

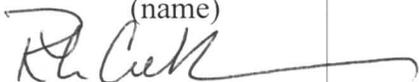
**EDUCATIONAL SKILL REQUIREMENTS (ESRs)
OPERATIONAL SCIENCES – CHEMISTRY
Subspecialty Code: 4201P**

1. **FUNDAMENTAL AREAS:** The officer will complete courses in the following fundamental areas of chemistry, developing sufficient mastery to qualify for teaching general chemistry at the undergraduate level. As is typical of an American Chemical Society accredited program, one semester of graduate level chemistry courses in 4 of the following areas are required: Organic, Physical, Inorganic, Analytical, and Biochemistry.
2. **APPLICATIONS:** The course work above should specifically include coverage at the graduate level of properties of matter, thermochemistry, chemical thermodynamics, chemical equilibria, kinetics, and electrochemistry. Upon completion, the officer should be able to apply this knowledge to real gases as well as electrolytic and non-electrolytic multi-component solutions. Additionally, they should be able to calculate equilibrium quantities, estimate thermodynamic properties, and calculate thermodynamic data from spectroscopic data and other measurements.
3. **COMPUTER SKILLS:** The officer should have conceptual knowledge of how computers are used to make basic quantum mechanically based energy calculations and in solving partial differential equations.
4. **COMMUNICATION AND RESEARCH SKILLS:** Officers will be able to independently conduct literature research sufficient to develop their own line of investigation into a chemical problem. They should be able to identify the appropriate instruments to use and, if not able to conduct the experiments themselves, find the appropriate facilities that can. After conducting the research, they should be able to communicate their findings orally and in writing both internally and externally via the accepted peer review process in place at established journals.

Navy Subspecialty Code Subject Matter Expert:

R. L. Calhoun, CDR, USN, PhD

(name)



(signature)

Associate Chair, USNA Chemistry Department

(title, organization)

23 JUN 2014

(date)