

## Standards Module I: ISO 14001

### I. Overview

This educational content on ISO 14001 was developed under award 70NANB16H268 from the National Institute of Standards and Technology to support instructors in incorporating national and international standards in course curricula. The statements, findings, conclusions, and recommendations are those of the author(s) and do not necessarily reflect the views of the National Institute of Standards and Technology or the U.S. Department of Commerce.

ISO 14001 is an internationally recognized standard for environmental management systems that can enable the organizations that adopt it to better manage their respective environmental risks, and leverage opportunities for continual improvement of their environmental performance.

The module includes an overview of ISO 14001, related educational content, and module assessment tools. The educational content is comprised of eight sets of teaching materials for the clauses of ISO 14001. Each set includes a slide deck with teaching notes, supplemental resources, links to online tools and materials where applicable, example discussion questions, assignments and/or exercises to provide a means for students to apply their knowledge and demonstrate their understanding of the material.

### Module Learning Outcomes

1. Describe the ISO 14001 framework for environmental management. (G, UG)
2. Explain the concept, purpose and characteristics of a systematic approach to environmental management. (G, UG)
3. Explain (UG) and apply (G) the key requirements associated with ISO 14001 elements.
4. Analyze and evaluate environmental management tools and strategies in organizations, based on ISO 14001 requirements and concepts. (G)

[G- Graduate Level; UG – Undergraduate Level]

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## II. Module Summary: ISO 14001 Framework and Benefits

ISO 14001 specifies requirements for environmental management systems (EMS). An EMS is a systematic approach for managing an organization's environmental interactions and meeting an organization's environmental objectives. ISO 14001 provides a framework for an organization to meet the intended outcomes they set for their EMS, respond to changing environmental conditions, and contribute to sustainable development by:

- Preventing or mitigating adverse environmental impacts;
- Mitigating adverse effects of environmental conditions on the organization;
- Meeting their legal requirements and stakeholder expectations;
- Improving their environmental performance.

## III. Educational Content

The *Overview* materials address clauses 1-3 in ISO 14001, and subsequent materials cover clauses 4-10 individually. Definitions provided in clause 3 are addressed in the *Overview* section, but are also incorporated into the educational content for the clauses in which the terms are used, as appropriate.

### Educational Content Outline

- Module 1 Overview: Clauses 1-3 and an overview of clauses 4-10 in the standard
- Module 1 Clause 4: Context of the Organization
- Module 1 Clause 5: Leadership
- Module 1 Clause 6: Planning
- Module 1 Clause 7: Support
- Module 1 Clause 8: Operation
- Module 1 Clause 9: Performance Evaluation
- Module 1 Clause 10: Improvement

## IV. Resources

General readings and links to resources applicable for the module are provided below.

### General Readings:

ISO. (2015). *ASQ/ANSI/ISO 14001:2015 Environmental management systems - Requirements with guidance for use*. Geneva, Switzerland: International Organization for Standardization.

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ISO. (2016). *ASQ/ANSI/ISO 14004:2016 Environmental management systems - General guidelines on implementation*. Geneva, Switzerland: International Organization for Standardization.

Meadows, D. H., & Wright, D. (2008). *Thinking in systems: A primer*: chelsea green publishing.

er. Chapter 1, The Basics.

### Links:

ISO Directives and Policies: <https://www.iso.org/directives-and-policies.html>

ISO Management Systems Page: <https://www.iso.org/management-system-standards.html>

ISO Online Browsing Platform: <https://www.iso.org/obp/ui/#iso:std:iso:14001:ed-3:v1:en>

Fundamentals of Standards and Standardization: [https://www.iso.org/sites/materials/teaching-materials/education\\_materials-higher-edu/educational\\_materials-detail-emfc6f.html?emid=20](https://www.iso.org/sites/materials/teaching-materials/education_materials-higher-edu/educational_materials-detail-emfc6f.html?emid=20)

### Supplemental Resources:

#### ISO 14001 Clause 4: Context of the Organization

Pojasek, R. B. (2013). Organizations and their contexts: where risk management meets sustainability performance. *Environmental Quality Management*, 22(3), 81-93.

#### ISO 14001 Clause 6: Planning

ISO. (2013). *ASQ/ANSI/ISO 14031:2013 Environmental Performance Evaluation*. Geneva, Switzerland: International Organization for Standardization.

Block, Marilyn R. *Identifying environmental aspects and impacts*. ASQ Quality Press, 1999.

#### ISO 14001 Clause 7: Support

Sammalisto, K., & Brorson, T. (2008). Training and communication in the implementation of environmental management systems (ISO 14001): a case study at the University of Gävle, Sweden. *Journal of Cleaner Production*, 16(3), 299-309.

Sobnosky, K. J. (2001), Effective Communication in Environmental Management. *Environ. Qual. Manage.*, 11: 47–56. doi:10.1002/tqem.1204

Chartered Institute of Ecology and Environmental Management Competency Framework:

<https://www.cieem.net/competency-framework>

EMS Operation/Implementation Guide: <https://www.nibusinessinfo.co.uk/content/operate-your-environmental-management-system-ems>

#### ISO 14001 Clause 8: Operation

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Cantor, D. E., Morrow, P. C., & Montabon, F. (2012). Engagement in environmental behaviors among supply chain management employees: An organizational support theoretical perspective. *Journal of Supply Chain Management*, 48(3), 33-51.

Morelli, J., & Collins, D. (2004). Operational Controls: The 'Affect-and-Solution' Approach for Environmental Managers. *EM-PITTSBURGH-AIR AND WASTE MANAGEMENT ASSOCIATION-*, 35-39.

EMS Operation/Implementation Guide: <https://www.nibusinessinfo.co.uk/content/operate-your-environmental-management-system-ems>

#### ISO 14001 Clause 9: Performance Evaluation

Dias-Sardinha, I., & Reijnders, L. (2001). Environmental performance evaluation and sustainability performance evaluation of organizations: an evolutionary framework. *Corporate Social Responsibility and Environmental Management*, 8(2), 71-79.

ISO. (2011). ASQ/ANSI/ISO 19011. *Guidelines for auditing management systems*. Geneva, Switzerland: International Organization for Standardization.

ISO. (2013). *ISO 14031 Environmental management - environmental performance evaluation - guidelines*. Geneva, Switzerland: International Organization for Standardization.

Jasch, C. (2000). Environmental performance evaluation and indicators. *Journal of Cleaner Production*, 8(1), 79-88.

LRQA ISO 14001 Self-Appraisal: <http://www.lrqa.co.uk/images/9858-iso-140012015-self-appraisal-questionnaire.pdf>

US EPA Compliance Resources: <https://www.epa.gov/compliance#resources>

#### ISO 14001 Clause 10: Improvement

Rooney, J. J., & Heuvel, L. N. V. (2004). Root cause analysis for beginners. *Quality progress*, 37(7), 45-56.

Vorley, G. (2008). Mini Guide to Root Cause Analysis. *Quality Management and Training*, London.

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