Design Document

**Prototype Methodology**

When it comes to prototyping, I will be developing prototypes for certain components of the application, not focusing too much on the GUI of the application. By developing the application component by component, it ensures that I get to refine the application bit by bit. By not focusing on a GUI, it means I would not be too attached to the prototype which is a good thing as I believe that if I focus on GUI first, I may miss certain components which are essential to the application as I may develop towards the GUI instead of what the application should do.

**Platform Components**

**Encryption/Decryption Component**

One component key to my application doing as it should is a component that handles encryption and decryption. This component is key to ensure that data being sent to and from the database is secure and that if it gets intercepted, the data will remain secure. Furthermore, with the component, it can be used as one way to verify the files being sent to and from the database so that if a teacher uploads a file to the system, the student can ensure that the file that they download is the same as the one that was uploaded. Encryption will be achieved using SHA256 as that is an industry standard for generating keys.

**Verification Component**

The point of this component is to check whether data being uploaded to the SQL server is valid before being sent. It would check the validity of simple data such as strings to even more complex data such as files to check the veracity of data being sent. This is important to ensure data integrity with the application and reduce the chances of an attack happening because erroneous data was prevented from being sent.

This component will be handled using an offline API. This is important as it ensures that I don’t have to develop algorithms for verifying file types myself which will in turn save time and most likely be more secure than algorithms that I make.

**Programming Approach**

I will be developing the application using a Rapid Application Development approach or a more agile approach. Developing using this approach will ensure that I stick to my prototyping methodology which includes developing the application bit by bit. This allows me to refine the applications functionality and ensure that it works better. Furthermore, it gives me the opportunity to look at ways to expand the application in aspects that I may not have considered. Also a RAD approach allows me to get feedback more often from testers which in turn will allow me to develop a better application.

**Key aspects of Class Diagram**

With the class diagram, classes are going to be lightweight, with not many functions attached to them. This will improve maintenance of the code and ensures that the code will be more readable. Furthermore, with more lightweight classes, it reduces the time taken to develop key components of the application and thus reduces the cost.

In the class diagram, there are classes which store data to be retrieved from the SQL server such as the CoursePost class which will get relevant information from the database and store it in the objects of that class. The reason for compartmentalising parts of what data gets retrieved by SQL queries is that it ensures that the user only gets the information that they need, thus reducing the likelihood of broken access control and increasing security.