Why do you want to study this course or subject?

I realised I wanted to pursue Engineering after designing a climbing hangboard during the summer of 2024. Studying this process, and researching into the manufacturing requirements to complete such a project was a brilliant experience, and it has fuelled my desire to specialise in this subject.
I find aerospace engineering the most interesting specialisation - I recently toured an Aerodynamics lab during an university open day, which displayed how turbulence affects scaled models at mach speeds. I've since read further into shockwaves and the effect of drag on objects at transonic speeds. Learning about the history of how drag at transonic speeds has been dealt with previously - from dive flaps to swept wings - is very interesting, but I have found that with this kind of reading, it is hard to truly understand the mechanics behind how they work. This is why Engineering swiftly became the obvious subject choice for me - I want to learn to understand the complexities of modern day manufacturing.

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How have your qualifications and studies helped you to prepare for this course or subject?

Something I have found very frustrating with my studies, especially at A-level, is the constant need to learn and rehearse content that seems to have no bearing on real-world applications. For example, in further maths we learnt about volumes of revolution. This was a short topic, and at the time it felt largely pointless. I've since found that if I personally focus on understanding how areas like this are applied in the real world, it often becomes much more intuitive - in this case, I found that volumes of revolution were absolutely essential for many functions in modelling software. Engineering embodies this idea - applying advanced concepts in order to solve any number of problems.

Earlier this year, I designed and built an electric guitar for an EPQ artefact. The volume of research needed to make this project successful was no small undertaking. I had to research tooling, material selection, and methods of manufacturing, whilst dealing with a budget and an imminent deadline. From this I developed in-depth research, time-management, analysis and referencing skills, as well as gaining large amounts of hands-on experience with basic tooling under pressure. In addition I also learnt to use GIMP in order to design to-scale templates for each part of the guitar. This was generally effective, however GIMP is unspecialised software designed primarily for image manipulation, and I found it limiting at points - for example, complex sketches needed whilst carving the guitar neck were quite difficult to draw accurately within the software.

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What else have you done to prepare outside of education, and why are these experiences useful?

Although my EPQ was an in-depth, complex project, I still found the experience limiting - I think it was only a small sample of the true scale industrial processes involved in engineering. This is why I applied for and completed a week of work experience at Hucknall Sheet Metal Engineering, a local manufacturing company. Throughout the week, I moved through the manufacturing process, starting with CAD design and finishing with quality control. Learning how to set up waterjet machinery and

operate laser cutters was a brilliant experience, but for me, gaining a holistic understanding of the engineering process was by far the most valuable part of this placement.

This placement also led me to realise the power behind using CAD software as a design tool in engineering. I have since completed a MOOC on learning the basics of Siemens NX CAD software. I found the skills gained from this very valuable - I learnt how to use basic sketch features to define and shape parts, which I could then manipulate with features such as extrude and revolve. I am planning to build a new guitar neck, which I want to construct to extremely tight tolerances - I will be using Siemens NX to design the entire neck before I start construction, in order to gain a holistic understanding of how the neck will be built. This will allow me to be much more precise with my tooling and material choice.

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