This short course outlines the fundamental concepts of pulsed power systems and emphases how these fundamentals have influenced the architectures of various pulsed power drivers and accelerators throughout the world. For instance, in the early 1960s, Charlie Martin's Pulsed Power Group at AWE developed technology and understanding of short pulsed electrical systems used in flash radiography and other high power applications. These developments drove further work in the UK and USA that has led to the breadth of Pulsed Power systems we see operating today. This course explores that legacy of Pulsed Power development by first looking in some detail at the machines that have been used at AWE over the years, with focus on the Blumlein-based Single Pulse Forming line machines, which have been the workhorses at AWE, and then onto newer technologies being brought into service now to upgrade capabilities. For Sandia's contribution, we describe the IVA architecture and provide several examples such as RITS, HERMES, Cygnus, and the Scorpius injector. In addition, we will touch on LTD technologies such as Ursa Minor and Mykonos, and finish by discussing high current drivers such as Saturn, the Z Machine, and Next Generation Pulsed Power (NGPP). Future capabilities such as fast Marxs and solid-state pulsed power will also be mentioned. The focus of this short course is pulsed-power architectures, including their components and descriptions of how they work, with additional information provided on applications, design challenges, limitations, and future capabilities, plus a review of accelerator diagnostics and basic grounding and shielding principles. This course is intended for students, scientists, and engineers who have an interest in pulsed-power and may find themselves working with such systems now or in the future.

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