

General Education Reflection

Joseph Metzen

When I first began taking general education classes, I thought of them to be tasks I needed to complete. However, as I have moved through my Computer Engineering degree, I have discovered that the general education classes I have taken, such as RUS 375 Russia Today, ARCH 3210 History of the American City, and ENGL 314 Technical Communication, have, in fact, provided me with tools to use in my thinking when I think about engineering problems. These courses taught me to consider problems from multiple perspectives, provide clear communication, and think about the context of engineering in terms of people and society as a whole.

In RUS 375 Russia Today, I studied geopolitics, government systems, and how countries deal with technology and information. We discussed how various governments have addressed issues related to technology development and digital infrastructure. The experience opened my eyes to recognizing that engineering decisions are not only technical but also political and social. In addition, one of the most important things I learned is gaining an understanding of global perspectives on technology adoption and development (different countries center on different priorities when it comes to infrastructure development and technology deployment). As a computer engineer, I now consider the systems I design to ensure they can function in various contexts, and reflect on how individuals from diverse backgrounds will actually utilize the products and systems. This has really influenced my thinking about user experience and systems design.

ARCH 3210 History of the American City expanded my knowledge of urban planning, infrastructure development, and the development of cities over time. The course explored how transportation systems, utilities, and communication networks collaborate to shape cities. The course engaged me in thinking about how embedded systems and IoT technology relate to urban planning in a completely new way. Throughout the semester, I learned about urban challenges related to aging infrastructure, energy efficiency, and connecting incompatible legacy systems that were deployed in cities decades ago and are now being challenged as viable. Today, engineers are working to address these issues through smart grids, connected infrastructure, and intelligent transportation systems. Learning about how cities were constructed gives me a clear understanding of why updating cities is complicated. Like eco-technology, simply adding an upgrade on top of the vintage implementation of an operating system does not take into account the interplay and change implications it has on the lives of everyday

people. In my own work and of embedded systems and other versions of the IoT, I now have to think about scalability and whether or not I will be needed to also consider how to possibly integrate someone else's design or alteration to weatherized suspended aerosol resistance, which may have been designed within their association decades ago.

ENGL 314 Technical Communication was arguably the most useful course I took during my engineering education for my engineering work. Before this class, I thought a sound engineer just needed to write good computer code or design good electrical circuits. I learned in this class that if you cannot convey your work in a logical, concise manner, the quality of the work is irrelevant. We learned how to compose technical documentation, effectively present information, and convey complex ideas to non-engineering audiences. For my senior design project, I was responsible for writing project proposals, creating technical documentation of our team's work, and presenting our progress to both technical and non-technical audiences. If it were not for the skills I learned in ENGL 314, I would have been effectively lost in completing those projects. The first conceptual step was considering the audience - what they needed to know, their technical backgrounds, and what formats would best help convey the information. That methodology has been essential in every engineering course I have taken since that class.

These three general education courses are directly related to current issues that engineers face today. One of the main issues engineers face is the development of sustainable technology and addressing climate change. Cities are striving to reduce their carbon footprints by upgrading their infrastructure, and engineers must develop infrastructure systems that conserve energy and are environmentally friendly. I have some knowledge from ARCH 3210 about the challenges that cities face, which helps me understand the difficulties of the problem. The infrastructure engineers are working with could be decades or centuries old. Another issue is the global collaborative aspect of technology engineering projects. As I learned in RUS 375, nations and cultures approach technology projects from different perspectives, and engineers are increasingly working on multinational teams. Understanding cultural and political perspectives for engineering teams enables me to be a more effective team member and design systems that benefit a global audience.

Communication is also a vital challenge in contemporary engineering. Projects are more complex, teams are larger, and stakeholders have diverse backgrounds. The technical writing and skills gained in ENGL 314 are a challenge. Regardless of whether I am writing documentation for a software library, explaining a circuit design to a client, or presenting research findings, I strive to communicate clearly and effectively. Poor communication can lead to project failure, safety hazards, and waste. Effective

communication, which I learned in general education courses, enables engineering groups to collaborate and enhance the quality of their work.

Upon reflection, I'm pleased that I didn't take the easy route and skimmed through my general education requirements. Those subjects helped broaden my perspective, and as a result, made me a better engineer. RUS 375 taught me how to think globally and that technology doesn't exist in a vacuum - rather, it exists in a social and political context. ARCH 3210 taught me how systems grow/decay over time and how much our legacy infrastructure matters. ENGL 314 provided the communication skills I use every single day. All of these courses prepared me to take on real-world engineering problems, which are never technical - and are all about people, places, and communication. As I move into my career, I'll continue to apply what I learned in these classes alongside my technical knowledge.