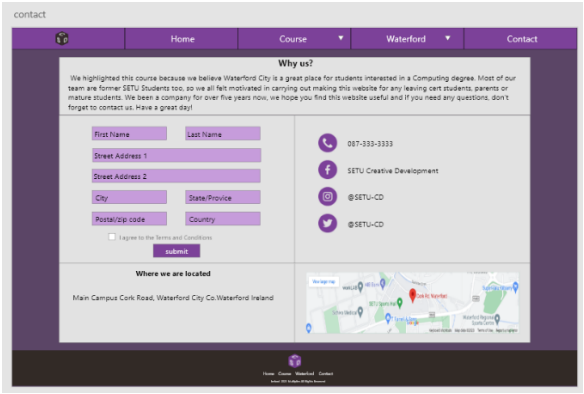


Figure 31 Contact Page

6. System Architecture

We need to deliver a **reliable** and **fully secure** software product for our college website. This is important because the architecture affects our college website's performance, usability, and security. The word architecture in software is the structure or organization of functions in the product.

As web developers and designers, architecture is essential to us. Especially in design because it creates vital components and their relationships to each other (e.g., Login / Log Out or Navigation Bars). Developers need a good understanding of their software issues that affect the architecture, thus, the whole system with it.

Architecture also has a role in the software system on non-functional system properties such as reliability, responsiveness, usability, and security. The critical issue within these properties is the following.

- **Reliability:** Does our college website features behave as expected to us the developers and the users?

- **Responsiveness:** Can our college website returns results in a reasonable time for users?

- **Security:** Does our college website protect itself from any malicious attacks on our data

- **Usability:** Can visitors access our site's features they need and use them quickly without errors?

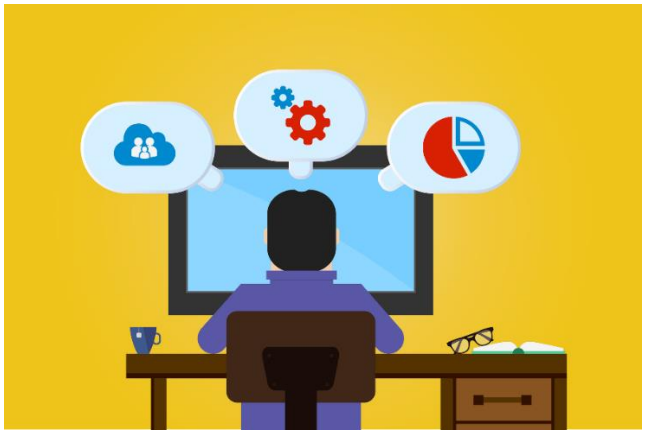


Figure 32 Web Developer (www.pixabay.com)

6.1 Hardware architecture

These are the **physical** components that make up our product. This includes the CPU (Central Processing Unit), memory storage, and Input/Output devices. It is essential to have good hardware architecture so that our software product runs smoothly on any computer system.

Figure 33 Motherboard (www.pixabay.com)

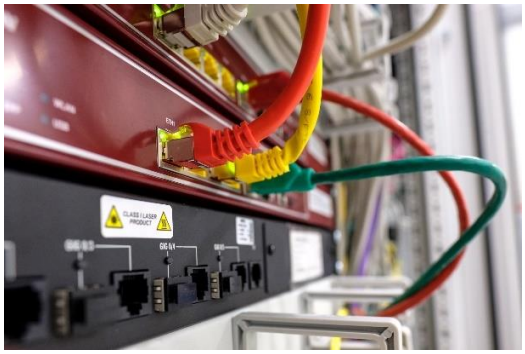


Figure 34 Router (www.pixabay.com)

6.2 Software architecture

The difference between software and hardware architecture is the way we interpret them with our website. The hardware architecture describes the physical components and their relationships with our product. Software architecture is making decisions during the planning and how data is **stored** and retrieved, as well as how these components will **interact** with each other in our product.

Components are essentially a feature or elements of the software. They also can be in a collection of one more services.

7. Security Management

Security is a high priority when developing software. With how fast and advanced computers are becoming. New ways of attacking websites from hackers are being created at the same time. Their motive can be varied, with one of the biggest reasons simply stealing data for ransom.

Cyber security is heavily used by worldwide companies such as Google, Microsoft, and Amazon. As they are constantly trying to find ways of protecting themselves from these malicious attacks. Such as **DDoS Attacks and Brute force attacks**.

Figure 35 Malicious Computer Attacks (www.pixabay.com)

There are several ways of reducing the likelihood of getting hacked:

Traffic Encryption: You must encrypt the network traffic between clients and servers. This is changing the protocol HTTP to HTTPS (Hypertext Transfer Protocol Secure) when using sessions. The encrypted traffic makes it difficult to find session cookies.

Short timeouts: If no activity occurs on a user page for a period, it automatically logs out the user. It reduces the opportunity for hackers to access a legit account as the user is logged out already.

Figure 36 Hacker (www.pixabay.com)

Cyber Security is focuses on these areas:

- Confidentiality – Protect sensitive data, such as password/bank details.
- Availability – Info should be available when requested.
- Accountability – Use of user identification and authentication

Security management approach follows several procedures to reduce the risk of attacks that may occur on our website:

System infrastructure management

The website infrastructure should be properly configured. Along with security updates that patches vulnerabilities with our system.

Attack monitoring

Our system should be check regularly for any unauthorized access. Resistance strategies may be use if attacks are detected on our website.

Backup

These procedures are implemented to ensure we keep undamaged copies of our program and files in the case of an attack. We can restore these later when the attack has been resolved.

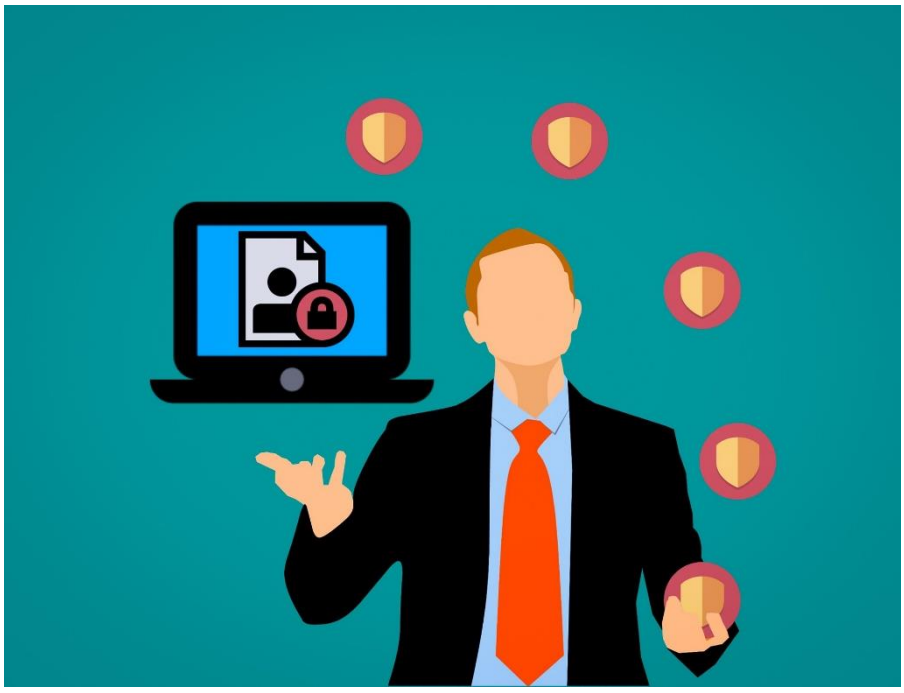


Figure 37 Security Protection (www.pixabay.com)

7.1 Data Protection Law

This law is widely used worldwide as the right to individual privacy is protected by data protection laws. It is mainly used to **limit** personal data collection, dissemination, and use.

As developers, we must ensure that visitors to our site are aware of the data collected. In our research, websites often would have a **pop-up box** when a user visits a site. Websites would use **cookies** for advertising purposes (those pop-ups ads you would regularly see on the internet). The screenshot below asks the user to allow cookies, which is the user data.

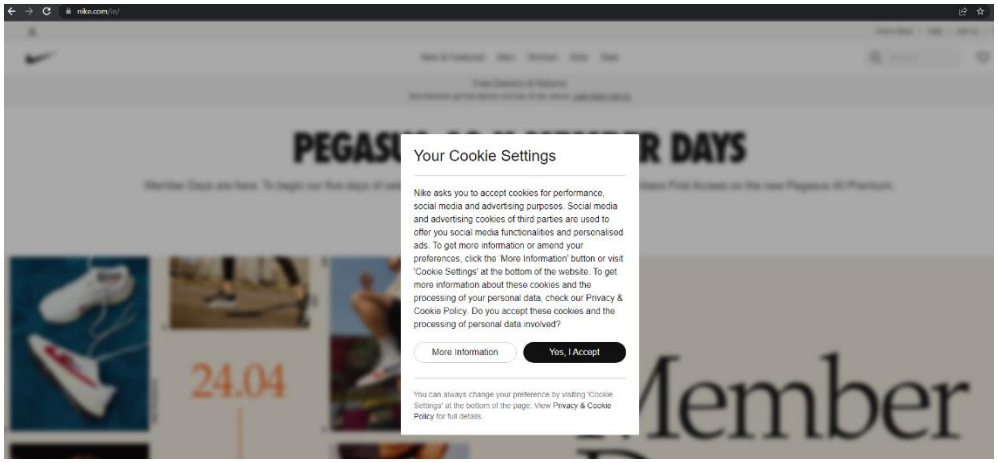


Figure 38 Example of Cookies (www.nike.ie)

Our website should have a similar method to Nike. However, we may aim our pop message at the bottom of the screen, smaller text field, and not blurring the background. As we want people who are not familiar with tech to turn away at the start (**Persona: Shauna Roche**).

Other data protection principles applied to our above scenario are the purpose (telling visitors why data is being collected) and consent (permission of users before we disclose their data to other people).

All these data protection law principles tie into our **Privacy policy** that our website must use. It defines how personal information about users is collected, stored, and managed. The purpose of our data may be different from other college sites. Our policy must define the personal data we collected and how we are going to use that data.

Also, users should have access and be able to change their preferences regarding the information we are storing for them.

8. Testing

System testing is a process in which you execute a program using data that simulates user inputs. During the process, we, as developers, observe the behavior to check if the software is the desired function. If it goes smoothly, then it is safe to say that the user inputs were correct too.

Bugs are quite common in any software. During testing, we may discover them if the behaviour of a program is not correct. The two most common causes are **programming errors and understanding errors**. These can be done by accident by the web developer. In that, they may be unaware of other details in the program. For example, when you extract a zip file and discover that some of the data is in the wrong format.

There are several ways of testing our website:

Functional testing

This is where we are to find as many bugs as possible and then to test it again to prove the website is fit for its intended purpose.

Performance and load testing

This is testing the website that is works quickly and handle loads of traffic on the system by its users. To know how strong the scalability is. It is important because it can be analysed so that we know when the website exceeds the limit of users browsing on there.

Security testing

Test that the website maintains its integrity and can protect user information from theft and damage.

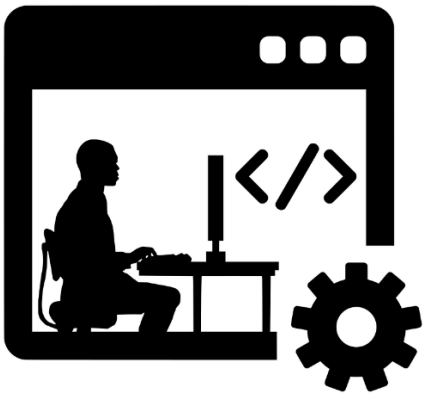


Figure 39 Testing Software (www.pixabay.com)

8.1 Test Case Examples

A feature test is a type of software testing that verifies if a particular feature of the software works as expected. I will refer to the two personas I made in this document for these test case examples. Time White and Shauna Roche. Now I will go into their user inputs and how they resolve the issues stated in their user stories.

These two cases below are examples of the Functional testing**.** As I am testing the overall functionality while looking for bugs along the way.

(**Tim White** Test Case)

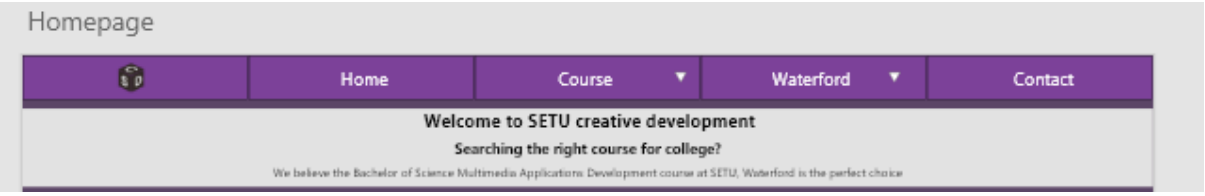
*"As a **leaving cert** student, I **want** to find what Waterford City has to offer. The **reason** being I need to find ways of socialising with any new college friends.*

Since our college website is full of information regarding the "Multimedia Applications Development" course, Tim only wants to find info about the things he can do in Waterford City with friends as Tim is a very social person and doesn't know Waterford City that well.

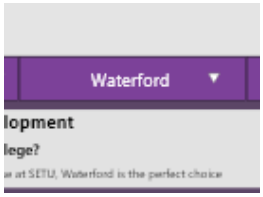
1. Open his default browser.

2. Type our website URL "https://setucreativedevelopment.ie".

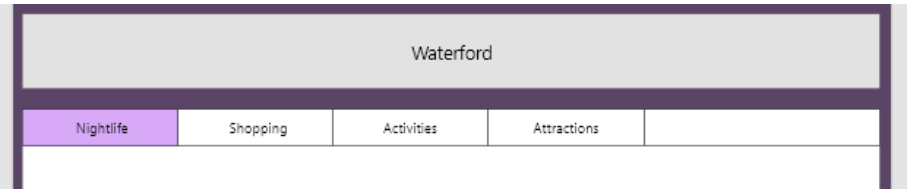
3. Navigate to menu bar at the top of page.



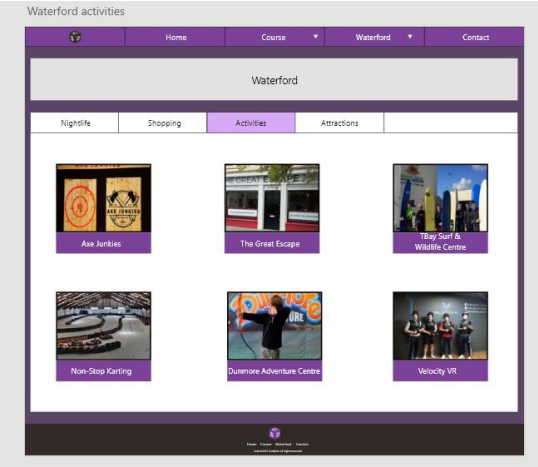
4. Click mouse on "Waterford" page.



5. Navigate through the page Tabular Menu.



6. Select the “Activities Tab”.



7. Clicks on the first link card “Axe Junkies”, link to their official site in a separate tab.

8. Verify the links works. He may return explore another section on the Waterford page such as the “Attractions” tab.

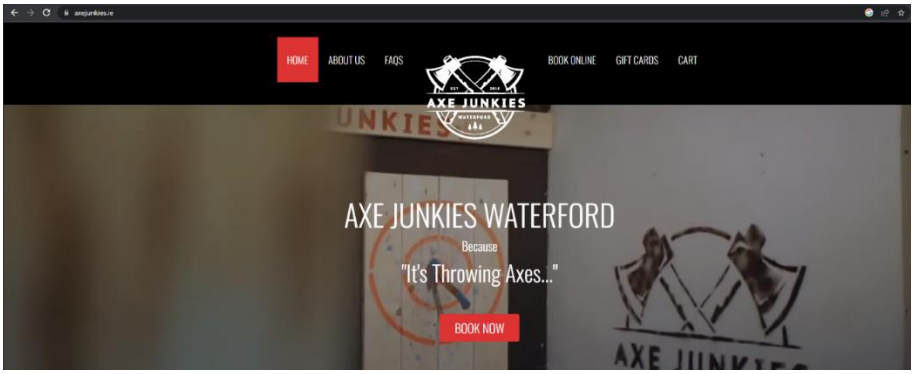
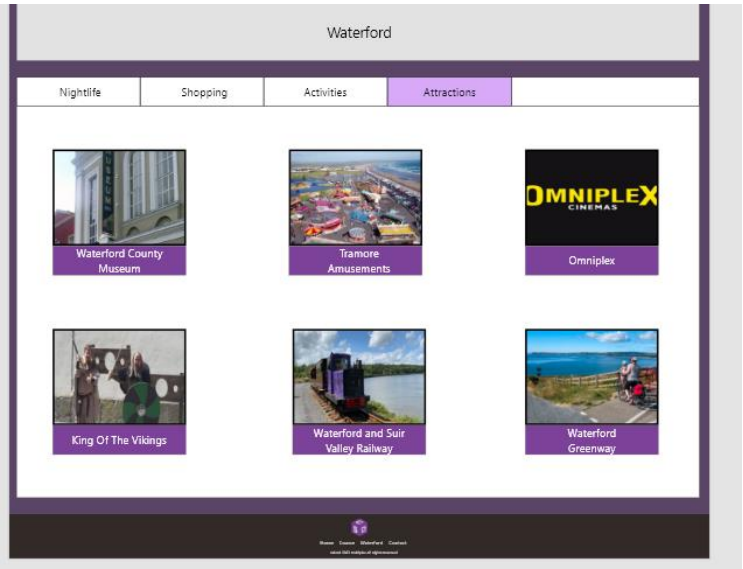


Figure 40 Axe Junkies Website (www.axejunkies.ie)



By following these steps, you can verify that the navigation links work on the menu bar and that the links to the official sites attached to the link cards work. Also, bugs or issues can be addressed before the website is released.

(**Shauna Roche** Test Case)

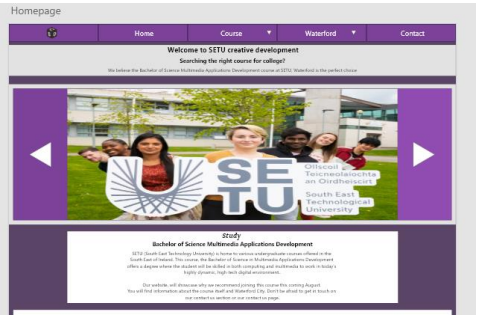
*"As a **parent**, I **want** to find important information about the Multimedia course at SETU. This is **because** my son is looking for an undergraduate computing course. I am **hopeful** the website is easy to read and gets straight to the point because I am not used to technology, unlike my son."*

Since our college website is full of information regarding the "Multimedia Applications Development" course. Shauna wants to find the course information as her priority.

1. Open hers default browser.

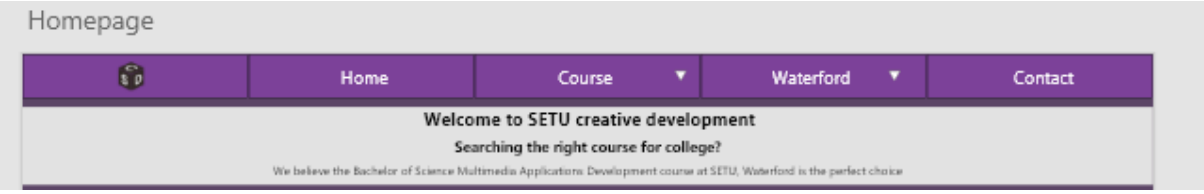
2. Type our website URL "https://setucreativedevelopment.ie".

3. Scrolls down the home page.

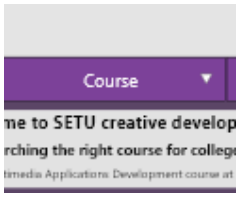


4. Scrolls up back up.

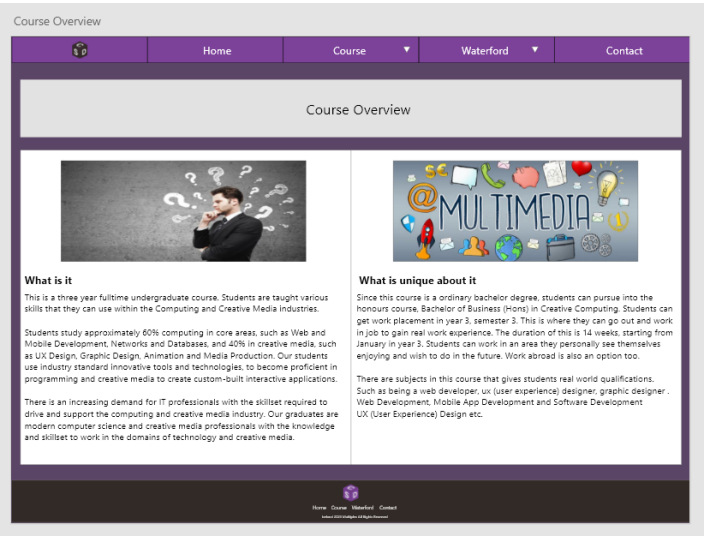
3. Navigate to menu bar at the top of page.



4. Click mouse on “Course” page.



5. Make sure content is loaded on the page.



By following these steps, you can verify that the navigation links work on the menu bar like Tim and that the link to the course detail page works as well. For Shauna, the information she wanted was only one click away on the website, which should satisfy on needs, and she may wish to explore other information on the website.

9. Conclusion

We, as developers, found this project and this module a great experience. We believe that it gave us a good idea of what a software developer goes through in the workforce. However, we are more suited for designing websites as creative students.

We found that there is a lot of research, planning, teamwork, and communication involved in making a software product. Creating our own college website, we believe, went down well as we followed the agile approach and kept up-to-date with our team board on Azure Dev Ops. We also often meet at the college face-to-face to discuss our project and make any needed modifications. We also used the app “Discord” and “WhatsApp” for remote communication.

I (Aaron) was tasked with producing this project document in Microsoft Word while Mark worked on our prototype, including wireframes and mockups. We also made sure to help each other if the workload got too heavy. We are very happy how our website. The colour scheme, easy-to-use navigation, and the number of pages left us satisfied.

Figure 41 Shaking Hands (www.pixabay.com)