Helwan University
Faculty of Applied Arts

Template for Course Specifications

Course Specifications

Programme(s) **on which the course is given**	Metal Products and jewelry
Major or Minor element of programs	Major
Department offering the program	**Metal Products and jewelry**
Department offering the course	**Metal Products and jewelry**
Academic year / Level	3rd Year / second semester
Date of specification approval	

A- Basic Information

Course Title:	Ergonomics					**Course Code:**	
Credit Hours:	3	**Lecture:**	2	**Tutorial:**		**Practical:**	2
						Total:	4

B- Professional Information

1 – Overall Aims of Course

- Identify the significance of ergonomics and the implications of ignoring ergonomics in design and how to avoid risks related to the lack of ergonomics awareness
- Recognize the role of designers in dealing with ergonomics problems and customizing products to match human capabilities and limitations.
- Exploring probable strategies for aiding designers in achieving safe and comfortable products, work practices and workplaces
- Minimizing work loads and product use restrictions and help find a formula for adapting environmental elements to consumers
- Study major factors and consideration of product and work environment adaptation to basic human needs
- Elevating designers capabilities in evaluating product and workplace environment to achieve comfort and safety of consumers
- Develop a deep understanding of consumers of products, their capabilities, limitations and body movements restrictions
- Acquire skills of ergonomics measurements and data manipulation
- Recognize techniques of identifying, analysis and evaluation of suitable solutions of ergonomics problems and the evaluation of the value of these solutions.
- Encourage critical evaluation and enable cooperative and group work or individually

- Develop students capabilities to optimize and make use of human and physical resources to achieve a better relation between man and his working environment, tools and products

2 – Intended Learning Outcomes of Course (ILOs)

a) Knowledge and Understanding:

U_{1}	Identify ergonomics history
U_{2}	Remember basic ergonomics concepts
U_{3}	Understanding ergonomics goals
U_{4}	Acknowledge the need for ergonomics
U_{5}	Recognize the importance of Information in ergonomics
U_{6}	Admit significance of ergonomics in Product Design
U_{7}	Recognize the role of ergonomics in Product Evaluation
U_{8}	distinguish safety considerations of product design
U_{9}	List different ergonomics domains
U_{10}	Make a distinction between different ergonomics domains.
U_{11}	Identify characteristics of each ergonomics domain
U_{12}	Define terms of Physical, cognitive, organizational, informatics and environmental ergonomics
U_{13}	Define Functional Anatomy
U_{14}	Admit significance of functional anatomy
U_{15}	Identify functional anatomy elements
U_{16}	Define descriptive anatomy
U_{17}	Detect importance of descriptive anatomy
U_{18}	Identify descriptive anatomy elements anatomy
U_{19}	Define surface anatomy basic terms
U_{20}	Admit significance of surface anatomy
U_{21}	Identify surface anatomy elements
U_{22}	Admit significance of human senses and its ergonomics functions
U_{23}	Identify principles of human vision, hearing, olfactory, tactile and taste
U_{24}	Recognize anatomy and physiology of each of the human senses
U_{25}	Identify major musculoskeletal disorders related to product design
U_{26}	Identify major causes of musculoskeletal disorders
U_{27}	Identify methods of preventing musculoskeletal disorders
U_{28}	recognize the importance of range of motion
U_{29}	recognize the importance of muscle strength tests
U_{30}	Have knowledge of the significance of Somatotyping
U_{31}	Consider anatomical considerations of anthropometric measurements
U_{32}	Practice measurements experimental design
U_{33}	Exercise statistical analysis of data
U_{34}	Define major anthropometry measurements
U_{35}	Identify quality standards in ergonomics practice
U_{36}	Identify methods of applying quality standards in ergonomics measurements
U_{37}	Differentiate different types of anthropometric measurements
U_{38}	Recognize the significance of static measurements
U_{39}	Recognize the significance of Clothing design measurements
U_{40}	Recognize the significance of Functional measurements
U_{41}	Workspace design recognize the significance of measurements
U_{42}	Recognize fundamentals of biomechanics
U_{43}	Understanding biomechanical analysis of work
U_{44}	Be acquainted with the significance Spine anatomy

U_{45}	Appreciate lifting biomechanics
U_{46}	Be familiar with ergonomics related disorders
U_{47}	Distinguish work analysis techniques
U_{48}	Compare working postures
U_{49}	Consider major ergonomics design criteria in the design of dwellings
U_{50}	Consider major ergonomics design criteria in the design of work
U_{51}	Consider major ergonomics design criteria in the design of office and workplace
U_{52}	Consider major ergonomics design criteria in the design of clothing

b) Intellectual Skills

I_1	State the nature of ergonomics problems related to product design
I_2	Resolve samples of ergonomics problems related to product design.
I_3	Practice skills of analysis and exploring elements of problem solution
I_4	Acquire an innovative ability in dealing with ergonomics problems related to human-product interface

c) Professional and Practical Skills

P_1	Practice using ergonomics values and methodologies in product evaluation
P_2	Practice using functional evaluation skills
P_3	Investigate ergonomics restrictions and limitations
P_4	Design ergonomically approved elements of the house
P_5	Design ergonomically approved elements of workplace
P_6	Design ergonomically approved elements of the office
P_7	Design ergonomically approved elements of clothing
P_8	Ability to identify the problem - ability to estimate cost - ability to diagnose

d) General and Transferable Skills

G_1	Practice verbal and written communication with colleagues
G_2	Be acquainted with the use of sophisticated and digital technological ergonomics tool
G_3	Practice skills of cooperative work with a team in an integrated group
G_4	Perform ergonomics practices applying advances in informatics and communication technology
G_5	Act upon emergency ergonomics crisis applying methods of management
G_6	Develop skills of problem solving and innovative thinking such as brain storming.. etc.

3- Contents

Topics	Hrs	Lecture	Tutor	Practice
1. Ergonomics Basics and concepts	2	1	1	
• Ergonomics Basics				
• History of Ergonomics				
• ergonomics concepts				
• Ergonomics Goals				
• The need of ergonomics				
• Ergonomics restrictions and limitations				
• Ergonomics and Information				
2. Ergonomics in Product Design	2	1	1	
• Ergonomics in the design process				
• Ergonomic methods in Product Design				
• Ergonomics role in Product development				

3. Ergonomics and Design Evaluation	2	1	1	
• Ergonomics techniques in Product Evaluation				
• Product Functionality Evaluation				
• Safety considerations in product design				
4. Ergonomics Domains	2	1	1	
• Physical Ergonomics				
• Cognitive Ergonomics				
• Organizational Ergonomics				
• Information Ergonomics				
• Environmental Ergonomics				
5. Physical Ergonomics	2	1		1
6. Human Anatomy	4	1		3
• Functional Anatomy				
• Descriptive Anatomy				
• Surface Anatomy				
• Human Senses				
7. Laboratory Anatomical investigations	4	1		3
• Major anatomical features of surface anatomy experiment				
• Identify names of each segment of the skeleton experiment				
• Identify methods of bones articulation				
8. Musculoskeletal disorders	4	1	1	2
• the musculoskeletal disorders related to product design				
• Causes of the musculoskeletal disorders related to product design				
• Methods of preventing musculoskeletal disorders				
9. Biomechanics Applications and Experiments	4	1		3
• Identify natural laws governing human motion				
• lever system in the human body experiment				
10. Anthropometry	4	1		3
• measuring range of motion				
• measuring Muscle strength tests				
• Somatotype				
11. Anthropometric Data	4	1		3
• Anatomical Aspects				
• Measuring trials				
• Statistical analysis				
• Measurements definitions				
• Quality control and ergonomics				
• Static measurements				
• Clothing design measurements				
• Functional measurements				
• Workspace design measurements				
12. Anthropometry Applications	4	1		3
• Static and functional human body measurements experiment				
• Vertical and horizontal functional reach measurements experiment				

• Range of motion measurements experiment				
13. Biomechanics	4	1		3
• Biomechanics fundamentals				
• Biomechanical analysis of work				
• Spine anatomy				
• Lifting biomechanics				
• Ergonomics related disorders				
• Analysis Work				
• working postures				
14. Design Ergonomic Applications	4	1		3
15. Ergonomic Applications	4	1		3
• Ergonomics of the home				
• Ergonomics of work				
• Office ergonomics				
• Clothing Ergonomics				
16. Consumer Products Ergonomics	4	1		3
• design practice to solve product problems related to body anatomy				
• design practice to respond to product problems related to human behavior				
General review	2		2	
Practical exam	4			4
Written exam	2			
Total (disregarding exam time)	60	16	7	37

4– Teaching and Learning Methods

4.1	lectures and interactive discussions including Power Point presentations and internet site exploration
4.2	Information collection and measurement data gathering
4.3	Practical training / lab including ergonomics and environmental measurements
4.4	Research and technical report assignment

5- Student Assessment Methods

5.1	Report	to assess	Student ability to prepare design reports and scientific manipulation of data
5.2	Oral Examination	to assess	Student ability to deal with others and face problems spontaneously and instantaneously
5.3	Written Exam	to assess	Student ability for understanding, comprehension and knowledge acquisition
5.4	Data manipulation	to assess	Student ability for extracting results of experimental work, analysis and weigh up estimations and perform calculations

Assessment Schedule

Assessment 1	Report on anatomy of body segments	Week	4
Assessment 2	Oral test or quiz	Week	5
Assessment 3	Report on anthropometry measurements	Week	6

Assessment 4	Med term examination	Week	7
Assessment 5	Report on muscle strength experiments	Week	9
Assessment 6	Written examination	Week	10
Assessment 7	Application project	Week	11
Assessment 8	Final Practical/lab examination	Week	12
Assessment 9	Final written examination (end of semester exam)	Week	14

Weighting of Assessments

Final-term Examination	60	%
Mid-Term Examination	10	%
Oral Examination	5	%
Practical Examination	5	%
Semester Work	10	%
Other types of assessment	10	%
Total	100	%

6- List of References

6.1- Course Notes

Ergonomics Experimental Notes
Ergo-eg Site Guide

6.2- Essential Books (Text Books)

- Ergonomics for human comfort and welfare, Design ergonomics Info Center Team, Cairo 2007
- Anatomy for artists and designers, Ahmed Moustafa, Vivian Ebraheem and Mohamed Hssanin Abdella, Design information center, Cairo 2007
- Anthropometry for designers, Ahmed Moustafa, and Mohamed Abdalla Radwan, Design information center, Cairo 2007

6.3- Recommended Books

Murrell J (1995) *Ergonomics*, Taylor and Francis UK
Stanley J. Ulijasze, k (2005) *Anthropometry (The Individual and the Population)*, C. G. Nicholas Mascie-Taylor , University of Cambridge
Grant J., k (2005) *Grant Anatomy,* Macmillan Publications, UK
Wilson J, (2004) *What is User-Centred Design*, Taylor and Francis, UK
Torrens George (2004) *Design Ergonomics Research Group*
Design Practice Research Group Department of Design and Technology, Loughborough University; Loughborough, UK
Roebuick et al (1998) *Engineering Anthropometric Methods* NASA, Pup USA
Lenihan J, (1991)Human Engineering (the body examined), Weidenfeld and Nicolson, London.
Dale Huchingson (2001) New Horizons for human Factors in design, Mc Graw Hill inc, London

6.4- Periodicals

Applied Ergonomics

Ergonomics Human factors

6.5- Web Sites,

www.ergo-eg.com www.ergo-eg.com/forum www.ergoboy.com www.ergonomics.com www.ergonomics4schools.com www.NIOSH.com

7- Facilities Required for Teaching and Learning

- Lecturing facilities including; data Show, Overhead Projector, Slide Projector, Internet connection
- Computer Facilities including PC w Plasma Screen and internet connection
- Anthropometers – Grip Dynamometer
- Field visits to Metal production factories, different work environment (office, industrial, educational), Rehabilitation centers, Care for the disabled and elderly centers

Approval:

	Name	Signature	Date:
Course Coordinator:	**Prof. Ahmed W. Moustafa**		**16 / 7 /2007**
Head of Department:	**Prof. Ahmed W. Moustafa**		**16 / 7 /2007**