Metals in Biology

BMB 961 (section 3), MMG 803 (section 1), & CMB 800 (section 1) – 2 credits

**Spring 2019**

**Instructors:** Eric Hegg Bob Hausinger

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**Lectures:** Tu and Th 9:10 A.M. 10:00 A.M. 502 Biochemistry

**Office Hours:** By appointment

**Text:** A significant portion of the reading will come from journal articles. All primary and secondary articles will be available online via D2L.

Short readings may also be assigned from a variety of texts including: *Biological Inorganic Chemistry: Structure and Reactivity* (Bertini, Gray, Stiefel, and Valentine), *Principles of Bioinorganic Chemistry* (Lippard and Berg), and *Physical Methods in Bioinorganic Chemistry* (Que, Ed.). These short text sections will be available via D2L.

**Topics:** Electron transfer

O2 activation by heme and nonheme sites

O2-production by the Mn cluster in photosystem II

 Metal regulation/homeostasis

Fe/Cu/Ni/Zn transport and storage

 Biochemistry of Nickel

 Biochemistry of Lanthanides

 Nitrogen cycle

 Hydrolysis reactions

 Metals in medicine

 Metal toxicity

 Metal cofactor biogenesis

 Metals in energy transduction

**Grading:** Two student presentations — (50%)

 Presentation evaluations/class participation — (20%)

 Midterm exam (take-home problem set) — (15%)

 Final exam (take-home problem set) — (15%)

Metals in Biology (BMB 961) is intended for graduate students with backgrounds in biochemistry, molecular/cellular/plant biology, microbiology, and/or chemistry. In this course we will discuss the roles of metals in biological systems, including metalloenzymes, metallocenter biosynthesis, metal transport, metal toxicity, and metalloregulation. Discussions will focus on the catalytic mechanisms as well as the way in which the different protein environments “tune” their active site. Student presentations will be an important emphasis in this class.