

# PHYSICAL ACOUSTICS GRADUATE CREDIT CERTIFICATE PROGRAM

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## Learning Outcomes

1. **Critical Thinking:** Graduates will be able to conceptualize, evaluate and formulate physical acoustics problems, such as source-path-receiver for linear and non-linear acoustic waves, reflection, refraction, and diffraction of sound underwater or in the body, and modeling of sound propagation in all fluid media.
2. **Apply/Create:** Graduates will be able to apply advanced knowledge, techniques, skills, pertaining to longitudinal wave propagation in fluids, to create solutions for problems in biomedical ultrasound, underwater acoustics, and physical acoustics.
3. **Professionalism:** Graduates will be able to demonstrate high standards of ethics and apply best practices in their research or professional activities.
4. **Knowledge:** Graduates will be able to demonstrate knowledge of principles of longitudinal wave propagation in fluids, linear and nonlinear waves in biomedical ultrasound, and scattering of sound underwater.
5. **Communication:** Graduates will be able to effectively communicate, using Penn State online learning resources, their solutions to physical acoustics problems.