Jonasz Tokar – University of Strathclyde – Rolls-Royce

The line between electrical and mechanical engineering gets more blurred by the day with the number of systems solely dependent on expertise from one field being few and far between. Cars, bikes, and civil structures are now packed with complex electrical circuits and sensors that improve their performance and longevity. As a third-year electromechanical degree student I'm in the unique position to comment on how these disciplines interplay with each other in academia and how they shape one's outlook on real world engineering.

To fully answer this question, we must first consider what the purpose of an engineering degree is and how it prepares a graduate in joining the workforce. It is impossible to teach everything about everything, engineering is no exception. In my view the aim of any BEng or Meng degree is engineering literacy, the ability to look at someone's work and have decent comprehension and appreciation of what engineering was done prior. It shouldn't take a competent engineer vast amounts of time and effort to take over someone's work in a similar field. I believe a high priority for many engineers should be versatility as within this field of work comes a lot of diversity, and they must be able to adapt to the demands of any particular job in a timely manner. Diversifying the first-year curriculum between electrical and mechanical engineering departments would help achieve exactly that.

Broadening the material being taught will come with an obvious penalty: sacrificing depth of knowledge in the student's primary field as some of their original classes will now be replaced with either electrical or mechanical ones. I believe this is an acceptable trade off as exposing a student to a variety of disciplines early on helps them paint a bigger picture of what engineering will look like in a professional environment. When graduates enter the workforce, they'll need to work as part of a team, a team likely composed of a variety of expertise. To communicate effectively they must all share a fundamental understanding of each other's disciplines. A mandatory electromechanical first year would give students at least a peripheral view of what they might encounter in the real world.

There's good reason why some of the most prestigious universities like Oxford and Cambridge offer a general engineering introductory year for all students entering the faculty. These universities know that within industry many of the subjects they teach go hand in hand and teaching them as such is most beneficial for their students. From personal experience studying at Strathclyde university, I know that these mixed curricula can work very well. Electrical and mechanical classes are always picked in a way that complement each other. There's always plenty cross over within the maths of each subject which greatly helps easing into topics. For example, the concept of resonance is explored both in electrical and mechanical engineering and is so closely related that even some mechanical problems can be modelled as electrical circuits! Being constantly exposed to analogous concepts from completely different areas has given me a richer perspective on engineering as a whole.

The ever-increasing integration of electronics into mechanical equipment has become a contentious issue for some. Car mechanics and repairmen have a much more difficult job working with complex circuitry piled into the devices they are fixing. They are acutely aware that during research and development, servicing and maintenance on a lot of equipment is a secondary consideration. I believe the cause of such an oversight might stem from electrical and mechanical teams working in a disjointed manner. To avoid such design compromises, it would be beneficial for all members working on a project to have good ground level

understanding of what the electrical and mechanical leads are doing. This way areas of difficulty would be quickly identified in-process.

To conclude, I believe that there is a strong argument for a joint electro-mechanical first year for many engineering students. Engineering in industry relies on a cohort of diverse professionals that rely on each other. Giving electrical and mechanical engineers perspective on each other's professions can only help in the way they work together.