Initial Professional development

Your guide to the electronic open assessment syllabus
General guidance on the structure and methodology of the Electronic Open Assessment is provided elsewhere, and it is not the purpose of this guidance to repeat this in its entirety.

As a general reminder, the Electronic Open Assessment is divided into two parts. Part A consists of multiple choice-type questions, marked automatically by computer software. Once this has been passed successfully, Part B can be attempted, consisting of two open-scenario-based questions.

The following syllabus details the subject matter with which the candidate needs to make him/herself aware. Success in the assessment is very unlikely without adequate research and revision of the following syllabus.

In producing this syllabus, the aim has been to test sufficiently the underpinning knowledge of UK candidates, and the ability to apply this, while at the same time accommodating the needs of non-UK candidates. This is not an easy task, and the following protocol has been adopted to enable this to be achieved.

Questions in Part A of the assessment are based on learning outcomes and principles, rather than on specific legislation, judicial or enforcement methodologies. Questions in Part B have a potentially wider remit. Although there are some references to UK/EU instruments and practice, the candidate does have the option to base his/her answer on his/her own national legislation/practice where there is an equivalent to UK issues, and should indicate if they have opted to do this in their registration for the assessment. This can then be taken into account when marking takes place. Aspects of the syllabus where this is an option, for Part B questions only, are indicated with words such as ‘or national equivalent’.
Element 1 - Promote a positive health and safety culture

Learning outcomes
You'll need to demonstrate that you can:

1.1 Outline the health and safety roles and responsibilities within organisations
1.2 Identify various internal and external influences on health and safety within an organisation
1.3 Explain how organisations should work with employees in consultation processes
1.4 Outline how to assess the health and safety culture and climate of an organisation
1.5 Describe how an organisation’s health and safety culture and climate may be improved
1.6 Explain how to review and promote a health and safety culture and climate

Topics covered by the electronic open assessment
In your assessment, you may be asked questions on the following topics.

1.1 Roles and responsibilities
- How to organise the management of health and safety; the roles of each category of employee in the development of a positive health and safety culture; and the need for control, co-operation, communication and competence (HSG65 management model)
- The differences between organisational goals and individual goals
- The integration of the goals of an organisation with the needs of the individual
- The roles and responsibilities of health and safety practitioners and specialists

1.2 Internal and external influences
- The external influences on an organisation, eg legislation, government, enforcement agencies, tribunals, contracts and contractors, trade unions, insurance companies, public opinion
- The internal influences on an organisation, e.g. finance, production targets, trade unions

1.3 Consultation processes
- The role of consultation within the workplace
- Formal consultation: functions and rights of employee representatives (trade union-appointed or elected); functions of health and safety committees/groups/forums
- Informal consultation with peer groups, safety circles, works and office committees
- The role of health and safety practitioners and specialists in the consultative process
- The behavioural aspects associated with consultation, eg peer group pressures, potential areas of conflict
- The development of positive consultative processes, including the contributions of employee representatives and safety group members

1.4 Health and safety culture and climate
- Meanings of ‘health and safety culture’ and ‘health and safety climate’
- The relevance of cultural factors and associated values to individual differences
- Basic organisational structures and organisational role cultures
- The indicators of culture and the correlation between health and safety culture and climate and health and safety performance; the subjective and objective nature of culture and climate
- The measurement of culture and climate, eg attitude surveys, ‘prompt lists’, findings of incident investigations, effectiveness of communication, evidence of commitment by personnel at all levels in an organisation

1.5 Improving health and safety culture and climate
- The factors that may promote a positive health and safety culture or climate, eg management commitment and leadership, high profile given to health and safety, provision of information, involvement and consultation, training, promotion of ownership, setting and meeting targets
- The factors that may promote a negative health and safety culture or climate, eg structure reorganisations, lack of confidence in organisation’s objectives and methods, uncertainty, management decisions that prejudice mutual trust or lead to ‘mixed signals’ regarding commitment

1.6 Reviewing health and safety culture
- The means of effecting change; planning and communication; advantages and disadvantages of a rapid and of a gradualist (step-by-step) approach; direct and indirect action to promote change, including cultural dividends from risk assessments; training and performance measurements; importance of feedback
- The problems and pitfalls, eg attempts to change culture too rapidly, adopting too broad an approach, absence of trust in communications, resistance to change

Relevant UK statutory provisions
- Health and Safety at Work etc Act 1974, sections 2, 3 and 4
- Management of Health and Safety at Work Regulations 1999
- Construction (Design and Management) Regulations 2015
- Occupiers’ Liability Acts 1957 and 1984
- Safety Representatives and Safety Committees Regulations 1977
- Health and Safety Information for Employees Regulations 1989
- Health and Safety (Consultation with Employees) Regulations 1996
Relevant ILO documents
- ILO Encyclopaedia of occupational health and safety
- Fundamental principles of occupational health and safety
- ILO-OSH 2001
- Convention on occupational health and safety 155
- Occupational safety and health recommendation 164

Relationship to UK NOS standards
This element covers, either wholly or partially, the underpinning knowledge from NOS standards:

HSP1: Develop, implement and review the organisation’s health and safety strategy
HSP2: Promote a positive health and safety culture
HSP14: Behavioural Safety in the Workplace
Element 2 - Develop and implement health and safety management systems

Learning outcomes
You’ll need to demonstrate that you can:

2.1 Explain the reasons for managing health and safety
2.2 Explain the principles of an effective health and safety management system
2.3 Outline how to assess an organisation’s health and safety policy, how to identify areas which need to be revised, and how to help draft, implement and monitor a policy
2.4 Outline any legal obligations that an organisation has towards third parties, and advise on effective arrangements to meet those obligations

Topics covered by the electronic open assessment
In your assessment, you may be asked questions on the following topics.

2.1 Reasons for managing health and safety
- Moral reasons, eg duty of reasonable care, unacceptability of putting health and safety of people at risk, society’s attitude to moral obligations
- Legal reasons, eg the preventive (by enforcement notices), punitive (through criminal sanctions) and compensatory effects of law
- Economic reasons, eg direct and indirect costs associated with accidents, and effects on the continuing health of an organisation

2.2 Principles of an effective health and safety management system
- The management models, eg HSG65, BS 8800, OHSAS 18001, ILO-OSH 2001
- Health and safety management systems (BS 8800, HSG65, OHSAS 18001, ILO-OSH), quality management systems (BS EN ISO 9000 series), total quality management and environmental management systems (BS EN ISO 14000 series), and discuss the arguments for and against their integration
- The effect of the Turnbull Report
- The effective management of health and safety, including the allocation of resources and responsibilities, setting performance standards, and providing information and training to minimise loss

2.3 Health and safety policy
- The role of the health and safety policy in relation to a health and safety management system, and as a vehicle for the effective communication of health and safety information
- The legal or best practice requirements for a written health and safety policy and for recording arrangements
- The general components of a health and safety policy document:
  - statement of intent
  - organisation
  - arrangements

2.4 Third party control
- The meaning of ‘third parties’
- The differences between contractors, visitors, trespassers and members of the public
- The basic duties of organisations and third parties to each other
- An organisation’s responsibilities for controlling hazards associated with on-site contractors
- The internal rules and procedures used in appointing and controlling contractors
- The provision of information relating to hazards and risks to third parties, eg contractors, visitors, the general public

Relevant UK statutory provisions
- Health and Safety at Work etc Act 1974, sections 2 and 3
- Management of Health and Safety at Work Regulations 1999
- Health and Safety Information for Employees Regulations 1989
- Health and Safety (Consultation with Employees) Regulations 1996

Relevant ILO documents
- ILO-OSH 2001
- Fundamental principles of occupational health and safety
- Convention on occupational health and safety 155
- Occupational safety and health recommendation 164

Relationship to UK NOS standards
This element covers, either wholly or partially, the underpinning knowledge from NOS standards:

HSP1: Develop, implement and review the organisation’s health and safety strategy
HSP3: Develop and implement the health and safety policy
HSP4: Develop and implement effective communication systems for health and safety information
HSP13: Influence and keep pace with improvements in health and safety practice
HSP15: Manage contractors to ensure compliance with health and safety
Learning outcomes
You’ll need to demonstrate that you can:

3.1 Describe the factors which are the cause of specific patterns of safe and unsafe behaviour in the work environment

3.2 Explain the differences between individual perceptive processes and their influence on risk assessment and decision-making

3.3 Explain the influence of job factors on human behaviour

3.4 Explain the relationship between the individual and the physical environment, and explain workplace interface factors likely to lead to errors, eg non-user-friendly control panels, incorrect working height for machinery

3.5 Describe the main differences between organisational structures, their systems of control, their impact on the behaviour, motivation and attitudes of individuals towards health and safety; and the effect of social and technological change on human factors and reliability

3.6 Describe the range of techniques available for improving human reliability, including training and motivating

Topics covered by the electronic open assessment
In your assessment, you may be asked questions on the following topics.

3.1 Factors affecting behaviour
- The complexity of human behaviour and the large range of factors affecting this
- The main theories of human motivation provided by:
  - F W Taylor
  - Mayo (Hawthorne experiments)
  - Maslow (hierarchy of needs)
  - Modern theory (complex)
- The HSG48 model in relation to human failure
- The individual’s decision-making processes
- Online and offline processing, knowledge, rule-based and skill-based behaviour (Rasmussen’s model)
- The psychological, sociological and anthropological factors leading to individual differences
- The meanings of ‘personality’, ‘attitude’, ‘aptitude’ and ‘motivation’ in terms of human behaviour
- The effects of experience, intelligence, education and training on behaviour at work
- The contribution of human error to major disasters

3.2 Perceptive processes
- The human sensory receptors and their reaction to stimuli, sensory defects and basic screening techniques
- The process of perception of danger; perceptual set and perceptual distortion
- The errors in perception caused by physical stressors
- The perception and assessment of risk, perception and the limitations of human performance, and filtering and selectivity as factors in perception
- Perception and sensory inputs (Hale and Hale model)
- Individual behaviour in the face of danger (Hale and Glendon model)

3.3 Job factors
- The importance of the level of risk involved
- The effects of patterns of employment, payment systems and shift work
- The application of task/job analysis to a workplace application

3.4 Workplace interface
- The meaning of ‘ergonomics’
- The employee and the workstation as a system
- Elementary physiology and anthropometry
- The degradation of human performance resulting from poorly designed workstations
- Ergonomically-designed control systems and examples of applications, eg production process control panels, crane cab controls, aircraft cockpits, CNC lathes
- The relationship between physical stressors and human reliability
- The effects of fatigue and stress on human reliability

3.5 Organisational structures
- The effect of the human factors within an organisation, with practical examples (inadequacies in policy, information, design, implementation)
- The role of formal and informal groups within an organisation, and the use of sociograms
- Peer group pressures and norms
- Types of organisational communication
- The procedures for resolving conflict and introducing change
- Workplace representation on safety committees/groups/forums
3.6 Improving human reliability
- Techniques for improving human reliability
- Motivation and reinforcement, eg workplace incentive schemes, reward schemes, job satisfaction and appraisal schemes
- The importance of interview, selection and on- and off-the-job training
- The systematic training model and the principles of systematic training
- The stages in systematic training:
  • identify training needs
  • design training
  • carry out training
  • evaluate training

Relevant UK statutory provisions
- Health and Safety at Work etc Act 1974, sections 2 and 3
- Management of Health and Safety at Work Regulations 1999
- Safety Representatives and Safety Committees Regulations 1977
- Health and Safety Information for Employees Regulations 1989
- Health and Safety (Consultation with Employees) Regulations 1996

Relevant ILO documents
- Convention on occupational health and safety 155
- Occupational safety and health recommendation 164
- Fundamental principles of occupational health and safety

Relationship to UK NOS standards
This element covers, either wholly or partially, the underpinning knowledge from NOS standards:

HSP1: Develop, implement and review the organisation’s health and safety strategy
HSP4: Develop and implement effective communication systems for health and safety information
HSP5: Develop and maintain individual and organisational competence in health and safety matters
HSP13: Influence and keep pace with improvements in health and safety practice
HSP14: Behavioural Safety in the Workplace
HSP16: Develop and implement the health and safety induction process
**Syllabus**

**Element 4 - Develop and implement active/proactive monitoring systems for health and safety**

**Learning outcomes**
You’ll need to demonstrate that you can:

4.1 Explain the need for carrying out active (proactive) monitoring and the techniques used
4.2 Outline how to present and communicate monitoring findings in an effective way
4.3 Describe how to sample and measure airborne contaminants in the workplace atmosphere
4.4 Outline the requirements of biological monitoring
4.5 Outline the requirements of health monitoring
4.6 Outline the requirements for monitoring and maintaining control measures for hazardous substances
4.7 Identify items of work equipment which are subject to a periodic/statutory examination, and describe the nature of such examinations
4.8 Identify electrical equipment that requires inspection and testing regimes, and describe the nature of such regimes
4.9 Identify the principal examinations needed for construction and demolition work
4.10 Outline the principles of epidemiological techniques in the health surveillance of the workforce

**Topics covered by the electronic open assessment**
In your assessment, you may be asked questions on the following topics.

4.1 Active monitoring techniques
- The objectives of active/proactive monitoring
- The need for a range of active measures
- The key elements and features of workplace inspections, safety sampling, safety tours and audits
- How computer technology can be used in data storage, analysis and the production of reports
- The distinction between, and applicability of, objective/subjective and qualitative/quantitative active performance measures

4.2 Presenting and communicating findings
- Appropriate textual and graphical reporting techniques

4.3 Measuring airborne contaminants
- Types of sampling
- Strategies for sampling
- Types of device for sampling vapours, eg activated charcoal tubes and pumps
- Advantages and disadvantages of direct reading instruments
- Stain tube (colourmetric) detectors and dust monitoring (eg Tyndall beam), and their use and limitations
- Measurement principles for dusts (eg gravimetric, chemical analysis), fibres (microscopy) and vapours (chemical analysis)
- The importance of using standard methods (eg MDHS series)

4.4 Biological monitoring
- The meaning of ‘biological monitoring’
- The basic methods and the relative advantages and disadvantages

4.5 Health surveillance
- The meaning of ‘health surveillance’
- The basic methods for a range of agents, eg lead, dermatitic substances, radiation

4.6 Monitoring and maintaining control measures
- The visual inspection of engineering controls, eg local exhaust ventilation, enclosures, glove boxes
- The measurements for assessing the performance of local exhaust ventilation, and the methods and equipment for measuring capture velocities, face velocities, transport velocities and static pressures

4.7 Statutory examinations
- The purpose and nature of statutory examinations
- The need for competent persons, notification and record-keeping
- The types of inspection, and the frequencies and statutory basis for examining cranes and accessories, hoists and lifts, simple pressure systems, power presses and local exhaust ventilation

4.8 Electricity
- The inspection and maintenance strategy for electrical systems and equipment
- Portable appliance inspection and testing

4.9 Construction and demolition
- The requirements for statutory inspection of scaffolds
- The requirements for statutory inspection and examination of excavations

4.10 Epidemiology
- The uses and limitations of epidemiological studies
- The different types of study – morbidity and mortality statistics, cross-sectional surveys, case control studies, retrospective and prospective cohort studies – how they are carried out, and the relative merits of each
- The application of epidemiological techniques to the health surveillance of a workforce
Relevant UK statutory provisions
- Control of Asbestos Regulations 2012
- Control of Lead at Work Regulations 2002
- Control of Substances Hazardous to Health Regulations 2002
- Lifting Operations and Lifting Equipment Regulations 1998
- Pressure Systems Safety Regulations 2000
- Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009
- REACH Enforcement Regulations 2008

Relevant ILO documents
- Asbestos convention 162
- Asbestos recommendation 172
- Code of practice – safety in the use of asbestos
- Chemicals convention 170
- Chemicals recommendation 177
- Code of practice – safety in the use of chemicals at work
- Code of practice – safety and health in construction

Relationship to UK NOS standards
This element covers, either wholly or partially, the underpinning knowledge from NOS standards:

HSP4: Develop and implement effective communication systems for health and safety information
HSP7: Develop, implement and review proactive monitoring systems for health and safety information
HSP13: Influence and keep pace with improvements in health and safety practice
Element 5 - Develop and implement reactive monitoring systems for health and safety

Learning outcomes
You’ll need to demonstrate that you can:

5.1 Explain the need for carrying out reactive monitoring
5.2 Describe incident causation theories and analysis techniques
5.3 Describe how to carry out investigations of injuries, cases of occupational ill health, dangerous occurrences, incidents and near-misses; and how to collect the information needed to identify immediate and underlying causes
5.4 Outline how statutory requirements for reporting and recording injuries, ill health and dangerous occurrences are met
5.5 Describe reactive monitoring and measurement techniques

Topics covered by the electronic open assessment
In your assessment, you may be asked questions on the following topics.

5.1 Reactive monitoring techniques
- The objectives of reactive monitoring
- The need for a range of reactive measures
- The limitations of relying on accident and ill health data as performance measures
- The significance of accident and ill health rates as a measure of performance

5.2 Incident causation and analysis
- Domino and multi-causality theories, accident ratio studies and their limitations, immediate and underlying causes
- Methods for calculating injury and ill health rates (fatal accident rate, accident incidence rate, lost-time accident frequency, accident severity rate) from raw data
- The application of statistical and epidemiological analyses in identifying patterns and trends
- How to present and interpret loss event data in graphical and numerical format, using histograms, pie charts, line graphs, Normal and Poisson distributions

5.3 Purposes of, and procedures for, investigating accidents and ill health
- The implied legal requirements and guidance on accident and ill health investigations
- The purpose of investigations, eg to discover underlying causes, prevent recurrence, establish legal liability, gather data and identify trends
- Investigation procedures and techniques, eg injury and ill health report forms, gathering of relevant information, interviewing witnesses, analysis of information, involvement of managers, supervisors, employees’ representatives and others in the investigation process

5.4 Reporting and recording accidents, ill health and dangerous occurrences
- Statutory reporting requirements and procedures, and internal reporting and recording systems

5.5 Reactive monitoring and measurement techniques
- The distinctions between, and applicability of, objective/subjective and qualitative/quantitative reactive performance measures
- The range of reactive measures available to evaluate the health and safety performance of an organisation, and how these can be used to review the effectiveness of the safety management system
- How to compare recorded reactive performance data with those of similar organisations and industry sectors, and with national/international performance data

Relevant UK statutory provisions
- Management of Health and Safety at Work Regulations 1999
- Control of Major Accident Hazards Regulations 1999
- Health and Safety at Work etc Act 1974, section 2
- Regulatory Reform (Fire Safety) Order 2005
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013

Relevant ILO documents
- Occupational safety and health convention 155
- Occupational safety and health recommendation 164
- Fundamental principles of occupational health and safety
- Code of practice – recording and notification of occupational accidents and diseases
- Prevention of major industrial accidents convention 174
- Prevention of major industrial accidents recommendation 181

Relationship to UK NOS standards
This element covers, either wholly or partially, the underpinning knowledge from NOS standards:

HSP4: Develop and implement effective communication systems for health and safety information
HSP8: Develop, implement and review reactive monitoring systems for health and safety
HSP13: Influence and keep pace with improvements in health and safety practice
Element 6 - Develop and implement health and safety emergency response systems and procedures

Learning outcomes
You'll need to demonstrate that you can:
6.1 Describe the development, monitoring and maintenance of an organisation’s emergency and contingency plans and procedures

Topics covered by the electronic open assessment
In your assessment, you may be asked questions on the following topics.

6.1 Emergency planning
- Why emergency preparedness is needed in an organisation
- Consequence minimisation using emergency procedures, eg first aid, extinguishing fires, containing spills
- Why contingency plans must be developed to reduce the impact of an emergency on an organisation, including post-incident
- The purpose of, and essential requirements for, evacuation procedures and drills, alarm evacuations and roll calls

Relevant UK statutory provisions
- Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 2013
- Health and Safety at Work etc Act 1974
- Control of Substances Hazardous to Health Regulations 2002
- Dangerous Substances and Explosive Atmospheres Regulations 2002
- Regulatory Reform (Fire Safety) Order 2005
- Control of Asbestos Regulations 2012
- Personal Protective Equipment at Work Regulations 1992

Relevant ILO documents
- Occupational safety and health convention 155
- Occupational safety and health recommendation 164
- Fundamental principles of occupational health and safety
- Prevention of major industrial accidents convention 174
- Prevention of major industrial accidents recommendation 181
- ILO Encyclopaedia of occupational health and safety

Relationship to UK NOS standards
This element covers, either wholly or partially, the underpinning knowledge from NOS standards:

HSP1: Develop, implement and review the organisation’s health and safety strategy
HSP10: Develop and implement health and safety emergency response systems and procedures
Syllabus

Element 7 - Develop and implement health and safety review and audit systems

Learning outcomes
You’ll need to demonstrate that you can:

7.1 Identify the performance indicators that may be used in a review system
7.2 Outline how to review current management systems
7.3 Outline the nature, scope and frequency of health and safety audits in an organisation
7.4 Outline and communicate audit findings to management in an effective way

Topics covered by the electronic open assessment
In your assessment, you may be asked questions on the following topics.

7.1 Performance indicators
- Examples of performance indicators, eg accident frequency rate, number of inspections carried out, actions completed

7.2 Review of current management systems
- How to assess the effectiveness and appropriateness of health and safety objectives and arrangements, including control measures
- Changes that are needed to improve the efficient and cost-effective working of the health and safety management system
- Measures that can be used to evaluate the health and safety performance of an organisation and review the effectiveness of a safety management system, eg HSG65, OHSAS 18001, ILO-OSH, benchmarking, accident frequency rate
- Comparing recorded performance data with those of similar organisations and industry sectors, and with national/international performance data

7.3 Nature, scope and frequency of audits
- In-house and proprietary audit systems
- How to compare recorded performance data with those of similar organisations and industry sectors, and with national/international performance data

7.4 Presenting and communicating findings
- Competency of auditor(s) and a suitable audit tool for an organisation
- Textual and graphical reporting techniques
- Content and style of recommendations, and a timescale for their implementation

Relevant UK statutory provisions
- Health and Safety at Work etc Act 1974
- Management of Health and Safety at Work Regulations 1999

Relevant ILO documents
- Occupational safety and health convention 155
- Occupational safety and health recommendation 164
- Fundamental principles of occupational health and safety

Relationship to UK NOS standards
This element covers, either wholly or partially, the underpinning knowledge from NOS standards:

HSP1: Develop, implement and review the organisation’s health and safety strategy
HSP9: Develop and implement a health and safety audit
HSP11: Develop and implement health and safety review systems
HSP13: Influence and keep pace with improvements in health and safety practice
Learning outcomes

You’ll need to demonstrate that you can:

8.1 Explain the differences between sources and types of law, with reference to statute and common law, and civil and criminal law

8.2 Explain the difference between absolute duties and qualified duties, and the concept of strict liability

8.3 Describe the structure and functions of courts and related institutions in the UK, or national equivalent

8.4 Describe the procedures for making Acts and regulations

8.5 Outline the issues in UK contract law and employment law that relate to health and safety, e.g. discrimination and unfair dismissal, or national equivalent

8.6 Describe the arrangements for the enforcement of health and safety law and their implications

8.7 Outline the influence and role of the EU on UK health and safety legislation, and describe the arrangements for adopting EC directives and implementing them into UK law, and assess the impact of decisions of the European Court of Justice on UK health and safety law

8.8 Outline the differences between UK Acts, regulations, Approved Codes of Practice and guidance notes, or national equivalent

8.9 Explain the statutory obligations for health and safety imposed on an organisation and individuals by the Health and Safety at Work etc Act and Management of Health and Safety at Work Regulations, or national equivalent

8.10 Outline the defences available to a defendant in a criminal law case

8.11 Explain the duties owed in UK civil law by an employer to employers and others, and describe the standards employers need to achieve in discharging their duties, or national equivalent

8.12 Describe the defences available to a defendant in a civil law case

8.13 Explain the concept of vicarious liability

Topics covered by the open assessment

In your assessment, you may be asked questions on the following topics.

8.1 Sources and types of law
- Statute law and its sources
- Common law, the nature and development of judicial precedent, and relevant case law
- The types and purpose of criminal law, and the sanctions available
- The types and purpose of civil law, and the remedies available
- The burden of proof in civil law and criminal law

Relevant UK case law
- Adsett v K&L Steelfounders & Engineers Ltd [1953] 2 All ER 320 — meaning of ‘practicable’
- Baker v T & E Hopkins & Sons Ltd [1959] 1 WLR 966 — non-application of volenti non fit injuria where aid is given to a co-employee or third party
- Barkway v South Wales Transport Co Ltd [1950] 1 All ER 392, HL — employer’s duty to maintain work equipment
- Bradford v Robinson Rentals Ltd [1967] 1 All ER 267 — employer’s duty to provide necessary equipment
- British Railways Board v Herrington [1971] 1 All ER 897 — duty of common humanity in relation to trespassers
- Cambridge Water Co v Eastern Counties Leather plc [1994] 2 WLR 53 — development of rule in Rylands v Fletcher: liability does not apply retrospectively in absence of foreseeability of harm
- Corn v Weirs Glass (Hanley) Ltd [1960] 2 All ER 300 — successful claim of tort of breach of statutory duty requires loss to be a consequence of the breach
- Davie v New Merton Board Mills Limited [1958] 1 All ER 67 — employer not liable where injury results from latent defect in tools or equipment (led to, and remedied by, Employer’s Liability (Defective Equipment) Act 1969)
- Donoghue v Stevenson [1932] AC 562 — the neighbour principle; reasonable care; duty of manufacturer to end-user
- Edwards v National Coal Board [1949] 1 All ER 743 — meaning of ‘reasonably practicable’
- Ferguson v John Dawson and Partners Ltd [1976] IRLR 376, CA — self-employed workers may be regarded as employees
- General Cleaning Contractors v Christmas [1952] 2 All ER 1110 — employer’s duty to provide a safe system of work
- Hudson v Ridge Manufacturing Co Ltd [1957] 2 All ER 229 — employer’s duty to provide competent fellow employees; issue of horseplay at work
- ICI v Shatwell [1965] AC 656 — volenti non fit injuria and sole fault of claimant as defences in employer’s liability cases
- Knowles v Liverpool County Council [1993] 1 WLR 1428 — Employer’s Liability (Defective Equipment) Act 1969 extends to materials used at work
- Latimer v AEC Ltd [1953] 2 All ER 449, HL — discharge of duty to take reasonable care
- Lister v Romford Ice and Cold Storage Co Ltd [1957] ACSSS — negligence of fellow employees regarding vicarious liability; joint tortfeasors and subrogation
- Machray v Stewart and Lloyds Ltd [1964] — employer’s duty to provide sufficient plant
- Mersey Docks and Harbour Board v Coggins and Griffith (Liverpool) Ltd [1946] 2 All ER 345 — extent to which employer may be held vicariously liable for negligence of contractor
- Paine v Colne Valley Electricity Supply Company [1938] 4 All ER 803 — employer’s duty to provide a safe place of work
- Paris v Stepney Borough Council [1951] 1 All ER 42, HL — higher duty of care owed to vulnerable employees
- Qualcast (Wolverhampton) Ltd v Haynes [1959] AC 743 —
higher duty of care expected of an experienced employee
- Rose v Plenty [1976] 1 AER 97 – vicarious liability of employer for acts of employee
- Rylands v Fletcher [1868] LR 3 HL 330 – tort relative to escape of stored materials
- Smith v Crossley Brothers Ltd [1951] 95 SJ 655, CA – vicarious liability relative to an extreme act of horseplay
- Speed v Swift (Thomas) & Co Ltd [1943] 1 All ER 539 – elements of, and an employer’s duty to provide, a safe system of work
- Summers (John) & Sons v Frost [1955] AC 740 – nature of ‘absolute duty’
- Sutherland v Hatton and others [2002] EWCA Civ 76 – reasonableness in relation to harm from stress at work
- Thompson and others v Smiths Shiprepairers (North Shields) [1984] 1 All ER 881 – employer’s duty to protect employees from known and reasonably foreseeable danger; date of knowledge of risk
- Uddin v Associated Portland Cement Manufacturers Ltd [1965] 2 All ER 213 – contributory negligence
- Walker v Northumberland County Council [1995] 1 All ER 737 – employer’s duty of care in relation to mental ill health caused by excessive workload
- Wilsons and Clyde Coal Co v English [1938] 3 All ER 628 – extent of common law duty of care to employee and non-delegable nature of duty owed

8.2 Absolute and qualified duties, and strict liability
- The concepts of ‘absolute duties’ and ‘qualified duties’
- The concept of ‘strict liability’
- Meanings of ‘absolute’, ‘practicable’ and ‘reasonably practicable’, with reference to relevant decided cases

8.3 Structure and functions of the courts
- The functions, jurisdiction and powers of Magistrates’ courts, High Court, Crown Court, Court of Appeal (and their Scottish or other national equivalents, where appropriate), House of Lords and the European Court of Justice
- The basic procedures for bringing prosecutions for breaches of health and safety legislation and for pursuing civil actions
- The purpose, procedures, presentation and conduct of cases before UK Employment Tribunals, or national equivalent, in respect of health and safety matters
- The rights and responsibilities of accused parties and witnesses
- The appeals system – basic concept and procedures

8.4 The procedures for making Acts and regulations
- The status and procedure for making UK Acts of Parliament, regulations and orders (or national equivalent)
  - Acts of Parliament – the functions of Green and White Papers; the progression of a Bill through Parliament
  - Regulations – procedure under section 15 of the

Health and Safety Work etc Act; permissible subject matter of regulations; the role of the Secretary of State and the HSE in making regulations; the various stages of consultation
- The use of socio-technical, cost–benefit analysis in the economic assessment of proposed legislative and regulatory change

8.5 Other areas of law relevant to health and safety
- The meaning of ‘contract’
- The principles of the law of contract and their application to health and safety issues; the relationship between producer and vendor, vendor and consumer, client and contractor; exclusion clauses and the impact of the UK Unfair Contract Terms Act 1977, or national equivalent
- Employment law in relation to health and safety
- The meaning of ‘contract of employment’
- Contract of employment in relation to health and safety matters; disciplinary procedures; remedies for unfair dismissal; discrimination and situations where it’s lawful to discriminate; protection for ‘whistleblowers’ within the scope of the following relevant UK statutory provisions (or national equivalent):
  - Employment Rights Act 1996
  - Trade Union and Labour Relations (Consolidation) Act 1992
  - Trade Union Reform and Employment Rights Act 1993
  - Equality Act 2010
  - Employment Equality (Age) Regulations 2006
  - Public Interest Disclosure Act 1998

8.6 Enforcing health and safety law
- The authorities empowered to enforce health and safety legislation, and how their responsibilities are divided
- The powers of enforcing authorities and their inspectors
- The offences and maximum penalties
- The options for enforcement action
- The types of prosecution – summary, indictable and hybrid offences
- The types of UK enforcement notice, their purpose, status, conditions for being served, grounds for appeal, appeal procedures and effects of appeal (or national equivalent)
- The implications of sections 36, 37 and 40 of the Health and Safety at Work etc Act, or national equivalent
- The regulatory powers of a fire authority with respect to fire safety
- The application of manslaughter and corporate manslaughter to work-related incidents, with specific reference to Lyme Bay, Herald of Free Enterprise, Southall rail crash, Tebay
8.7 The health and safety legislative framework
- The influence and role of the EU as it affects UK health and safety legislation (or equivalent comparison relating to national legislation)
- The main structure and mode of operation of the EU
- The composition and roles of the main institutions:
  • Council of Ministers
  • European Commission
  • European Parliament
  • European Court of Justice (as well as its jurisdiction and powers)
  • Economic and Social Committee and advisory groups
- The status (including precedence) and procedure for creating:
  • instruments in EU law
  • directives, including co-decision and co-operation procedures and qualified majority voting
  • UK law in response to directives (including the distinction between directives made under Article 95 and Article 137 of the Treaty of Rome – formerly Article 100 and Article 118a respectively – and between health and safety and trade issues)
- The role of the European Court of Justice and the procedure for referring cases; how decisions of the Court are enforced through the courts of member states; and the effect of decisions of the European Court of Justice on UK law

8.8 Acts, regulations, ACoPs and guidance
- The creation, purpose, role, structure, application and status of UK Approved Codes of Practices, guidance from the Health and Safety Executive, and general guidance material, with reference to the Workplace (Health, Safety and Welfare) Regulations 1992, or national equivalent
- The purpose, role, structure, application and status of Acts and regulations, as appropriate
- The range, nature and content of International Labour Organization publications relevant to health and safety

8.9 Health and Safety at Work etc Act 1974 and associated legislation (or equivalent national legislation)
- The application of sections 2 to 9 of the Act – relationship between general and specific duties
- The Management of Health and Safety at Work Regulations 1999 and ACoP – duties placed on employers, employees and others

Relevant decided cases:
- R v Swan Hunter Shipbuilders Ltd and Another [1982] 1 All ER 264 – interpretation of Sec 2(2)(c) of the Act regarding information and instruction to contractors required to undertake their work safely
- R v Associated Octel Co Ltd [1996] 4 All ER 846 – interpretation of Sec 3(1) of the Act

8.10 Defences available in criminal law
Defences available in criminal health and safety and manslaughter cases:
- manslaughter – behaviour not reckless, not gross negligence
- absolute and qualified duty – practicable and reasonably practicable
- fault lay with someone else
- not guilty due to technicality

8.11 Civil liability
The tort of negligence:
- duty of care owed
- breach of the duty of care through negligence
- causal link between the breach and the loss suffered
- concept of res ipsa loquitur
The concept of ‘duty of care’:
- to whom a duty is owed (the ‘neighbour test’)
- the duty of care owed by:
  • designers, manufacturers and suppliers to customers and users
  • occupiers of premises to those using or visiting the premises
  • contractors to clients and vice versa
- extent of duty (remoteness, reasonableness, foreseeability)
The duties owed by employers to employees and others to provide:
- a safe place of work, including safe entrances and exits
- safe systems of work
- safe plant, equipment and materials
- instruction, training and supervision
- competent fellow employees

8.12 Breach of duties, defences and damage
The main defences to claims of negligence:
- denial
- no duty owed
- no breach of duty (with reference to foreseeability, reasonableness)
- breach did not lead to damage
- remoteness of damage
- volenti non fit injuria

8.13 Vicarious liability
- The concept of ‘vicarious liability’
- The circumstances in which an employer is vicariously liable for an employee’s negligence
- The vicarious liability for the actions of contractors
- The liability for employees of another company
Relevant UK statutory provisions
- Health and Safety at Work etc Act 1974
- Management of Health and Safety at Work Regulations 1999
- Unfair Contract Terms Act 1977
- Employment Rights Act 1996
- Trade Union and Labour Relations (Consolidation) Act 1992
- Trade Union Reform and Employment Rights Act 1993
- Equality Act 2010
- Employment Equality (Age) Regulations 2006
- Public Interest Disclosure Act 1998

Relevant ILO documents
- Occupational safety and health convention 155
- Occupational safety and health recommendation 164
- Fundamental principles of occupational health and safety
- ILO Encyclopaedia of occupational health and safety

Relationship to UK NOS standards
This element covers, either wholly or partially, the underpinning knowledge from NOS standards:

HSP1: Develop, implement and review the organisation’s health and safety strategy
HSP12: Contribute to health and safely legal actions
HSP13: Influence and keep pace with improvements in health and safety practice

Candidates who practise outside the UK
If the country you work in doesn’t operate under UK law, and you do not wish to use UK law in answering examination questions, you’ll need to demonstrate that you have an equivalent knowledge and experience to that indicated here of your own country’s legal framework. This option is only available for Part B questions (Part A questions will avoid a basis on, and reference to, specific UK legislation/enforcement).
Syllabus

Element 9 - Identify and evaluate health and safety hazards

**Learning outcomes**

You'll need to demonstrate that you can:

9.1 Explain the principles of hazard identification

9.2 Describe hazardous substances found in the workplace

9.3 Describe the main effects and routes of attack of hazardous substances on the human body

9.4 Describe health hazards in the workplace arising from exposure to biological agents

9.5 Describe ergonomic health hazards

9.6 Describe health hazards in the workplace arising from exposure to noise and vibration

9.7 Describe health hazards in the workplace arising from exposure to harmful radiation and extreme conditions in the thermal environment

9.8 Describe the psychosocial hazards encountered in the workplace

9.9 Describe the hazards associated with the working environment

9.10 Describe the hazards associated with fire and explosion in the workplace

9.11 Describe the hazards associated with chemical processes

9.12 Describe the hazards associated with using work equipment

9.13 Describe the hazards associated with the movement of materials

9.14 Describe the hazards associated with electricity

9.15 Describe the hazards associated with construction and demolition work

**Topics covered by the electronic open assessment**

In your assessment, you may be asked questions on the following topics.

9.1 **Principles of hazard identification**

- The meaning of ‘hazard’
- Identifying hazards using workplace inspections, surveys, safety tours and safety sampling
- Carrying out workplace observations and referring to suppliers’ information, internal records and published information
- The main types of occupational health hazard:
  - substances
  - biological
  - ergonomic
  - noise
  - vibration
  - radiation
  - stress
  - violence
  - drugs and alcohol
- The legal requirements and practical arrangements for providing health and safety information internally (to employees, temporary workers, contractors) and externally (to customers, suppliers, enforcement authorities and members of the public)
- The development of internal health and safety management information systems in the workplace
- Sources of health and safety information:
  - accident and ill health data
  - cost data
  - compliance data
  - results of audits and inspections
  - management performance data

9.2 **Hazardous substances in the workplace**

- Describe the physical forms, ie solids, liquids, dusts, fibres, mists, gases, fumes, vapours
- Risk and safety phrases contained in the UK Approved Supply List, or national equivalent
- The requirements relating to safety data sheets/international chemical safety cards and other sources of information
- Definitions of:
  - toxic and toxicity; examples of toxic effects of commonly occurring toxic substances, eg trichloroethylene, asbestos, carbon monoxide, lead
  - corrosive; effects of inhaling, and skin and eye contact with, corrosive substances; examples of the effects of common substances, eg acids, ammonia, sodium hydroxide
  - irritant; examples of the irritant effects of common substances, e.g. cleaning agents, silicates
  - harmful; examples of the harmful effects of common substances, e.g. bleach, ammonium hydroxide
  - dermatitic and dermatitis; primary (contact) and secondary (allergic or sensitised) forms of dermatitis; circumstances and substances likely to lead to dermatitis; typical workplace examples, e.g. grease, mineral oil, cement
  - sensitisation; effects on the skin and respiratory system; typical workplace examples, eg rubber additives
  - carcinogenic and carcinogen; examples of types of cancer relating to specific substances, eg asbestos, coal tar, chromium mist
  - mutagenic and mutagen, eg plutonium oxide, 2-ethoxyethanol

9.3 **Main routes of attack on the human body**

- The human anatomical systems (respiratory, digestive, circulatory, nervous) and the sense organs (skin, eyes, ears, nose)
- The main routes of entry of harmful substances into the human body (inhalation, ingestion, skin pervasion, substances into the bloodstream (lungs, gut, skin, mucous membrane of eyes)
- Local and systemic effects, with examples
  - The target organs and systems
  - The common signs and symptoms, and the body’s defensive responses

9.4 **Biological agents**

- The types of biological agent, eg fungi, bacteria, viruses
- The modes of transmission of disease, and mechanisms
of attack on the body
- The signs and symptoms of disease, and the body’s defence mechanisms
- Define ‘zoonose’, with examples
- The sources and symptoms of biological diseases, eg anthrax, brucellosis, farmer’s lung, hepatitis, HIV, legionellosis, leptospirosis, E-coli
- Biological sensitisation
- The role of diagnostic laboratories

9.5 Ergonomic health hazards
- Ergonomic hazards with workplace examples
- The possible ill health effects caused by using visual display units, eg upper limb pain and discomfort, eye and eyesight problems, fatigue and stress
- The possible injuries associated with manual handling, eg sprains and strains, fractures, lacerations

9.6 Noise and vibration
Noise:
- The meaning of ‘workplace noise’
- The basic concepts of sound, i.e. wavelength, amplitude, frequency, intensity, pitch, the decibel (dB) and A-weighting (dB(A))
- How to apply the basic concept of sound physics to the evaluation of occupational noise; the significance of logarithmic scales and concept of addition of combined sounds (equal and unequal); noise rating curves
- Acute and chronic physiological effects of exposure to high noise levels
- Noise surveys; their planning and approach; interpretation and evaluation of results
- Exposure standards for noise
Vibration:
- The basic concepts of displacement, velocity, amplitude, frequency and acceleration of oscillating particles
- The significance of amplitude and frequency of vibrations on comfort levels
- The ill health effects and conditions produced by whole body and segmental vibration
- Groups of workers at risk
- The measurement of vibration
- Exposure standards for vibration

9.7 Radiation
- Types of non-ionising radiation throughout the electromagnetic spectrum; particulate and non-particulate types of ionising radiation; the origins and sources
- The role of the International Commission for Radiological Protection and the Health Protection Agency
- The acute and chronic physiological effects of exposure to non-ionising radiations: ultraviolet, optical, infrared, microwaves, radiowaves and lasers
- The measurement of power density; biological effect; exposure standards for non-ionising radiations
- The biological effects of exposure; acute and chronic effects of irradiation; dose response and dose effect – alpha, beta, gamma, X-radiation, neutrons
- The units of radioactivity, radiation dose and dose equivalent
- The use of ionisation chambers (Geiger counter), scintillation detectors, film badges, thermoluminescent dosimeters
- Thermal environment:
  - The main effects of working in high and low temperature and humidity
  - Typical work situations likely to lead to thermal discomfort
  - The human body (thermal environment) parameters, i.e. surrounding temperature, humidity, air velocity, metabolic rate, clothing, duration of exposure
  - Instrumentation, ie wet bulb globe temperature (WBGT), thermometer, hygrometer, anemometer or Kata thermometer

9.8 Psychosocial
Stress:
- The ill health effects associated with stress
- The causes of stress:
  - organisational factors
  - personal relationships, including bullying and harassment
  - physical factors in the workplace
  - working hours
  - the legal obligations and case law relating to stress, eg Sutherland v Hatton and others [2002] EWCA Civ 76
  - how to recognise the problem
Alcohol and drugs:
- The effects of alcohol and prescribed and controlled drugs on health and safety at work
- The methods of testing for drugs and alcohol
Violence:
- Violence at work; what constitutes violence at work; the extent of the problem; the consequences for organisations and individuals
- Groups of worker at risk, eg working with the public in the caring and teaching professions; working with psychiatric clients or alcohol- or drug-impaired people; working alone; home visiting; handling money or valuables; inspection and enforcement duties

9.9 Working environment
- Places of work and safe means of entry and exit
- Lighting levels
- Welfare arrangements
- First aid arrangements
- Safety signage
- Building structure; structural safety of workplace; construction failure modes
- Confined spaces
- Working at height
9.10 Fire and explosion
- Sources of ignition and fuel
- Define ‘flammable’, ‘highly flammable’ and ‘extremely flammable’
- The effects of atomisation
- The effects of particulate size; explosive concentrations; ignition energy; primary and secondary explosion
- The behaviour of building structures and materials in fires; fire properties of common building materials and structural elements; levels of fire resistance
- Confined vapour cloud explosions, unconfined vapour cloud explosions, boiling liquid expanding vapour explosions
- Methods of containing and venting explosions
- Examples of incidents, causes and effects, eg Hickson and Welch, Flixborough, Mexico City, Buncefield

9.11 Chemical processes
- The hazardous effects of temperature, pressure and catalysts in causing chemical reactions
- The heat of reaction in terms of endothermic, exothermic and runaway reactions
- The hazards presented in storing hazardous substances

9.12 Work equipment
- The role and application of European standards relating to machinery (or national equivalents)
- BS EN 12001-1:2003
- Type A, B1, 62 and C standards
- The classification of machinery hazards in BS EN 12001-1:2003, with examples
- Mechanical hazards, eg crushing, shearing, cutting or severing, entanglement, drawing in or trapping, impact, stabbing, puncturing, ejecting, friction or abrasion, high-pressure fluid injection
- Other machinery hazards, eg noise, vibration, electricity, high or low temperature, radiation, hazardous substances
- The hazards associated with machines, eg drills (radial arm, pedestal), circular saws, guillotines, paper shredders, abrasive wheels, lathes, simple robots, mechanical and hydraulic presses, portable power tools
- Programmable electronic systems (PESs):
  - The types of computer-controlled equipment, e.g. robots, CNC machines
  - The hazards associated with using PESs
  - The reasons for aberrant behaviour, eg electrical interference, programming faults, stored energy
- Pressure systems:
  - Define ‘components’ and ‘relevant fluids’
  - The hazards associated with using pressure systems
  - The typical causes of failure

9.13 Safety in the movement of materials
- Stability of vehicles
  - The factors affecting lateral and longitudinal instability, and control loss, of vehicles
- Lift trucks
  - Types, eg counterbalance, reach, rough terrain, telescopic materials handlers, side-loading, pedestrian-controlled
  - The hazards associated with lift trucks
- Cranes and lifting accessories
  - Types, eg mobile, tower, overhead
  - The hazards associated with cranes and lifting operations
  - The hazards associated with hoists (gin wheel, construction site platform hoist) and lifts (passenger and goods, scissor, vehicle inspection, mobile elevating work platform)
- Conveyors
  - Types, eg belt, roller, plate, screw, monorail
  - The main hazards associated with conveyors
- Automated warehousing systems
  - The hazards associated with automated warehousing systems

9.14 Electricity
- Define ‘voltage’, ‘current’, ‘resistance’, ‘impedance’ and ‘Ohm’s law’
- Basic electrical circuitry
- Earthing principles
- The significance of direct and alternating currents
- The hazards associated with electricity
- Electric shock:
  - The effects on the body
  - The factors that influence the severity of effects on the body
  - Electrical burns
- Direct and indirect contact:
  - The common causes of fire from electrical sources
  - Electric arcs
- The hazards associated with portable electrical equipment
- The hazards of molten metal splash and radiation
- The conditions and practices likely to lead to accidents, including unsuitable equipment, inadequate maintenance, use of defective apparatus
- The circumstances that give rise to the generation of static electricity
- The hazards from static electricity
9.15 Construction
- The types and causes of accidents and ill health in construction and demolition work
- Hazards associated with working at heights:
  - falling materials
  - mobile elevating work platforms
- Excavation work and excavations
  - damage to buried services
- The demolition of buildings
  - using mobile equipment on construction sites
  - the main techniques used in the demolition of buildings

Relevant UK statutory provisions
- Management of Health and Safety at Work Regulations 1999
- Control of Substances Hazardous to Health Regulations 2002
- REACH Enforcement Regulations 2008
- Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulations 2015
- Control of Noise at Work Regulations 2005
- Control of Vibration at Work Regulations 2005
- Ionising Radiations Regulations 1999
- Workplace (Health, Safety and Welfare) Regulations 1992
- Working Time Regulations 1998
- Health and Safety (Display Screen Equipment) Regulations 1992
- Health and Safety (First Aid) Regulations 1981
- Health and Safety (Safety Signs and Signals) Regulations 1996
- Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009
- Control of Major Accident Hazards Regulations 1999
- Simple Pressure Vessels (Safety) Regulations 1991
- Personal Protective Equipment at Work Regulations 1992
- Lifting Operations and Lifting Equipment Regulations 1998
- Supply of Machinery (Safety) Regulations 2008
- Provision and Use of Work Equipment Regulations 1998
- Construction (Design and Management) Regulations 2015
- Work at Height Regulations 2005

Relevant ILO documents
- Occupational safety and health convention 155
- Occupational safety and health recommendation 164
- Fundamental principles of occupational health and safety
- ILO Encyclopaedia of occupational health and safety
- Chemicals convention 170
- Chemicals recommendation 177
- Code of practice – safety in the use of chemicals at work
- Code of practice – safety and health in construction
- OSH Series 70
- Radiation protection convention 115
- Radiation protection recommendation 114
- OSH Series 73
- Radiation protection of workers
- Code of practice for radiation protection of workers
- Code of practice – protection of workers against noise and vibration in the working environment
- Code of practice – safety and health in construction
- Prevention of major industrial accidents convention 174
- Prevention of major industrial accidents recommendation 181
- OSH Series 63
- Welfare facilities recommendation 102

Relationship to UK NOS standards
This element covers, either wholly or partially, the underpinning knowledge from NOS standards:

HSP6: Control health and safety risks
HSP13: Influence and keep pace with improvements in health and safety practice
HSP14: Behavioural Safety in the Workplace
Learning outcomes

You'll need to demonstrate that you can:

10.1 Explain and use qualitative, semi-quantitative and quantitative risk assessment methods to decide priorities and set objectives for risk control
10.2 Explain the factors to be considered when assessing the risks to health
10.3 Explain the benefits, role, function and composition of an occupational health service provider
10.4 Explain the relevance of toxicological data in identifying work-related ill health

Topics covered by the electronic open assessment

In your assessment, you may be asked questions on the following topics.

10.1 Assessing risk
- Meanings of ‘risk’, ‘qualitative’, ‘semi-quantitative’ and ‘quantitative’
- The types and principles of risk assessment (qualitative, semi-quantitative and quantitative)
- Relativistic and probabilistic methods of rating
- Categorisation and prioritisation of risk
- The effects of exposure to hazards; accident and exposure outcomes; persons and numbers exposed; duration and frequency of exposure
- The use of damage, injury and ill health data to evaluate risk
- The use of total accident and disease data; accident and disease ratios (incidence, frequency, severity)
- External information sources, e.g., Health and Safety Executive, Department for Work and Pensions, other Safety and Health, International Labour Organization, World Health Organization, European Agency for Safety and Health at Work, trade associations
- Internal information sources; the collection, provision, analysis and use of damage, injury and ill health data, near-miss information and maintenance records
- The uses and limitations of external and internal information sources
- The acceptability or tolerability of risk
- The principles and techniques of failure tracing methods, including HAZOPs, FMEA, FTA, ETA; simple quantification of FTAs and ETAs

10.2 Assessing risks to health
- Chemical and biological agents, and other hazardous substances
  - The factors that affect risk to the individual from chemical and biological agents
  - Intentional work and opportunistic infection
  - The meaning of ‘workplace exposure limits’ (WELs)
  - The use of WELs to define ‘adequate control’ under the COSHH Regulations 2002 and guidance note EH40
- The criteria by which WELs are established; the work of the Advisory Committee on Toxic Substances (ACTS) and the Working Group on the Assessment of Toxic Chemicals (WATCH), or national/international equivalents
- The significance in occupational health and hygiene practice of short-term and long-term exposure limits (STEL, [TEL) and time-weighted average (TWA) values
- Ergonomics
  - The assessment of risk from using visual display units (equipment, environment, interface between computer and user)
  - The analysis of workstation, machinery and process operators
  - The assessment of risk from manual handling operations (task, individual capability, load, environment)
- Physical agents
  - Assessments of noise, vibration, ionising radiation, non-ionising radiation and extreme thermal environments
  - The role and principles of audiometry
  - The measurement of noise; types of instrument; methodology; calibration; calculation of \( L_{eq} \) and \( L_{eqP,d} \); use of frequency analysis; background noise
- Psychosocial
  - Assessment of psychosocial hazards, including stress, drugs and alcohol, and violence
- Lighting
  - Assessment of suitable and sufficient lighting
  - The impact of lighting levels on safety (incorrect perception, failure to perceive, stroboscopic effects, colour assessment, effect on attitudes)
  - The instrumentation, units and measurement of light for assessing lighting levels and standards in different workplaces
- Fire and explosion
  - The assessment of risk of fire and/or explosion in the workplace
- Work equipment
  - The requirements for machinery risk assessment e.g. BS EN 1050
  - The risk assessment of work equipment; the duties of manufacturers and suppliers in respect of machinery, pressuresystems and electricity
  - Machinery risk assessment; essential health and safety requirements; technical file; declaration of conformity or incorporation; type approval; CE marking
  - The main modes of failure and their causes
  - The risk assessment of pressure systems
  - Typical causes of failure and outcomes
- Movement of people and materials
  - Assessment of the risks associated with the movement of people and materials, including lift trucks, cranes,
hoists, lifts, conveyor systems, automated warehouses
- Electricity:
  - Assessment of the risks associated with electricity in the workplace, including PESs
- Construction:
  - Assessment of the risks associated with construction and demolition work
  - Methods of assessing the risks from the structural failure of buildings used as workplaces

10.3 Occupational health service provider
The role and function of
- the occupational hygienist
- the occupational health physician
- the occupational health nurse
- the UK Employment Medical Advisory Service (EMAS)
The role, function and composition of an occupational health service:
- health promotion
- pre-employment medical screening
- medical/health surveillance
- assessment of fitness for work and counseling

10.4 Toxicology
- The requirements for testing of new substances
- The types of toxicity tests performed, including the use of animal testing, Ames assays for testing mutagenicity and long-term toxicity tests, and the limitations associated with the various tests
- The significance of LD50, LD90, LC50, LC90
- The significance of chemical analogy as a method of predicting chemical hazards

Relevant UK statutory provisions
- Management of Health and Safety at Work Regulations 1999
- Control of Substances Hazardous to Health Regulations 2002
- REACH Enforcement Regulations 2008
- Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulations 2015
- Control of Noise at Work Regulations 2005
- Control of Vibration at Work Regulations 2005
- Ionising Radiations Regulations 1999
- Workplace (Health, Safety and Welfare) Regulations 1992
- Working Time Regulations 1998
- Health and Safety (Display Screen Equipment) Regulations 1992
- Health and Safety (First Aid) Regulations 1981
- Health and Safety (Safety Signs and Signals) Regulations 1996
- Dangerous Substances and Explosive Atmosphere Regulations 2002
- Electricity at Work Regulations 1989
- Regulatory Reform (Fire Safety) Order 2005
- Dangerous Substances (Notification and Marking of Sites) Regulations 1990
- Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009
- Control of Major Accident Hazards Regulations 1999
- Simple Pressure Vessels (Safety) Regulations 1991
- Personal Protective Equipment at Work Regulations 1992
- Lifting Operations and Lifting Equipment Regulations 1998
- Pressure Equipment Regulations 1999
- Pressure Systems Safety Regulations 2000
- Transportable Pressure Vessels Regulations 2001
- Supply of Machinery (Safety) Regulations 2008 – scope and application
- Provision and Use of Work Equipment Regulations 1998
- Construction (Design and Management) Regulations 2015
- Work at Height Regulations 2005

Relevant ILO documents
- Occupational safety and health convention 155
- Occupational safety and health recommendation 164
- Fundamental principles of occupational health and safety
- ILO Encyclopaedia of occupational health and safety
- Chemicals convention 170
- Chemicals recommendation 177
- Code of practice – safety in the use of chemicals at work
- Code of practice – safety and health in construction
- OSH Series 70
- Radiation protection convention 115
- Radiation protection recommendation 114
- OSH Series 73
- Radiation protection of workers
- Code of practice for radiation protection of workers
- Code of practice – protection of workers against noise and vibration in the working environment
- Code of practice – safety and health in construction
- Prevention of major industrial accidents convention 174
- Prevention of major industrial accidents recommendation 181
- OSH Series 63

Relationship to UK NOS standards
This element covers, either wholly or partially, the underpinning knowledge from NOS standards:

HSP6: Control health and safety risks
HSP13: Influence and keep pace with improvements in health and safety practice
HSP14: Behavioural Safety in the Workplace
Element 11 - Determine and implement health and safety risk control measures

Learning outcomes
You’ll need to demonstrate that you can:

11.1 Explain the analysis, assessment and improvement of system failures and system reliability
11.2 Explain the principles of prevention and control of risk
11.3 Explain the use of cost-benefit analysis in relation to risk control decisions
11.4 Explain the requirements for the development of safe systems of work
11.5 Describe selection procedures for measures to control exposure to hazardous substances and agents

Topics covered by the open assessment
In your assessment, you may be asked questions on the following topics.

11.1 Systems failures and reliability
- The differences between systemic and systematic analysis
- Analytical considerations of systems and sub-systems failures
- The assessment of system reliability
- Methods for improving system reliability

11.2 Principles of prevention and control of risk
- The general principles of prevention contained in the Management of Health and Safety at Work Regulations 1999 (Schedule 1) and/or the ILO Fundamentals of occupational health and safety and ILO Encyclopaedia
- The factors to be considered in selecting the best solution for an organisation, based on relevant data control measures:
  - technical, e.g. design, fencing, ventilation
  - procedural, e.g. systems of work, maintenance
  - behavioural, e.g. information and training measures
  - The general hierarchy of risk control in OHSAS 18001
- The factors affecting the choice of control measures

11.3 Risk control
- The concepts of avoidance, reduction, transfer and retention within a health and safety management programme, and their limitations
- The factors to be considered in selecting the best solution for an organisation based on relevant risk data
- The role of risk control systems and their relationship to workplace precautions
- Risk control systems – matching the hazard profile of the business
- Control of inputs: physical resources, human resources, information
- Control of work activities: premises, plant, substances, procedures, people
- Control of outputs: products and services, by-products, information
- Cost-benefit analysis in relation to risk control cost decisions (organisational, design, planning, operational); break-even analysis

11.4 Safe systems of work
- Legal and practical requirements
- Components of a safe system of work
- Developing and implementing safe systems of work in an organisation
- Techniques such as job safety analysis in the development of safe systems of work
- The preparation of job safety instructions and safe operating procedures
- Permit-to-work systems:
  - Essential features
  - General application and operation
  - Examples

11.5 Control measures
- Chemical agents and hazardous substances: hierarchy of risk control
  - elimination (control at source)
  - substitution (one substance for a less harmful substance)
  - change of work method to minimise or suppress generation of harmful substance or agent, e.g. painting instead of spraying
  - change of work patterns to reduce the length of time of exposure
  - isolation and segregation, e.g. remote handling systems, enclosure of process or enclosure of process or plant producing harmful substances, reducing numbers exposed by segregation of process or people
  - engineering control methods, e.g. local exhaust ventilation (LEV) systems (captor, receptor, low-volume high velocity), and factors that can have an impact on their effectiveness
- Biological agents: hierarchy of risk control
  - eradication
  - reduced virulence
  - change of work method to minimise or suppress generation of aerosols
  - isolation and segregation
  - containment
  - ventilation (HEPA filters)
  - sharps control
  - immunisation, decontamination and disinfection
- the role of effluent and waste disposal (controlled);
- personal hygiene measures; PPE; biohazard signs;
- baseline testing and health surveillance
- control measures in relation to hospitals, laboratory work and animal houses
- Carcinogens
  - In relation to the requirements of the Approved Code of Practice: total enclosure; prohibition of eating, drinking and smoking in contaminated areas; designating and cleaning contaminated areas and closed containers
- Personal protective equipment (PPE)
  - The factors affecting the choice of PPE (respiratory, eye and skin) and the degree of protection afforded
  - The different types of respiratory protective equipment, and their application and limitations
  - The significance of applied protection factors
  - The different types of eye and skin protection; the hazards they are designed to protect against; the specification and standards for protection against different chemical forms; their limitations
- Noise
  - The principles of noise reduction and their application to the control of occupational noise (transmission, reflection, absorption, damping, diffusion, silencing, intimation and isolation)
  - The influence of sound reduction indices and sound absorption coefficients; design specifications, with examples
  - The evaluation of noise control techniques to remedy specific workplace problems
  - Controls of noise at source, eg relocation, redesign, maintenance
  - Controls along transmission path, e.g. isolation, barriers, enclosure, absorption, insulation
  - Controls at receiver, eg acoustic havens, ear protection
  - The types of hearing protection; the significance of attenuation data; factors affecting the degree of protection in practice (as opposed to theoretical protection)
- Vibration
  - The control measures that may be applied in respect of whole body vibration for those such as agricultural and construction workers, and drivers; and segmental vibration for those who use vibrating tools
- Ionising radiation
  - Radiological limits
  - Define ‘classified person’
  - The roles of the UK radiation protection adviser and radiation protection supervisor
  - The practical controls for external radiation (shielding, distance, time) and internal radiation
- Non-ionising radiation
  - The design, siting, direction control and reduction of stray fields; screening, enclosures, distance, administrative controls, PPE
  - The hazard classification of lasers (e.g. EN 60825-1) and their associated controls
- Thermal environment
  - Control measures to improve unsatisfactory thermal environment parameters, eg circulation of air and ventilation, workplace design, work organisation, health surveillance, PPE
- Ergonomics
  - The ergonomic design of tools, equipment and workplaces, job rotation, work routine
  - Control measures for visual display units; ergonomic considerations of equipment and workstation design; daily work routine of users
  - Eye and eyesight testing
  - Manual handling control measures
  - The key points of efficient moving and handling techniques
- Psychosocial
  - Control measures to reduce stress
  - Control of alcohol and drugs at work
  - Guidance, support and counselling for staff
  - The legal duties to protect employees from violence
- Workplaces
  - The practical considerations in providing and maintaining safe places of work and safe means of entry and exit
  - The importance of good housekeeping
  - The provision of safe traffic routes, and the hazards and precautions associated with internal transport

The working environment
- Welfare facilities and arrangements:
  - The provision of:
    - toilet, washing and changing facilities
    - storage facilities for clothing
    - facilities for eating
    - rest rooms facilities for pregnant women and nursing mothers
    - arrangements to protect non-smokers from tobacco smoke
  - The basis of adequate first aid provision
  - Safety signs:
    - common signs; their use and location; compliance issues

Fire prevention and protection
- The prevention of fire and smoke spread in buildings; structural fire protection; segregation of flammable materials; protection of openings and voids
- Explosions
  - Hazardous area zoning
  - The key features of plant design
  - Process controls to mitigate explosion
  - Explosion relief and suppression techniques
  - The control of ignition sources
  - Precautions and emergency procedures
- Detection and alarm
  - Common fire detection and alarm systems and procedures, and factors in the design and application of fire detection and alarm systems
  - The principal components of systems
Manual and automatic systems, and their application

Firefighting
- The classification of fires
- Factors in the design and application of fixed firefighting systems and equipment
- Portable firefighting equipment
- Siting and maintenance requirements
- Training requirements
- Extinguishing media and modes of action
- Means of escape
- The factors to be considered in providing and maintaining a means of escape
- The general requirements for travel distances, stairs, passageways and doors, emergency lighting, exit and directional signs
- Evacuation procedures
- The requirements of the relevant legislation

Chemical process hazards
- The methods of controlling temperature and pressure
- The contribution of typical mechanical and systems failures to major accidents, e.g. Flixborough, Piper Alpha, Grangemouth, Allied Colloids, Hickson and Welch
- Storage of flammable solids, liquids and gases
- Storage methods and quantities (bulk, intermediate, drum storage, specific locations)
- Segregation requirements and access
- How to contain leaks and spills
- Storage of toxic and corrosive substances
- The implications for storage, with an emphasis on incompatible materials and their segregation
- On-site transport
  - The key safety principles involved in loading and unloading tankers and tank containers
  - The labelling of vehicles and packaging of substances
  - Driver training and the role of a dangerous goods safety adviser

Work equipment
- The main types of safeguarding devices; characteristics; key features; limitations and typical applications of fixed enclosed guards, fixed distance guards, interlocked guards, automatic guards, trip devices, adjustable and self-adjusting guards, two-hand controls, mechanical restraints, jigs and push-sticks
- Selecting work equipment:
  - Suitability for task and environment
  - Conformity with relevant standards, such as CE marking
  - The requirements for maintenance; the expertise and skills needed by operators and maintenance personnel
- Design and use
  - Training, and statutory requirements for training, certification and authorisation
  - The statutory restrictions on using work equipment
- The duties of manufacturers and suppliers in respect of machinery, pressure systems and electricity, including ergonomic, anthropometric and human reliability considerations
- The design of controls and emergency controls; reducing the need for access (automation, remote systems); lighting; layout of plant and machinery; training
- The importance of the size of openings, height of barriers, distance from danger

Failure modes and prevention
- Failure prevention strategies and methods of identifying potential failure modes; related environmental factors
- The role of testing and quality assurance during manufacture and installation
- Failure modes and prevention in relation to major incidents, e.g. Flixborough, Brent Cross, Littlebrook D, Markham Colliery, Port of Ramsgate

Non-destructive testing
- The principles, advantages, disadvantages and application of non-destructive testing techniques

Maintenance
- Maintenance strategies and options, from emergency and breakdown maintenance to planned preventive maintenance; use of routine condition monitoring
- The factors to be considered in developing a planned maintenance programme
- The benefits of planned preventive maintenance
- The statutory requirements for maintenance and inspection

Pressure systems
- Prevention strategy to maintain the reliability and integrity of control systems
- Programmable electronic systems
  - Safeguards for the reliability and integrity of control systems
  - Safety requirements in programming, operation and maintenance
  - Considerations in safeguarding control systems

Safety in the movement of people and materials
- Lift trucks
  - Precautions for using lift trucks, including safe layout of areas where trucks are used and the protection of pedestrians
  - The use of lift trucks to move people; necessary conditions and equipment; other attachments used on lift trucks
  - The training requirements for lift truck operators
- Cranes and lifting equipment
  - Precautions in the use of cranes; selection, siting and stability of cranes; integrity of lifting accessories; competence of personnel
  - The types of lifting accessories; factors influencing
choice; limitations of the various types

- The maintenance, inspection and statutory examination of cranes and lifting accessories

- Hoists and lifts
  - The methods of controlling the risks associated with hoists (gin wheel, construction site platform hoist) and lifts (passenger and goods, scissor, vehicle inspection, mobile elevating work platform)

- Conveyors
  - The main methods of controlling risks

- Automated warehousing systems
  - Specific safeguards associated with automated warehousing systems

Electricity

- The planning, design and installation of electrical systems
  - Define ‘duty holders’ and ‘construction’
  - The importance of the strength and capability of electrical equipment; insulation; protection and placing of conductors; reducing the risk of shock; excess current protection; cutting off supply and isolation; working space, access and lighting
  - Control measures for:
    - the selection and suitability of equipment
    - protective systems
    - inspection and maintenance strategy
  - The significance of the Institution of Engineering and Technology’s ‘Requirements for electrical installations’ (BS 7671), previously known as the ‘IEE Wiring Regulations’

- Adverse or hazardous environments
  - What constitutes a hazardous environment
  - The principles of selecting electrical equipment for use in flammable atmospheres
  - The classification of hazardous areas; zoning
  - The principles of pressurisation and purging
  - Intrinsically safe equipment, flameproof equipment, type ‘N’ equipment, type ‘e’ equipment

- Use, maintenance and repair of electrical systems
  - The importance of maintenance schemes, schedules, plans and records; criteria of acceptability for live working; safe systems of work on installations made dead
  - Define ‘competent person’
  - Working with or near high voltage systems
  - System modifications and the role of competent and authorised people
  - Safe working and the precautions needed when working near overhead power lines and underground cables

- Protection of the public
  - The use of method statements and permits to work
  - Working at heights
    - The provision of safe access and safe place of work when working at heights
    - The safe use of access equipment, including ladders, trestles, scaffolds (simple, independent and tower)
    - The precautions for scaffold hoist towers, including passenger and material hoists
    - Control measures in relation to falling materials
    - Safe methods for working on roofs and the precautions needed when working on fragile roofs, flat roofs and sloping roofs
  - The means of access for maintenance work; use, types and safety features of cradles and boatswain’s chairs
  - Mobile elevating work platforms; types and applications; precautions needed
  - The selection, application and precautions needed in using safety nets, belts and harnesses

- Excavations
  - The methods of checking for buried services, water ingress, stability of sides, air conditioning
  - The precautions to be observed

- Demolition work
  - The main techniques used in the demolition of buildings, and the safe working method associated with each technique
  - Typical precautions
  - Mobile equipment
  - The precautions for safe use

Relevant UK statutory provisions

- Management of Health and Safety at Work Regulations 1999
- Control of Substances Hazardous to Health Regulations 2002
- REACH Enforcement Regulations 2008
- Classification, Labelling and Packaging of Substances and Mixtures (CLP) Regulations 2015
- Control of Noise at Work Regulations 2005
- Control of Vibration at Work Regulations 2005
- Ionising Radiations Regulations 1999
- Workplace (Health, Safety and Welfare) Regulations 1992
- Working Time Regulations 1998
- Health and Safety (Display Screen Equipment) Regulations
- Health and Safety (First Aid) Regulations 1981
- Health and Safety (Safety Signs and Signals) Regulations 1996
- Dangerous Substances and Explosive Atmosphere Regulations 2002
- Electricity at Work Regulations 1989
- Regulatory Reform (Fire Safety) Order 2005
- Dangerous Substances (Notification and Marking of Sites) Regulations 1990
- Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2009
- Transport of Dangerous Goods (Safety Advisers) Regulations 1999
- Health and Safety (Safety Signs and Signals) Regulations 1996
- Control of Major Accident Hazards Regulations 1999
- Personal Protective Equipment at Work Regulations 1992
- Lifting Operations and Lifting Equipment Regulations 1998
- Pressure Equipment Regulations 1999
- Pressure Systems Safety Regulations 2000
- Provision and Use of Work Equipment Regulations 1998
- Construction (Design and Management) Regulations 2015
- Work at Height Regulations 2005
- Code of practice for radiation protection of workers
- Code of practice — protection of workers against noise and vibration in the working environment
- Code of practice — safety and health in construction
- Prevention of major industrial accidents convention 174
- Prevention of major industrial accidents recommendation 181
- OSH Series 63
- Welfare facilities recommendation 102

**Relationship to UK NOS standards**
This element covers, either wholly or partially, the underpinning knowledge from NOS standards:

- HSP6: Control health and safety risks
- HSP13: Influence and keep pace with improvements in health and safety practice
- HSP14: Behavioural Safety in the Workplace

**Relevant ILO documents**
- Occupational safety and health convention 155
- Occupational safety and health recommendation 164
- Fundamental principles of occupational health and safety
- ILO Encyclopaedia of occupational health and safety
- Chemicals convention 170
- Chemicals recommendation 177
- Code of practice — safety in the use of chemicals at work
- Code of practice — safety and health in construction
- OSH Series 70
- Radiation protection convention 115
- Radiation protection recommendation 114
- OSH Series 73
- Radiation protection of workers