The Chartered Society for Worker Health Protection

M506 Module Syllabus

Ergonomics Essentials (including manual handling and DSE)

Teaching Aims

This course aims to provide candidates with 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 the social and legal aspects. Study of this module is beneficial to persons wishing to qualify for the Certificate of Competence in this subject.

Prior Knowledge and Understanding

There are no prerequisites required for this qualification, however, this course is suitable for technicians and technologists who conduct measurements and testing in workplaces.

Learning Outcomes

On completion of this module, candidates will have a basic understanding of the following:

- **Understand and apply ergonomic principles to the creation of safer, healthier, and more efficient and effective activities in the workplace**
- **Understand ergonomic risk assessments**
- **Develop appropriate control measures for ergonomic risk factors**
- **Describe work-related causes of Musculo-skeletal disorders**
- **Design a workplace according to good ergonomic principles**
- **Assess ergonomic aspects of the working environment and work organisation**

Content

The syllabus is structured into six sections:

		Time Allocation
1	Overview of Ergonomics	20%
2	Ergonomics Methods & 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 and other documentation. This list may not include the most up-to-date relevant publications from HSE and other sources and is intended as guidance for candidates only.

1 Overview of Ergonomics (20%)

This section will provide candidates with an introduction to ergonomics and its scope in relation to work. Outline of the disciplines of anatomy, physiology, and psychology, with respect to ergonomics building blocks such as anthropometry and biomechanics.

On completion, the candidate should be able recognise relevant problems at work and approach solutions via the application of ergonomics principles.

In order to achieve this the candidate must be able to demonstrate both their knowledge and understanding in the following:

1.0.1 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

1.0.2 Biological Ergonomics:

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

1.0.3 Psychology:

- 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

1.0.4 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

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.

On completion, the candidate should be able to understand how to apply ergonomics at work, and where to obtain information and advice for using ergonomics.

In order to achieve this the candidate will be able to demonstrate both their knowledge and understanding in the following:

2.0.1 Work Design:

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

2.0.2 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

2.0.3 Measurements and Information Gathering:

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

3 Musculo-Skeletal Disorder (20%)

This section will identify the disorders resulting from manual handling and repetitive work and explains the causes, how to assess and prevent them and how to reduce their effect. The methods of assessment and techniques used to prevent or reduce these disorders are also covered.

On completion, the candidate should be able to appreciate situations where Musculo-skeletal disorders may occur and how to reduce them with an ergonomics approach.

In order to achieve this the candidate must be able to demonstrate both their knowledge and understanding in the following:

3.0.1 Manual Handling:

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

3.0.2 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

4 Workplace, Job, and Product Design (20%)

This section will cover 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.

On completion, the candidate should have a basic understanding of how ergonomics principles can improve the design of work, workplaces, and products.

In order to achieve this the candidate must be able to demonstrate both their knowledge and understanding in the following:

4.0.1 Workplace Layout and Equipment Design, Principles of workstation and system design, Space and workstation design principles and Risks to health:

- Musculoskeletal problems
- Visual fatigue
- Mental stress
- Requirements for eye tests

4.0.2 Design considerations for Visual Display Unit (VDU) Stations:

- Ergonomic factors
- Workstations
- Design of work and practice
- Conducting assessments of risk at VDU workstations

4.0.3 Controls, Displays 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

5 Relevant Physical Factors of the Work Environment (10%)

This section covers physical factors of the working environment and includes the way the eye, ear and clothed body respond qualitatively to light, sound, heat etc., so that human performance can be predicted and improved.

This part of the syllabus should be regarded as an overview and therefore technical and quantitative detail will be minimised.

On completion, the candidate should be able to recognise problems in the physical environment in relation to human responses and appreciate how to reduce these problems.

In order to achieve this the candidate will be able to demonstrate both their knowledge and understanding in the following:

5.0.1 Lighting:

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

5.0.2 Noise:

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

5.0.3 Thermal Environment:

- Body temperature regulation and acclimatisation
- Subjective assessments - thermal comfort and discomfort

5.0.4 Clothing and Protective Equipment:

- Objective and subjective effects
- Risk perception, and wearability
- Design, style and fit

5.0.5 Other Considerations:

- Smell, taste, and tactile senses
- Vibration - effects and subjective assessment

6 Standards and Social Aspects (10%)

This section considers key aspects of health and safety standards, covering ergonomics, social aspects and training, instruction, and supervision requirements.

On completion, the candidate will have obtained knowledge of social aspects, and of the sources and main UK legislation and Case Law implications, regarding ergonomics at work.

In order to achieve this the candidate will be able to demonstrate both their knowledge and practical ability in the following:

6.0.1 Standards:

- ISO standards
- Sources of other standards

6.0.2 Selection and Training:

- Training Needs Analysis
- Testing and interview techniques

6.0.3 Instruction and Supervision:

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

Suggested References and Further Reading

(1) Ergonomic checkpoints: Practical and easy-to-implement solutions for improving safety, health and working conditions. Second edition
(2) Ergonomic checkpoints in agriculture: Practical and easy-to-implement solutions for improving safety, health and working conditions in agriculture.
(3) Work Design: Occupational Ergonomics 7th Edition
(4) Ergonomics for Beginners
(5) Workplace Ergonomics: A Practical Guide
(6) Introduction to Ergonomics
(7) Evaluation of Human Work
(8) Ergonomics Work and Health
(9) The Ergonomics of Workspaces & Machines
(10) Bodyspace: Anthropometry Ergonomics and Design
(11) HSG 48: Reducing Error and Influencing Behaviour
(12) Fitting the Task to the Human – a textbook of Occupational Ergonomics
(13) Human Error
(14) ISO 11228-1:2003 Ergonomics -- Manual Handling -- Part 1: Lifting and Carrying
(15) ISO 11228 –2:2007 Ergonomics -- Manual Handling -- Part 2: Pushing and Pulling
(16) ISO 11228-3:2007 Ergonomics -- Manual Handling -- Part 3: Handling of Low Loads at High Frequency
(17) ISO/TS 20646-1:2004 Ergonomic Procedures for the Improvement of Local Muscular Workloads -- Part 1: Guidelines for Reducing Local Muscular Workloads
(18) ISO 6385: 2004 Ergonomic Principles in the Design of Work Systems
(19) ISO/TR 16982:2002 Ergonomics of Human-System Interaction -- Usability Methods Supporting Human-Centred Design

Course Length

This course will require at least **45** hours of study time, of which at least **37** hours will be taught (teaching and practical assessments) and **8** hours will be independent (in the candidates' own time).

Examinations and Assessment

Candidates are required to pass all of the following parts (A and B below) to be awarded this qualification.

A Practical Assessment

The practical assessment is conducted by the Tutor during the relevant part of the course for all candidates. This is to ensure that every candidate can demonstrate their individual ability and correct method.

The studies are designed by the course tutor(s) to assess basic skill and knowledge of each candidate.

Further information about the formative practical assessment is published in the following documents: Practical Evaluation Report which is available from www.bohs.org

B Written Examination

This is an open-book examination comprising of **40** (**160** marks) short-answer questions illustrated by photographs and diagrams as appropriate to be answered in **2** hours. Each question is worth **4** marks.

The examination covers all sections of the syllabus and is overseen by an invigilator.

The pass mark for this examination is 50 %

Certification

Candidates who pass all the parts (A, and B) within 12 months will be awarded the: '**M506 - Ergonomics Essentials (including manual handling and DSE)'**