# Human Factors/Ergonomics Professional Competencies

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| **1 Human Factors/Ergonomics (HFE) principles** |
| **1.1** Uses a systems approach that considers the broad context of the human in the environment; is design driven; and focuses on performance, safety and wellbeing outcomes. |
| **1.1a** Demonstrates HFE practice in the broad 'systems' sense of the definition, and in fields that may include physiology, biomechanics, cognition, psychology, sociology and organisational behaviour. |
| **1.2** Identifies and applies methods of analysis, evaluation and validation with respect to human interfaces for tasks, activities and environments. |
| **1.2a** Understands the role and application of HFE principles in optimising system performance, safety and wellbeing across all ages, cultures and capabilities. |
| **1.2b** Demonstrates ability to enhance health, safety, comfort, quality of life, attitudes, motivation, usability, accessibility, effectiveness and efficiency. |
| **1.2c** Demonstrates ability to identify potential and existing high risk tasks, activities and environments. |
| **2 Human Factors/Ergonomics (HFE) theory and practice** |
| **2.1** Demonstrates knowledge of theoretical and practice bases for analysis of human interactions. |
| **2.1a** Demonstrates use of HFE theories, methods and tools for analysis of systems (including process), tasks, workload (physical and mental) including mental models, communication and anthropometry. |
| **2.2** Understands and applies the theoretical and practice bases for (re)design of human interfaces (physical and mental). |
| **2.2a** Understands the influence of individual differences and factors as a person's body size, skill, cognitive abilities, age, sensory capacity, culture, general health and experience and applies this to human performance. |
| **2.2b** Demonstrates integration of HFE principles and concepts into systems, interface and product design including requirements development and validation. |
| **2.2c** Evaluates user needs for safety, efficiency, reliability, ease of use. |
| **2.2d** Determines the match and the interaction between human characteristics, abilities, capacities and motivations, and the system(s), organisation, planned or existing environment, products used, equipment, work systems, machines and tasks. |
| **2.2e** Understands the management of HFE risks, including application to priorities and mitigations; potential benefits and costs of HFE solutions; short and long term goals relevant to defined problems. |
| **2.2f** Applies relevant legislation, codes of practice, standards (government and industry). |
| **2.2g** Determines whether the interface or interaction is amenable to HFE intervention. |
| **2.3** Demonstrates knowledge of the theoretical and practice bases for data collection and analysis relating to HFE. |
| **2.3a** Understands what data are required for HFE appraisal and design; selects and validates appropriate data collection/analysis methods and tools. |
| **2.3b** Understands and applies the basics of experimental design and statistics. |

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| **2.3c** Understands and applies the basics of qualitative study design and analysis (for example knowledge elicitation, interviews, document analysis, and observation). |
| **2.3d** Understands the ethical implications of proposed data collection, analysis, application and dissemination, and demonstrates ability to seek and obtain appropriate ethical approval. |
| **3 Human capabilities and limitations** |
| **3.1** Demonstrates knowledge of the theoretical and practice bases for HFE relating to physical capabilities and limitations. |
| **3.1a** Demonstrates a working knowledge of anatomy, functional anatomy, anthropometry, physiology, pathophysiology, and environmental sciences as they apply to HFE practice. |
| **3.1b** Applies knowledge of biomechanics, anthropometry, motor control, energy, forces applied as they relate to stresses and strains produced in the human body. |
| **3.1c** Understands the effects of the environment (including acoustic, thermal, visual, vibration) and individual sensory response (sight, hearing, touch, taste, smell) and applies this to human performance, safety and wellbeing. |
| **3.2** Demonstrates knowledge of the theoretical and practice bases for HFE relating to psychological and social capabilities and limitations. |
| **3.2a** Understands and applies theoretical concepts and principles of social and psychological sciences relevant to HFE. |
| **3.2b** Applies knowledge of psychological characteristics and responses and how these affect health, human performance, attitudes, perception, stress, human reliability and error. |
| **3.2c** Applies knowledge of human information processing (including situation awareness, memory, decision making). |
| **3.2d** Demonstrates a knowledge of systems theory including socio-technical systems and culture (e.g. organisational and safety culture). |
| **3.2e** Understands and applies the principles of group functioning, motivation, engagement and participation. |
| **3.2f** Understands and applies the principles of organisational management including individual, group (team) and organisational change techniques, including training and work structuring. |
| **4 Design and development of systems including products, tasks, jobs, organisations and environments** |
| **4.1** Demonstrates knowledge of the theoretical and practice bases for HFE relating to design and development of systems. |
| **4.1a** Understands and applies basic engineering (technology) concepts, with a focus on design solutions and contextual operation of technologies. |
| **4.1b** Demonstrates an understanding of the principles of HFE and human-machine interface technology including hardware, software and virtual environments (e.g. internet and network based technologies and social media). |
| **4.1c** Understands and applies the requirements for safety systems, the concepts of risk, risk assessment and risk management. |
| **4.2** Utilises a systems approach to the human-aspects of the specification, design, assessment and acceptance of products, services and human factors interventions. |
| **4.2a** Applies HFE principles to design of systems (and services), products, job aids, controls, displays, instrumentation and other aspects of tasks and activities. |
| **4.2b** Demonstrates understanding of the iterative nature of design development including simulation and computer modelling. |

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| **4.2c** Considers the options for achieving a balance between human and technological, task and environment to achieve an optimal system. |
| **4.2d** Selects appropriate forms of HFE solutions and recommendations based on theoretical knowledge and practice, and develops a comprehensive, integrated and prioritised approach. |
| **5 Professional skills and implementation** |
| **5.1** Demonstrates understanding of the role of HFE in change strategies and strategic management. |
| **5.1a** Provides design specifications and guidelines for technological, organisational and HFE design or redesign of the work process, the activity and the environment which match the findings of HFE analysis. |
| **5.1b** Develops strategies to introduce a new design to achieve optimum performance, safety and wellbeing outcomes. |
| **5.1c** Recognises the safety hierarchy, the application of primary, secondary and tertiary controls and the order of introducing controls. |
| **5.1d** Interacts effectively with clients and stakeholders at all levels. |
| **5.2** Develops appropriate recommendations for education and training in relation to HFE principles. |
| **5.2a** Understands current concepts of education and training relevant to application of HFE principles. |
| **5.2b** Implements effective education and training programmes relevant to understanding the introduction of HFE measures. |
| **5.3** Supervises the application and evaluation of an HFE plan. |
| **5.3a** Capable of implementing appropriate design or modifications. |
| **5.3b** Incorporates methods to allow continuous improvement. |
| **5.3c** Selects appropriate criteria for evaluation. |
| **5.3d** Produces clear, concise, accurate and meaningful records and reports. |
| **5.3e** Uses a team-lead and owned participative approach. |
| **5.4** Understands and demonstrates commitment to The Treaty of Waitangi/Te Tiriti o Waitangi. |
| **5.4.a** Understands dual governance and applies the principles of partnership, participation and protection in HFE practice. |
| **5.5** Shows a commitment to safe, ethical and culturally appropriate practice and high standards of performance, and acts in accordance with legal requirements. |
| **5.5a** Behaves in a manner consistent with accepted codes and standards of professional behaviour, and meets the expectations of those people affected by the HFE actions. |
| **5.5b** Demonstrates a commitment to embracing diversity, equity and inclusion and ensures equal and fair treatment of people interacted with during HFE practice. |
| **5.5c** Recognises the scope of personal ability for HFE analysis and when it is necessary to consult and collaborate with different disciplines/professionals. |
| **5.5d** Demonstrates commitment to ongoing professional development by maintaining skill set and an awareness of wider HFE practice. |
| **5.5e** Engages with and takes responsibility for HFE as a profession. |

# Proficiency Scale (CIEHF)

| Score | Proficiency Level | Description |
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| 0 | ***Unaware*** | No knowledge of understanding of this competency |
| 1 | ***Aware*** | Knowledge or understanding of basic techniques and concepts |
| 2 | ***Novice*** | Limited experience gained in classroom and/or as trainee on the job.<br>Can understand and discuss terminology, concepts, principles and issues and can use reference and resource materials related to this competency. |
| 3 | ***Intermediate*** | Can successfully complete tasks in this competency independently though may need help from an expert.<br>Can understand and discuss the application and implications of changes to process, policies and procedures in this area. |
| 4 | ***Advanced*** | Can perform actions associated with this competency without assistance.<br>Recognised as the go-to person regarding this competency.<br>Focus is broad organisational/professional issues.<br>Participate in senior level discussions regarding this competency.<br>Assist in the development of reference and resource materials in this competency.<br>Capable of training others. |
| 5 | ***Expert*** | Known as expert or recognised authority in this area.<br>Provide guidance, troubleshoot and answer questions related to this area of expertise.<br>Focus is strategic.<br>Demonstration of consistent excellence in applying this competency across multiple projects and/or organisations.<br>Recognised as the go-to person in this area within and outside your organisations.<br>Create new applications for and/or lead the development of reference and resource materials for this competency. |

*Table adapted from NIH Competencies Proficiency Scale*
*https://hr.od.nih.gov/workingatnih/competencies/proficiencyscale.htm*