

HETPEP MODEL FOR EUROPEAN ERGONOMISTS

1. Introduction

This document replaces the original version von 1992 described in 1.1 below. It was accepted by the CREE Council on 2nd June, 2007. Revisions were made to improve the readability of the document. No changes were made to the requirements for registration as a European Ergonomist.

1.1 Meaning and Background

HETPEP stands for **Harmonising European Training Programmes for the Ergonomics Profession**. It resulted from the efforts of a working group drawn from the ergonomics societies of France, England, Germany and the Netherlands plus a series of subsequent meetings, from 1985 to 1992. Its report specifies the minimum qualification requirements for the decisions of the Board of the Centre for Registration of European Ergonomists (CREE) with regard to applicants for the title of European Ergonomist (Eur Erg). Its authors were: Prof. Ir. D.P. Rookmaaker (Chairman), Dr. C.M.M. Hurts (Secretary), Prof. Dr. E.N. Corlett, Prof. Dr. Y. Queinnec, and Dr.-Ing. W. Schwier.

1.2 Definition of Ergonomics

The formulation of the International Ergonomics Association (IEA) is used.

1.3 Objectives

1. To **promote mutual recognition** among states of the Council of Europe regarding ergonomics education and training programmes.
2. To **provide a framework** for thinking about, organising and assessing components of a professional level of qualification for ergonomists within Europe.
3. To **facilitate the mobility of qualified ergonomists** between the various countries in Europe.
4. To **improve the professional image** of ergonomics.
5. To accomplish the objectives under 1 and 2 **in a way that leaves flexibility to the individual training institutions and trainees** with regard to the precise composition of curricula.
6. To accomplish the objectives mentioned under 1 and 2 **in a way that defines training goals in terms of integration of knowledge into professional behaviour**, rather than in terms of detailed descriptions of isolated pieces of knowledge.

2. Model of Training Requirements

The Training Requirements Model has two major parts:

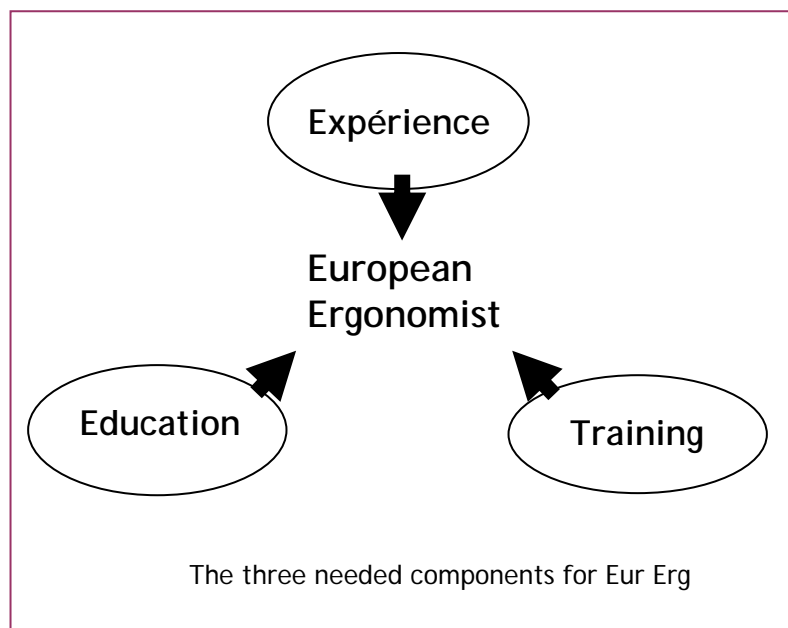
1. A framework describing the major COMPONENTS and their DURATION (see Figure 1).
2. A listing of AREAS OF KNOWLEDGE and TOPICS, each described by OBJECTIVES and POINTS OF REFERENCE (see Appendix).

2.1 Framework - duration of training

The framework is designed to be flexible and to accommodate different educational backgrounds and training paths. Figure 1 describes the training requirements leading up to the level of "European Ergonomist" (Eur Erg).

The training consists of the following three components:

1. **EDUCATION:** Diverse courses (credit units or modules), including laboratory exercises where appropriate.
2. **SUPERVISED TRAINING:** Learning by doing in applied situations.
3. **EXPERIENCE:** unsupervised professional practice which demonstrates the ability to work professionally and independently.



The title European Ergonomist will be granted to candidates who provide evidence of all three components. (see section 2.3).

This model of the training requirements may be expressed by the equation:

$$\text{EUR ERG} = \text{EDUCATION} + \text{SUPERVISED TRAINING} + \text{EXPERIENCE}$$

The equation is to be interpreted as follows:

- The nominal duration of training leading up to the title of "Eur Erg" is six (6) years, of which four (4) years are dedicated to ergonomics. This dedicated portion is a combination of education, supervised training and experience.
- The SEQUENCING of components suggested by the equation applies only to experience which should come last. Education and training may be timed in an interspersed fashion as long as not ALL training precedes ALL education e.g. 3 months of education might be followed by 3 months of training, which in turn might be followed by another 3 months of education, et cetera.

The total amount of supervised training should be a period of at least one (1) year, after the courses have been completed. In cases where educational courses are taken interspersed with supervised work experience, a maximum of six months may be counted towards fulfilling the requirement. Although supervised training is required for registration, the CREE Council can waive this requirement where evidence is provided that it was not possible for the candidate. In this instance a more rigorous examination of project work will be conducted by the National Assessment Board to ensure that professional work demonstrates an adequate transfer of knowledge to practice. Additionally the necessary period of unsupervised professional practice is extended to three years.

- The total amount of unsupervised professional experience should be at least two (2) years .

The EDUCATION comprises a total amount of at least one year devoted to ergonomics courses , including applications and laboratory exercises (see also section 2.3). The educational requirements can also be met by having ergonomics courses embedded in another type of education, preferably a bachelor's degree in a cognate subject, or a set of short courses. More important is the achievement of the detailed educational requirements discussed below (see section 2.3). Interpretation of these requirements and assessing their achievement by each candidate rests on the shoulders of the National Assessment Boards. For this reason CONFIRMATION by the National Assessment Board of how well requirements are met becomes very important (see section 2.3).

To ILLUSTRATE the above mentioned model, the following three imaginary paths are described, all leading to the Eur Erg title (indicated by arrows and horizontal dashed lines in Figure 1):

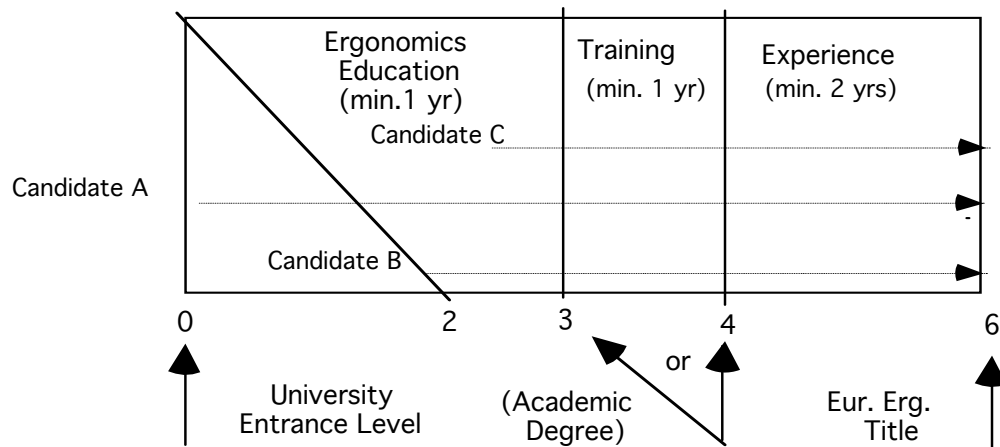


Figure 1: Ergonomics Framework: major components and durations

1. **Candidate A** brings no credits from previous education. This candidate must have at least 3 years of academic training, most of which is dedicated to ergonomics (example: Bachelor of Ergonomics,). Additionally, the candidate will be expected to spend at least another 3 years with supervised training and professional experience.

2. **Candidate B** receives at least 2 years of academic education in a field not related to ergonomics (e.g. law).. This candidate then undertakes a programme dedicated to ergonomics of at least one year (example; Master of Ergonomics), supplemented by at least 3 years of training and experience.

3. **Candidate C** has a Bachelor's degree (or its equivalent) in a related discipline such as biological sciences, engineering, architecture or psychology. When this previous educational course included some topics relevant to ergonomics the T candidate will be required to fulfil the remaining education requirements before they can start with training and experience.

Note that, DESPITE DIFFERENCES IN TRAINING PATHS such as those illustrated above, candidates completing these Eur Erg training requirements are EQUALLY QUALIFIED to practice ergonomics professionally.

2.2 Relationship to Existing Degrees

The framework described above does not function independently from existing degree programmes. For one thing, most education requirements and, in some cases part of the training requirements, can only be by completing such programmes. For those without previous academic education this will generally be a Bachelor's programme in a cognate subject (mixed ergonomics and non-ergonomics). For those already possessing a (Bachelor's) degree not related to ergonomics, such a programme may be a dedicated ergonomics programme resulting in a Master's degree.

However, it is important to emphasis the DIFFERENCE between the Eur Erg TITLE (which corresponds to professional recognition) and a DEGREE (which corresponds to a completed course of education). The degree is (in general) an essential prerequisite for the title but a title is not awarded by educational institutions, but rather by a national organisation recognised by ergonomics societies or similar ergonomics organisations (see Appendix B).

2.3 Framework - Components

2.3.1 Education

The education component breaks down into the Areas of Knowledge listed below. These are broad groups of topics which may consist of one or several courses (see also section 2.4). In parenthesis is indicated the minimum number of hours (= 60 minutes) of student involvement in classroom activities, excluding laboratory periods. These numbers total one year of full-time (dedicated) study of ergonomics. However the hours may be spread across several years. (See Appendix A for more detail on the Areas of Knowledge).

1. **ERGONOMICS PRINCIPLES:** introduction to the "ergonomics approach" and its relation to science and other sciences (20 hours).
2. **HUMAN CHARACTERISTICS:** basic knowledge from disciplines such as human biology and psychology that have particular relevance for ergonomics (80 hours).
3. **WORK ANALYSIS AND MEASUREMENT:** techniques and methods for analysis, measurement and computation (100 hours).
4. **PEOPLE AND TECHNOLOGY:** basic knowledge from engineering sciences that has particular relevance for applying ergonomics (100 hours).
5. **APPLICATIONS:** the integrative, interactive, social and iterative nature of applying ergonomics in the context of a structured and concrete research or design project (6 weeks full-time).
6. **PROFESSIONAL ISSUES:** legislation, economics, "politics" of ergonomics investigations, ethics, working with organisations (20 hours).

Laboratory exercises are in addition to the above mentioned hours and are an integral component of the education period. These laboratory exercises should prepare the student for later supervised training and experience. Ideally they should comprise approximately 30 to 35 half-days- (3 hours each) that should total about 100 hours during the academic period.

The confirmation of the educational standard of the student with respect to any of the above is the responsibility of the educational institution.

It should be noted that, independent of the path chosen (see section 2.1), **EACH CANDIDATE for the Eur Erg title needs to demonstrate COMPETENCE IN ALL Areas of Knowledge listed above**, according to the hours indicated and the objectives listed in the Appendix.

For compulsory and optional topics within these Areas of Knowledge see section 2.4

2.3.2 Supervised Training

The student should be supervised by a teacher and/or (if training is done outside the educational institution) a qualified or senior ergonomist, ideally another Eur.Erg.. The training period can be part of an existing degree programme (e.g. in the form of an internship) or it can follow on after the programme. The training period should involve at least one year of full-time work (holidays, et cetera included), 6 months of which can be inside the educational institution (example: research project), and should be validated by (a) supervisor(s).

2.3.3 Experience

This component must follow the formal ergonomics training period (education + supervised training). Therefore, at the beginning of the experience period, the candidate for the Eur Erg title usually possesses an ergonomics degree awarded by an educational institution.

The experience part should involve 2 years of independent professional practice. It must be confirmed by a professional interview with, or a report on major projects to, the National Assessment Board. Candidates may present a list of publications and presentations or be refereed in some other way, if the National Assessment Board agrees.

2.4 Structure and Use of Appendix (Areas of Knowledge and Topics)

The education components are described in detail in the Appendix.

An **AREA OF KNOWLEDGE** is a broad group of topics that belong together. The Appendix contains a brief description of each Area of Knowledge and its topic(s) in the form of an Educational Objective and Points of Reference.

A **TOPIC** can be one course, or more than one, or a cross-section of several courses.

A **POINT OF REFERENCE (POR)** is a keyword or a short phrase indicating the contents of the topic.

Generally PORs are intended to indicate knowledge or skills that the student must acquire as a minimum, however some trade-offs between breadth of study and depth of study are possible within areas of knowledge.

All topics mentioned in the Appendix are compulsory except those marked as "optional". From those optional topics (all listed under "People and Technology") three topics must be chosen, with at least one of them being a design topic (of workplace, information or organisation). Some freedom exists within topic D2 ("Technology") and within Area of Knowledge E ("Applications"). Here, one area of application may be chosen (e.g. consumer products or manufacturing). For more details see the Appendix.

The structure of the Appendix shows an important objective of the CREE, viz. providing only the minimum necessary guidelines to ensure the professional competence of a "European Ergonomist". Flexibility of curriculum composition is explicitly intended, recognising the special interests and competencies of local institutions and students.

3. Use for other Disciplines

Other disciplines related to ergonomics, such as architecture, engineering, biological sciences and psychology, may use the education model laid down in this document in several ways. First, they may use the education structure of Figure 2 to classify some of their own topics or areas of knowledge as ergonomically relevant knowledge or skills. This may help students in those disciplines to form a clearer idea of ergonomics, in which they later may want to specialise. Second, the education structure may be used to make other disciplines aware of issues related to ergonomics.

APPENDIX : AREAS OF KNOWLEDGE AND TOPICS

A1. SUMMARY TABLE

Area of Knowledge		Hours	Topics		Page
Code	Name		Number	Name	
A	Ergonomics Principles	20	1	Ergonomics Approach	8
B	Human Characteristics	80	1	Anatomy and Physiology,	8
			2	Demographics	8
			3	Human Psychology	8
			4	Social and Organisational Aspects of Physical Environment	8
C	Work Analysis and Measurement	100	1	Statistics and Experimental Design	9
			2	Computation and Information	9
			3	Technology	9
			4	Instrumentation	9
			5	Methods of Measurement and Investigation of Work Analysis	9
D	People and Technology	100	1	Systems Theory	10
			2	Technology	10
			3*	Human Reliability	10
			4*	Health, Safety and Well-Being	10
			5*	Training and Instruction	10
			6*	Occupational Hygiene	11
			7*	Workplace Design	11
			8*	Information Design	11
			9*	Work Organisation Design	11
E	Applications	100 6 weeks full-time	1	Laboratory Exercises	11
			2	A project pursued by the individual	11
F	Professional Issues	20			11

* any three, but one must be in Design (7,8, or 9)

A.2 EDUCATIONAL OBJECTIVES AND POINTS OF REFERENCE

A. ERGONOMICS PRINCIPLES

1. Ergonomics Approach

OBJECTIVE: To recognise the integrated (systems) nature of ergonomics, the centrality of the human being, and how to use its breadth of coverage and the available knowledge base to adapt the environment to people.

POINTS OF REFERENCE: History of work; current paradigms (designing for individuals vs. populations; working in normal vs. extreme circumstances); interaction between society and work.

B. HUMAN CHARACTERISTICS

To recognise and describe the effects of human factors which contribute to people's physical and psychological well-being and performance at work .

1. Anatomy and Physiology, Demographics

OBJECTIVE: To recognise and measure the physical characteristics of people and their physiological responses to their activities and their environments with particular reference to health and performance.

POINTS OF REFERENCE: Anatomy; biomechanics and posture; anthropometry; energy and force production; adjustments (stress and strain); individual, gender-related, developmental, racial and cultural variability; chrono-biology (e.g. circadian rhythms).

2. Human Psychology

OBJECTIVE: To recognise and measure cognitive characteristics of people and their psychological responses to their work situation so as to understand how these affect human behaviour (including health and performance) and attitudes.

POINTS OF REFERENCE: Psychophysiological and cognitive aspects of information intake, information handling, and decision making; individual motivation; human development.

3. Social and Organisational Aspects

OBJECTIVE: To recognise the social dimensions of ergonomics and organisations and to specify systems structures suitable to achieve a good quality of working life and of performance.

POINTS OF REFERENCE: Motivation and attitudes related to the needs of individuals and to working in groups; individual and group functioning; socio-technical systems.

4. Physical Environment

OBJECTIVE: To understand the human sensory systems and to be able to recognise, measure and specify the appropriate levels and characteristics of the physical environment such that sensory input is suitable for human performance and well-being.

POINTS OF REFERENCE: Climatic environment; visual environment; acoustic environment; vibration; human senses.

C. WORK ANALYSIS AND MEASUREMENT

To be able to understand, select and utilise the appropriate methods for investigating

ergonomics problems and for presenting data to evaluate design solutions to these problems.

1. Statistics and Experimental Design

OBJECTIVE: To be able to collect, aggregate, manipulate and evaluate data in a reliable and valid manner.

POINTS OF REFERENCE: Descriptive statistics; probability theory; correlation techniques; estimation and sampling; experimental design; non-parametric statistics.

2. Computation and Information Technology

OBJECTIVE: To be able to use computers, particularly to utilise standard packages, for the effective handling of ergonomics investigations.

POINTS OF REFERENCE: Data collection software; computation software; storage systems.

3. Instrumentation

OBJECTIVE: To be able to use the major measuring instruments, sensors, etc. required by the ergonomist to gather data for investigations, design or evaluation of workplaces, work procedures, or work equipment.

POINTS OF REFERENCE: Simple and complex equipment; their potentials and their limitations.

4. Methods of Measurement and Investigation

OBJECTIVE: To be competent in the major methods and procedures of measurement used in ergonomics investigations, and to know when to use them and how to interpret the results.

POINTS OF REFERENCE: Simulations (dynamic and static); methods for observing activity and performance; interviews and questionnaires; epidemiological approach; sampling procedures; checklists.

5. Work Analysis

OBJECTIVE: To be able to describe and understand the determinants and organisation of workers' activities in the field.

POINTS OF REFERENCE: Activity analysis; task analysis; function analysis; task interdependency, communication and co-operation; the importance of strategies in task execution.

D. PEOPLE AND TECHNOLOGY

To be familiar with an area for the application of ergonomics expertise, with some important models and concepts related to applying ergonomics, and with at least one form of ergonomics design.

1. Systems Theory

OBJECTIVE: To recognise the principles of systems theory and how they apply to ergonomics situations.

POINTS OF REFERENCE: Structure and dynamics of systems; the human as a system component; systems analysis and design (e.g. allocation of functions)

2. Technology

OBJECTIVE: To understand the factors in at least one chosen area of application that are

relevant to the creation of ergonomic work, in particular to recognise those aspects of the technology that are flexible/changeable.

APPLICATION AREAS, Examples: consumer products; manufacturing; office work; transport; process industry; health care; automation; recreation, arts and leisure activities (see also E. "Applications").

POINTS OF REFERENCE: Functionality, operation, and construction of the technology.

3. Human Reliability (optional)

OBJECTIVE: To be able to design and evaluate work situations using "best practice" in working towards error-free performance.

POINTS OF REFERENCE: Accident models; attention, effort and vigilance; error taxonomies.

4. Health, Safety and Well-Being (optional)

OBJECTIVE: To be able to design and evaluate work situations to achieve healthy and safe work, as well as contribute to the quality of working life.

POINTS OF REFERENCE: Safety management; occupational injuries and work-related disorders; safety technology; legislation; characteristics of a good quality of working life.

5. Training and Instruction (optional)

OBJECTIVE: To understand the fundamentals of learning, of training programmes and of instruction, and to specify the requirements of such programmes to achieve successful performance of new or changed work activities.

POINTS OF REFERENCE: Learning skills; learning knowledge; assessing job requirements and worker capabilities; designing training programmes to bring workers to the level of requirements; designing manuals.

6. Occupational Hygiene (optional)

OBJECTIVE: To be able to recognise, measure, and cope with the presence of adverse physical and chemical conditions and other major pollutants.

POINTS OF REFERENCE: National and international recommendations and requirements; their variations and limitations; measurement, protection, control, and monitoring.

7. Workplace Design (optional)

OBJECTIVE: To be able to investigate and design workplaces to match the physical and psychological dimensions of their users, and to measure workplace effects on ergonomically relevant dimensions.

POINTS OF REFERENCE: Measurement of activities and performance; workspace layout; use of mock-ups/simulations to improve designs; evaluation; compatibility between workplace requirements and human capabilities.

8. Information Design (optional)

OBJECTIVE: To be able to investigate and design the major modes of information transfer to the human for effective and efficient performance of the system.

POINTS OF REFERENCE: Signal detection; information processing and attention; display characteristics; information overload; stimulus-response compatibility.

9. Work Organisation Design (optional)

OBJECTIVE: To be able to investigate, design and implement work organisation systems for effective and efficient performance and good quality of working life.

POINTS OF REFERENCE: Co-operative analysis and design of new work systems; basics and applications of work-rest schedules; introduction of change.

E. APPLICATIONS

OBJECTIVE: To understand the integrative nature of applying ergonomics, the need for and structure of a job specification, the interactive and iterative nature of work in an applied research or design group, and to recognise the practicalities and limitations of applying ergonomics, including the introduction of change.

POINTS OF REFERENCE

1. **Laboratory Exercises:** should prepare the student for later training and experience, should comprise c.30 to 35 sessions (3h each) that should total about 100h during the academic period.

2. **Applied research/design process:** This should be done as a project undertaken in a chosen area such as: consumer products; manufacturing; office work; transport; process industry; health care; automation; architecture; recreation, arts and leisure activities (see also D2 "Technology"); It may also involve a study of intervention techniques.

F. PROFESSIONAL ISSUES

OBJECTIVES: To recognise the impact of ergonomics on people's lives, the costs and benefits accruing from ergonomics activities, the social and psychological impact of ergonomics investigations, and the professional responsibilities and requirements of the ergonomics practitioner.

POINTS OF REFERENCE: Legislation; economics; the ergonomist in the organisation; ergonomics and society; role of the ergonomist in social settings with different interest groups; ethics; development and marketing of the ergonomics profession.