Shortcut into Quantum Hardware Engineering
(Quantum Hardware Education Insights by Onri)

• Start with a 3D modeling & linguistics framework, may involve a custom keywords glossary.
• Know that this specialty involves learning to probe something without necessarily having to physically contact its surface. This is what spectroscopy or "scatterometry" is about.
• Typically, topics covered under quantum hardware engineering are combinations of materials science & engineering, quantum metrology, quantum transport, quantum optics, & quantum electronic design automation.
• Know how electronic filters are configured or set up.
• Know how electronic filters are designed & what they look like.
• Know what components various filters are made of.
• Know the difference between passive & active filters.
• Know the difference between optical, microwave, & radio frequency (RF) isolators, circulators, & mixers.
• Be aware of different room temperature & cryogenic amplifiers.
• Know what room temperature & cryogenic amplifiers are made of.
• Know the different types/hierarchy of amplifier noise (thermal, shot, external, quantum).
• Know how a signal curve or response is manipulated.
• Know how signals are triggered.
• Know what impedance matching is (how many ohms is required).
• Know how a Smith chart works.
• Know the many purposes of a resistor (there's a whole list).
• Know what multiphase power means.
• Know what a resonator & resonator cavity is.
• Know what vector network & spectrum analyzers, arbitrary waveform generators, & signal generators do.
• Know what an oscillator circuit does (voltage fluctuation or AC).
• Know what an inverter circuit does (DC to AC conversion).
• Know what a rectifier circuit does (AC to DC conversion).
• Know what high-pass, low-pass, band-pass, band-stop filter circuits/crossover networks do (signal filtering).
• Know what a comparator circuit does (threshold indicator).
• Know what a few basic logic gates can do (calculator).
• Know what a PID [closed-loop] controller does (electronic-based self-balancing).
• Know what a feed forward [open-loop] controller does (electronic-based self-balancing alternative).
• Bonus: know how to build a simple electronic audio amplifier device (many components similar to quantum computing systems).

Most Useful Coding Topics for Hardware Engineers by Onri:

• Library installation
• Syntax & commenting
• Curve fitting, direct parameterization, & mesh parameterization
• Automation scripting
• Data management & data structures
• Parallel processing & accelerated computing techniques
• Interpolation & extrapolation
• Linear regression
• Signal processing
• Noise plots
• Manual debugging