The British Occupational Hygiene Society
Faculty of Occupational Hygiene

British Occupational Hygiene Society
Working for a healthier workplace

MODULE SYLLABUS

M203 - ERGONOMICS ESSENTIALS (including Manual Handling and DSE)

Aim: This module provides a broad based introduction to ergonomic principles and their application in the design of work, equipment and the workplace. Consideration is given to musculo-skeletal disorders, manual handling, ergonomic aspects of the environment as well as to the social and legal aspects. Study of this module is beneficial to persons wishing to qualify for the Certificate of Competence in this subject.

On successful completion of this module the student should be able to:

- Understand and apply ergonomic principles to the creation of safer, healthier and more efficient and effective activities in the workplace
- understand ergonomic risk assessments
- understand the causes of upper limb disorders
- appreciate workplace layout and equipment design
- appreciate environmental aspects of good ergonomic design

Prior Knowledge: Candidates for this course are expected to be aware of the basic principles and scope of the application of ergonomics.

Course Length: It is envisaged that this course will be conducted over 5 days which includes the examination.

This course will require approximately 32 hours' study time, of which at least 24 hours will be taught (teaching and practical). The additional study time will be required in the candidates' own time.

Content:

Topic		Time Allocation
1	**Overview of Ergonomics**	**20%**
2	**Ergonomics Methods and Techniques**	**20%**
3	**Musculo-skeletal Disorders**	**20%**
4	**Workplace, Job and Product Design**	**20%**
5	**Relevant Physical Factors of the Work Environment**	**10%**
6	**Legal and Social Aspects**	**10%**

Note: Reference is made in this syllabus to HSE guidance or other documentation. This may not be the most up-to-date relevant publications from HSE/other sources and is intended as guidance for candidates only.

Recommended Documentation

1. Ergonomics for Beginners (2001), Dul & Weerdmeester (Taylor & Francis)
2. Workplace Ergonomics: A practical guide McKeown and Twiss (2001) (IOSH services)
3. Evaluation of Human Work: Wilson & Corlett (1995) (Taylor & Francis)
4. Ergonomics Work and Health, Pheasant (1991) (Macmillan)
5. The Ergonomics of Workspaces & Machines, Corlett & Clark (1995) (Taylor & Francis)
6. Bodyspace: Anthropometry Ergonomics and Design, Pheasant (1996) (Taylor & Francis)
7. HSG 48: Reducing error and influencing behaviour (1999)
8. Fitting the task to the human – a text book of Occupational Ergonomics, Kroemer & Grandjean (1997) Taylor & Francis

9. Human Error, Reason (1990) Cambridge University Press

Please check latest editions of each reference on appropriate Web site eg. HSE and Taylor and Francis.

1 Overview of Ergonomics (20%)

1.1 General Principles

Aims, objectives and benefits of ergonomics
Definition and scope of ergonomics and systems of work
The role of the ergonomist
Fitting the job to the person and the person to the job
Human characteristics, capabilities and limitations
Human error
Teamwork and ageing
Interfaces between job, person and environment
Human computer interaction

1.2 Biological Ergonomics

Body systems - musculo-skeletal and nervous
Anatomy, static and dynamic anthropometry
Biomechanics
Applying work physiology - body metabolism, work capacity & fatigue
Static and dynamic postures

1.3 Psychology at Work

Perception of risk
Motivation and behaviour
Memory
Signal Detection Theory and vigilance
Work 'Stress' - causes, preventative and protective measures
Work organisation - shift working and overtime

1.4 Developing an Ergonomics strategy at Work

Culture of an organisation - commitment and decision-making
'Macro-ergonomics' and participatory ergonomic teams
Ergonomics at the design stage
Developing ergonomics, professional ergonomists and competence

Educational Objectives

The student should be able recognise relevant problems at work and approach solutions via the application of ergonomics principles.

Recommended Documentation

References (2), (3), (6) and (7)

2 Ergonomics Methods and Techniques (20%)

This section identifies observational experimental methods which can be used for investigation, so that work, equipment and planned systems can be improved for human use.

2.1 Work Design

Task analysis and allocation of functions
User trials
Problem solving - scientific method

2.2 Ergonomics Risk Assessment

Definitions of hazard and risk
Priorities

Risk evaluation quantity and quality of risk
Assessment systems
Overall ergonomics approach
Control measures monitoring and feedback

2.3 Measurements and Information Gathering

Ergonomics standards
Observational techniques
Rating scales, questionnaires and check lists
Use of models and simulation

Educational Objectives

The student should be able to understand how to apply ergonomics at work, and where to obtain information and advice for using ergonomics.

Recommended Documentation

References (2), (3) and (4) and Successful Health and Safety Management, HSE HSG65 (1997).

3 Musculo-Skeletal Disorders (20%)

The disorders resulting from manual handling and repetitive work are covered in this section, which explains the causes, how to assess and prevent them and how to reduce their effect.

3.1 Manual Handling

The nature and causes of manual handling disorders
Risk Assessment
Job design and training
Principles of handling and preventative and protective measures

3.2 Work Related Upper Limb Disorders (WRULD)

The nature and causes of WRULD/ 'Repetitive Strain Injuries'/Cumulative Disorders
Risk assessment
Principles of control, preventive and protective measures

Educational Objectives

The student should be able to appreciate situations where musculo-skeletal disorders may occur and how to reduce them by an ergonomics approach.

Recommended Documentation

Reference (2)
Manual Handling Solutions You Can Handle, (HSE) HSG115 (1994)
The Guide to the Handling of Patients (1998) 4th.edition Revised. Introducing a Safer Handling policy. (RCN & National Back Pain Association)
Upper limb disorders in the workplace HSE HSG60 (2002)

4 Workplace, Job and Product Design (20%)

Key features in the design of workplaces, jobs and their results - products and services - are outlined, so that more effective and healthier work can be achieved. Existing data and routes to further sources of information are emphasised.

4.1 Workplace Layout and Equipment Design

Principles of workstation and system design
Space and workstation design principles
Risks to health:
- musculoskeletal problems
- visual fatigue
- mental stress
- requirements for eye tests

Design considerations for Visual Display Unit (VDU) Stations:
Ergonomic factors.
Work stations
Design of work and practice
Carrying out assessments of risk at VDU workstations.

4.2 Controls, Display and Information
Visual, auditory and other displays
Quantitative and qualitative information
Compatibility and population stereotypes
Warnings, signs and labels
Sources and selection of data
Principles of software ergonomics

Educational Objectives
To have a basic understanding of how ergonomics principles can improve the design of work, workplaces and products.

Recommended Documentation
References (2), (5) and (6)

5 Relevant Physical Factors of the Work Environment (10%)
This section looks at the way the eye, ear and clothed body respond qualitatively to light, sound heat etc., so that human performance can be predicted and improved. Technical and quantitative detail are minimised.

5.1 Lighting
Visual acuity and colour vision
Lighting levels, contrast and glare
Reflections and flicker fusion

5.2 Noise
Noise induced hearing loss
Distraction, annoyance and emergency signals

5.3 Thermal Environment
Body temperature regulation and acclimatisation
Subjective assessments - thermal comfort and discomfort

5.4 Other Considerations
Smell, taste and tactile senses
Vibration - effects and subjective assessment

5.5 Clothing and Protective Equipment
Objective and subjective effects
Risk perception, and wearability
Design, style and fit

Educational Objectives
The student should be able to recognise problems in the physical environment in relation to human responses and appreciate how to reduce these problems.

Recommended Documentation
Reference (2)
Code for Lighting 2004, CIBSE (Chartered Institute of Building Services Engineers)

Lighting at Work (HSE) HSG38 (1998)
Lighting for Occupational Hygienists, N A Smith, H&H Scientific Consultants Ltd Leeds
The Thermal Environment (BOHS Technical Guide No12) Second Edition
Essentials of Health and Safety at Work (HSE) 1999

6 Legal and Social Aspects (10%)

This section considers key aspects of health and safety law covering ergonomics, Case Law decisions (eg. 'RSI' and 'Stress') and training, instruction and supervision requirements.

6.1 Legal Aspects

Relevance of criminal law to ergonomics
Relevance of civil law to ergonomics, expert witness information
European developments including 'balanced participation'

6.2 Selection and Training

Training Needs Analysis
Testing and interview techniques

6.3 Instruction and Supervision

Health information, legal requirements
Supervision and records
Measuring health and illness

Educational Objectives

The student should have knowledge of social aspects, and of the sources and main UK legislation and Case Law implications, regarding ergonomics at work.

Recommended Documentation

Management of Health and Safety at Work Regulations 1999
Personal Protective Equipment at Work Regulations 1992
Provision and Use of Work Equipment Regulations 1998
Workplace (Health, Safety and Welfare) Regulations 1992
Manual Handling Operations Regulations 1992
Health and Safety (Consultation with Employees) Regulations 1996
Health and Safety (Display Screen Equipment) Regulations 1992
The Health and Safety (Miscellaneous Amendment) Regulations 2002