**ERGONOMICS or Human Factors Engineering:**

study of:
*“…human cognitive and physical capabilities and then applying the knowledge gained from that research to systems, tools, products, and environments”*
to…*“ help to ensure that people’s interactions with technology will be productive, comfortable, and effective.*

Human Factors Engineering combines the knowledge of a psychologist, physiologist, anatomist, engineer, anthropologist and a biometrician.

In a general sense, there is no meaningful difference between the two terms, other than in their origins and academic usages

 **Objectives**

The objectives of the study of ergonomics is to optimize the integration of man and machine in

order to increase work rate and accuracy. It involves

1. The design of a work place befitting the needs and requirements of the worker.

2. The design of equipment, machinery and controls in such a manner so as to minimize mental

and physical strain on the worker thereby increasing the efficiency, and

3. The design of a conductive environment for executing the task most effectively.

Both work study and Ergonomics are complementary and try to fit the job to the workers;

however Ergonomics adequately takes care of factors governing physical and mental strains.

 **Applications**

In practice, ergonomics has been applied to a number of areas as discussed below

1. Working environments 2. The work place, and 3. Other areas.

Human factors issues arise in simple systems and consumer products as well. Some examples include cellular telephones and other hand held devices that continue to shrink yet grow more complex (a phenomenon referred to as "creeping featurism"), or alarm clocks that allow sleepy users to inadvertently turn off the alarm when they mean to hit 'snooze'.

 A [user-centered design](http://en.wikipedia.org/wiki/User-centered_design) (UCD), also known as a systems approach or the [usability engineering](http://en.wikipedia.org/wiki/Usability_engineering) life cycle aims to improve the user-system. Ergonomic principles have been widely used in the [design](http://en.wikipedia.org/wiki/Industrial_design) of both consumer and industrial products. Examples include [screwdriver](http://en.wikipedia.org/wiki/Screwdriver) handles made with serrations to improve finger grip, and use of soft [thermoplastic elastomers](http://en.wikipedia.org/wiki/Thermoplastic_elastomer) to increase [friction](http://en.wikipedia.org/wiki/Friction) between the skin of the hand and the handle surface.

HFE continues to be successfully applied in the fields of [aerospace](http://en.wikipedia.org/wiki/Aerospace), aging, health care, [IT](http://en.wikipedia.org/wiki/Information_technology), product design, transportation, training, nuclear and virtual environments, among others.

[Physical ergonomics](http://en.wikipedia.org/wiki/Physical_ergonomics) is important in the medical field, particularly to those diagnosed with physiological ailments or disorders such as [arthritis](http://en.wikipedia.org/wiki/Arthritis) (both chronic and temporary) or [carpal tunnel syndrome](http://en.wikipedia.org/wiki/Carpal_tunnel_syndrome).

The Occupational Safety and Health Administration (OSHA) has found substantial evidence that ergonomics programs can cut workers' compensation costs, increase productivity and decrease employee turnover.

The emerging field of [human factors in highway safety](http://en.wikipedia.org/wiki/Traffic_psychology) uses human factor principles to understand the actions and capabilities of road users - car and truck drivers, pedestrians, bicyclists, etc. - and use this knowledge to design roads and streets to reduce [traffic collisions](http://en.wikipedia.org/wiki/Traffic_collisions).

**Methods:**Ergonomics science abounds with methods and models for analyzing tasks, designing work, predicting

performance, collecting data on human performance and interaction with artifacts and the environment

in which this interaction takes place.
**Physical Methods**
deals with the analysis and evaluation of musculoskeletal factors

The topics include: measurement of discomfort, observation of posture, analysis

of workplace risks, measurement of work effort and fatigue, assessing lower back

disorder, and predicting upper-extremity injury risks

**Psychophysiological Methods**
deals with the analysis and evaluation of human psychophysiology

The topics include: heart rate and heart rate variability, event-related potentials,

galvanic skin response, blood pressure, respiration rate, eyelid movements, and

muscle activity

**Behavioral and Cognitive Methods**deals with the analysis and evaluation of people, events, artifacts, and

tasks

The topics include: observation and interviews, cognitive task analysis methods,

human error prediction, workload analysis and prediction, and situational

awareness
**Team Methods**
deals with the analysis and evaluation of teams

The topics include: team training and assessment requirements, team building,

team assessment, team communication, team cognition, team decision making,

and team task analysis

**Environmental Methods**

deals with the analysis and evaluation of environmental factors

The topics include: thermal conditions, indoor air quality, indoor lighting, noise

and acoustic measures, vibration exposure, and habitability

**Macroergonomic Methods**

deals with the analysis and evaluation of work systems

The topics include: organizational and behavioral research methods,

manufacturing work systems, anthropotechnology, evaluations of work system

intervention, and analysis of the structure and processes of work systems

