

Subject Description Form

Subject Code	BSE5511
Subject Title	Occupational Health and Ergonomics
Credit Value	3
Level	5
Pre-requisite/ Co-requisite/ Exclusion	Nil
Objectives	<ul style="list-style-type: none"> • To recognize, evaluate and control occupational health hazards in workplace. • To acquire the fundamental knowledge on workplace ergonomics and workplace as well as workstation design. • To understand the principles of risk assessment on occupational health and ergonomics at work, and to assess health problems in the workplace and methods of control. • To investigate and identify the causes of ill-health at work and the introduction of systems of work for their prevention and measurement. • To develop implement and evaluate monitoring programs for biological, chemical, physical and radioactive workplace hazards. • To control and to mitigate the impact of occupational hazards.
Intended Learning Outcomes	<p>Upon completion of the subject, students will be able to:</p> <ol style="list-style-type: none"> a. acquire the knowledge on physical, cognitive and organizational ergonomics in the occupational setting; b. develop and analyse the occupational ergonomics issues and develop solutions to control occupational ergonomics hazards; c. have a clear understanding of the principles of risk assessment on occupational health and ergonomics at work, and to assess health problems in the workplace and methods of control; d. identify, recognize, evaluate and control occupational health hazards in workplace, investigate and identify the causes of ill-health at work and the introduction of systems of work for their prevention and measurement; e. develop implement and evaluate monitoring programs for biological, chemical, physical and radioactive workplace hazards, control and to mitigate the impact of occupational hazards.
Subject Synopsis/ Indicative Syllabus	<p>Industrial ventilation: Industrial ventilation systems including theory of design, indoor air quality, automatic controls, instrumentation, relevant codes and standards; Dilution, forced ventilation and hood design, and the testing of ventilation system and evaluation of system performance; Problems of air movement related to ventilation and maintenance in workplace.</p>

	<p>Noise control: Physical aspects and properties of sound with a concentration on evaluation of noise-related hazards and engineering processes of noise abatement measures; Noise measurement methodology, data and interpretation, reliable measurements of noise, according to the requirements of relevant standards, codes of practice or legislation, legal standards for noise exposure, presentation and interpretation of the measured data.</p> <p>Occupational health hazards and industrial hygiene: Anticipation, recognition, evaluation, and control of occupational health hazards from chemical, physical, and biological agents; Analysis and effect of chemical hazards, physical hazards of electromagnetic and ionising radiation, abnormal temperatures and pressure, noise ultrasonic and low-frequency vibration; Engineering solutions, administrative action, and personal protective equipment for hazard control, methodologies for control exposures to those workplace agents which cause illness and/or disease.</p> <p>Ergonomics and human factors: Introduction to ergonomics; Anthropometrics and design principles; Manual handling risk management and ergonomics tools for injury prevention; Ergonomics in workplace design; Office ergonomics and workstation design; Cognitive and organizational ergonomics; Workplace environment.</p> <p>Industrial hygiene measurements and analytical instrumentation: Current methods and techniques used in evaluating the occupational environment and hazards, theory and practice of current methods applicable, to measure ventilation, non-ionizing radiation, airborne contaminants, noise and heat stress, analytical and survey methods of hazard evaluation; Sampling and analysis of environmental contaminants, real-time monitoring, sample collection and proper handling, sampling techniques including detector tubes, particulate sampling, noise measurement and radiation detection; Governmental and industrial hygiene standards and codes.</p> <p>Microcomputers in occupational safety and health: Introduction on using microcomputers in occupational safety and health and computer application in quantitative industrial hygiene, theory and computer modelling with case studies; Computer techniques used for data processing, statistical analysis, interfacing with instrumentation and linking with computers and Internet resources.</p> <p>Seminar in occupational health: Participation by students and guest lecturers in discussions relating to occupational health.</p>																																	
<p>Teaching/Learning Methodology</p>	<ul style="list-style-type: none"> • Lectures/seminars • Student seminars/tutorials 																																	
<p>Assessment Methods in Alignment with Intended Learning Outcomes</p>	<table border="1"> <thead> <tr> <th rowspan="2">Specific assessment methods/tasks</th> <th rowspan="2">% weighting</th> <th colspan="5">Intended subject learning outcomes to be assessed (Please tick as appropriate)</th> </tr> <tr> <th>a.</th> <th>b.</th> <th>c.</th> <th>d.</th> <th>e.</th> </tr> </thead> <tbody> <tr> <td>1. Examination</td> <td>60%</td> <td>✓</td> <td>✓</td> <td></td> <td>✓</td> <td></td> </tr> <tr> <td>2. Continuous assessment</td> <td>40%</td> <td></td> <td>✓</td> <td>✓</td> <td></td> <td>✓</td> </tr> <tr> <td>Total</td> <td>100%</td> <td colspan="5"></td> </tr> </tbody> </table>	Specific assessment methods/tasks	% weighting	Intended subject learning outcomes to be assessed (Please tick as appropriate)					a.	b.	c.	d.	e.	1. Examination	60%	✓	✓		✓		2. Continuous assessment	40%		✓	✓		✓	Total	100%					
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	<p>Explanation of the appropriateness of the assessment methods in assessing the intended learning outcomes:</p> <p>Based on examination mark (60%) and continuous assessment mark (40%). The continuous assessment is made up of course work, seminar and case study.</p> <p>Tutorial Work</p> <p>Tutorial work will mainly focus on problem solving based on examination type questions and practical examples.</p>
<p>Reading List and References</p>	<p>Arezes P. et al (Editor), (2015) Occupational Safety and Hygiene III, CRC Press.</p> <p>Asfahl, C.R. (2010). <i>Industrial Safety and Health Management</i>, 6th Ed., Prentice Hall, NJ, USA.</p> <p>Australia Government, Australia Safety and Compensation Council (2007) <i>National Code of Practice For the Prevention of Musculoskeletal Disorders From Performing Manual Tasks at Work</i>, Australia.</p> <p>Australian Standard (SAA HB59-1994), Handbook Ergonomics - The human factor - A practical approach to work systems design. Baxter, P. J. Adams, P. H. & Harrington, J. M. (2000). <i>Hunter's Diseases of Occupations</i>, 9th Ed., Arnold, London, UK.</p> <p>Bies, D.A. & Hansen, C.H. (2009). <i>Engineering Noise Control: Theory and Practice</i>, 4th Ed., Taylor & Francis, NY, USA.</p> <p>Bisesi, M.S. (2004). <i>Bisesi and Kohn's Industrial Hygiene Evaluation Methods</i>, 2nd Ed., Lewis Publishers, Boca Raton, FL, USA.</p> <p>Bridger, R.S. (2018), <i>Introduction to Human Factors and Ergonomics</i>, 4th Ed., CRC Press, US.</p> <p>Burton, D.J. (2000). <i>Industrial Ventilation, A Self-Directed Learning Workbook</i>, 4th Ed., IVE, Inc., Bountiful, UT, USA.</p> <p>Gardiner, K. & Harrington, J.M. (2005). <i>Occupational Hygiene</i>, 3rd Ed., Blackwell Publishing Ltd., USA.</p> <p>Heinsohn, R.J. (1991). <i>Industrial Ventilation: Engineering Principles</i>, Wiley-Interscience, New York, USA.</p> <p>Human Factors & Ergonomics Society Europe Chapter, <i>Bad Ergonomics</i>, http://www.hfes-europe.org.</p> <p>Karwowski, W. & Marras, W.S. (2003) <i>Occupational Ergonomics: Engineering and Administrative Controls</i>, CRC Press, FL, USA.</p> <p>Labour Department (2005), <i>A Guide to Part VII of the Occupational Safety and Health Regulation (Manual Handling Operations)</i>. Hong Kong.</p> <p>Labour Department (2010), <i>Guidance Notes on Manual Handling Operations</i>. Hong Kong.</p> <p>Osborne, D.J. (1995). <i>Ergonomics at work: Human Factors in Design and Development</i>, John Wiley & Sons, 3rd Ed., New York, USA.</p>

Pheasant S. and Haslegrave, C.M. (2006), *Bodyspace: Anthropometry, Ergonomics and the Design of Work*, 3rd Ed., CRC Press, USA.

Reese, C.D. (2016). *Occupational Health and Safety Management: A Practical Approach*, 3rd Ed., CRC Press, USA.

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Scott, R.M. (1997). *Basic Concepts of Industrial Hygiene*, Lewis Publishers, Boca Raton, FL, USA.

US Department of Labor, *OSH Administration* (2000). *Ergonomics: The Study of Work*. US.