Human Factors and Ergonomics for Occupational Safety and Health
August 12 – 16, 2019

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The U.S. National Institute for Occupational Safety and Health (NIOSH)

Workshop Description:

This workshop develops the student's understanding and competence in theories and applications of human factors and ergonomics for occupational injury control and health protection. Emphasis is placed on hazard identification, research and practice, and management of workplace safety. Topics include anthropometry and biomechanics, human cognition and signal detection, human-system interface and risk assessment, injury investigation methods, and writing human factors research proposals and reports.

Workshop Objectives:

- Introduce students to the concept of integration of the principles of epidemiology, engineering, and ergonomics to the prevention of injury and safety failures.
- Develop students the academic experience necessary for them to conduct research in occupation injury prevention, health protection, and emerging occupational issues.
- Develop students the basic skills necessary to prepare for industrial practices in occupation injury prevention and health protection areas.

Student Outcomes:

- Has excellent knowledge of human factors and ergonomics for safety, practical injury control techniques, and strategic plans for injury prevention and health protection.
- Has the ability to identify and organize literature for workplace injury prevention and health protection research and practices.
- Has the skill to develop sound injury prevention and health protection research concepts.
- Has the ability to establish basic safety guidelines for industrial practices.

Method of Instruction

This course is taught primarily through lectures and group exercise. The course materials or handouts will be available at the lecture or a week before the lecture. Although no prerequisite is set, a basic knowledge of statistics is helpful.

Topical Schedule of Lectures

Date	Time	Topic
8/12	9:00 - 10:00	Human Factors ABC and injury prevention models
8/12	10:00 – 12:00	Anthropometry theories
8/12	14:00 – 17:00	Anthropometry research and applications (+ group practice)
8/13	9:00 - 10:00	Anthropometry (group presentation)
8/13	10:00 - 12:00	Biomechanics
8/13	14:00 – 17:00	Biomechanics applications (+ group practice)
8/14	9:00 - 10:00	Biomechanics (group presentation)
8/14	10:00 – 12:00	Cognitive issues and human-system interface
8/14	14:00 – 17:00	Cognitive issues and signal detection (+ group practice/presentation)
8/15	9:00 - 12:00	Developing injury investigation techniques and practice
8/15	14:00 – 17:00	Developing research concepts (+ injury investigation group practice)
8/16	9:00 – 10:00	Injury investigation case studies (group presentation)
8/16	10:00 – 12:00	Course review (comprehensive problem solving)
8/16	14:00 – 17:00	Exam

Grading:		
	Class Participation and Preparation	20%
	Group Project and Presentation	40%
	Exam	40%

This is a graduate level class. Grading is based on a system of points accumulated on a variety of measures including written tests, class project and presentation, and class participation. At the end of the workshop, cumulative points are transformed into percentages, and applied to this formula:

90 per cent - 100 per cent earns:	A+
85 per cent - 89 per cent earns:	A
80 per cent - 84 per cent earns:	A-
77 per cent - 79 per cent earns:	B+
73 per cent - 76 per cent earns:	B
70 per cent - 72 per cent earns:	B-
60 per cent - 69 per cent earns:	C

The instructor expects to foster a nurturing learning environment that is based upon open communication, mutual respect, and non-discrimination. Any suggestions as to how to further such a positive and open environment in this class will be appreciated and given serious consideration.

Instructor's Profile

Hongwei Hsiao, Ph.D.

Dr. Hongwei Hsiao serves as Chief of the Protective Technology Branch and Coordinator of Center for Occupational Robotics Research at the National Institute for Occupational Safety and Health (NIOSH), USA. He received his degrees from Cornell University and the University of Michigan and has held engineering and management positions in both the manufacturing industry and the U.S. Government. He also has taught engineering and public health in academia and guided students and scientists for research proposal writing for 19 years.

Dr. Hsiao has coordinated numerous large-scale programs and projects in the areas of safety research and human factors engineering, including fall prevention, equipment safety, patient safety, protective technologies for special populations, robotics, autonomous vehicle safety, and digital simulations for job safety, which have had significant public health and occupational safety impacts. An internationally recognized scientist for occupational safety, he is involved in the development of institute-wide strategic goals and international safety standards. He has chaired several international conferences and seminars on digital simulations, fall Prevention, anthropometry research, and robotics.

Dr. Hsiao currently manages eight laboratories for NIOSH, including the Virtual Reality Lab, Human Factors Lab, Anthropometry Research Lab, Robotics research, and Vehicle Safety Lab, among others. An editorial board member for eight scientific journals, Dr. Hsiao also has more than 170 publications and patents in engineering innovation for injury control. He also edited two journal special issues and a book on fall prevention and protection. With more than 25 years of program management and safety research experience, he has been frequently invited as an international speaker on strategic planning and research for industrial safety. He is a recipient of more than twenty prestigious service, science, and innovation awards. Among the most recent honors are the Public Health Service Engineer of the Year from the U.S. Government (2011), Human Factors Prize from the Human Factors and Ergonomics Society (2012), Alice Hamilton Award (2013), Bullard-Sherwood Transfer of Knowledge Award (2014), Federal Health Information Technology Innovation Award from the Digital Health Xchange (2015), and Samuel Heyman Service to America Medals Career Achievement Finalist (2016).

Dr. Hsiao was elected as a Fellow of the *Institute of Ergonomics and Human Factors* (UK) in 2003 and an Honorary Fellow of the *Human Factors and Ergonomics Society* (US) in 2005. In 2003, he was credentialed by the U.S. Government Centers for Disease Control and Prevention (CDC) Executive Resources Board as a Silvio O. Conte Senior Biomedical Research Service Fellow and was named a CDC Distinguished Consultant, an appointment analogous to Senior Executive and Endowed Chair Professor ranks.