**The Ohio State University Freshman Seminar Program – Arts & Sciences 1138. \_\_\_ (Proposal) Autumn 2016**

**Title:** Noise-induced hearing loss,

Credits: 1

Grading: S/U

Meeting time: Tuesdays, 1:50-2:45

**Description:** Noise-induced hearing loss is a public health problem that affects people from all parts of the world, at all ages, and from all walks of life. The course will discuss the phenomenon as a health problem, with focus on the biology of noise-induced injury and the communication deficits that result from the hearing loss. We will explore the cutting-edge research from the last 10 years that has changed how we view noise-induced hearing loss. Finally, we will discuss hearing conservation approaches to prevent hearing loss in at-risk populations.

**Professor:** Eric Bielefeld, Ph.D.

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**Course goals:**

1. To define parameters of hazardous noise acoustics.
2. To explore the normal functioning inner ear and how it is damaged by hazardous noise.
3. To understand how research over the last 10 years has re-defined our understanding of the problem and the steps that need to be taken to prevent it.
4. To develop methods to raise awareness:
   1. of noise has an environmental hazard
   2. that all noise-induced hearing loss is completely preventable
   3. of the long-term negative consequences of noise injury on communication
   4. of the variety of effective protection methods available to protect against noise injury

**Meetings:** For this 1 credit course, you are expected to spend 2 additional hours a week preparing outside of class (reading, preparing for class discussion).

**Weekly topical outline:**

Week 1 Overview of the auditory system

Week 2 Functionality of the cochlea

Week 3 Hearing testing

Week 4 Hazardous noise

Week 5 Cochlear injury from noise

Week 6 Other auditory tissue injuries from noise

Week 7 Sensorineural hearing loss

Week 8 The interaction of noise-induced hearing loss and age-related hearing loss

Week 9 Tinnitus

Week 10 Hearing protection devices

Week 11 Music as a source of noise-induced hearing loss

Week 12 Molecular mechanisms of NIHL

Week 13 Drug protection from NIHL

Week 14 Dangerous Decibels

Week 15 Presentations and Discussion: What will you do to raise awareness of NIHL?

Finals Week Final exam on the key takeaways from the course

**Required Materials (Posted on Carmen):**

1. **Dangerous Decibels materials:** 
   * Interactive hearing loss simulator
   * Package of different aspects of the workshop
2. **Readings including, but not limited to, the following:**

Week 1) Bielefeld (2016). Anatomy and Physiology of the Ear: Normal Function and the Damage Underlying Hearing Loss. From The Noise Manual, 6th Edition.

Week 2) Dallos (1996). Overview: Cochlear Neurobiology. From Springer Handbook of Auditory Research Volume 8: The Cochlea.

Week 3) Bielefeld (2008). Teaching the hearing impaired: a guide to understanding hearing and hearing loss for educators. Long Island Education Review.

Week 4) Arenas and Suter (2014) Comparison of occupational noise legislation in the Americas: An overview and analysis. Noise and Health.

Week 5) Bielefeld (2016). Anatomy and Physiology of the Ear: Normal Function and the Damage Underlying Hearing Loss. From The Noise Manual, 6th Edition.

Week 6) Fernandez et al. (2015) Aging after Noise Exposure: Acceleration of Cochlear Synaptopathy in “Recovered” Ears. Journal of Neuroscience.

Week 8) Bielefeld (2011). Effects of Early Noise Exposure on Subsequent Age-Related Changes in Hearing. From Springer Handbook of Auditory Research Volume 40: Noise-induced hearing loss.

Week 9) Møller (2016) Sensorineural Tinnitus: Its Pathology and Probable Therapies. International Journal of Otolaryngology.

Week 10) Verbeek et al. (2012) Interventions to prevent occupational noise-induced hearing loss. The Cochrane Datadase of Systematic Reviews. Pages 1-25.

Week 11) Portnuff (2016) Reducing the risk of music-induced hearing loss from overuse of portable listening devices: understanding the problems and establishing strategies for improving awareness in adolescents. Adolescent Health, Medicine and Therapeutics

Week 12) Henderson et al. (2006) The role of oxidative stress in noise-induced hearing loss. Ear and Hearing.

Week 13) Le Prell et al. (2007) Mechanisms of noise-induced hearing loss indicate multiple methods of prevention. Hearing Research

Week 14) Griest et al. (2007) Effectiveness of "Dangerous Decibels," a school-based hearing loss prevention program. American Journal of Audiology

**Assignments:**  Class participation 30% Final presentation 35% Final exam 35% **TOTAL 100%**

**Class Participation** consists of attendance at class meetings and actively providing questions and answers during the class meetings.

**Final Presentation** consists of an oral presentation made in groups of 2-3 students describing a novel approach your group would take to raising awareness of NIHL as a problem. The group will choose the population to whom they wish to send their message, the medium through which they will communicate it, and the content of that message.

**Final exam**: consists of written questions on the key topics from the course. “Takeaway” messages from each course topic will be highlighted week-to-week, and the final exam will explore the extent to which the student has retained that information going forward.

**Academic Misconduct**: It is the responsibility of the Committee on Academic Misconduct to investigate or establish procedures for the investigation of all reported cases of student academic misconduct. The term “academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations. Instructors shall report all instances of alleged academic misconduct to the committee (Faculty Rule 3335-5-487). For additional information, see the Code of Student Conduct http://studentlife.osu.edu/csc/.

**Disability Accommodations**. Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; http://www.ods.ohio-state.edu/.