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	4th Year / second semester
Date of specification approval	

A- Basic Information

Course Title: Ergonomics II **Course Code:**

Credit Hours: 3 **Lecture:** 2 **Tutorial:** **Practical:** 2

Total: 4

B- Professional Information

1 – Overall Aims of Course

- Acquire knowledge and capabilities required to respond to special consumers (disable, elderly, women, children) design needs
- Gain skills of ergonomic environmental measurements, data manipulation and predicting norms and standards and the use of results to solve work environment problems.
- Utilize ergonomic applications in avoiding work environmental risks and elevate workers awareness of ergonomic standards
- State an obvious role for designers in dealing with ergonomic complications and adapt tools to match Egyptian worker capabilities and limitations.
- Develop students ability to utilize human and physical resources to achieve a better ergonomic relation between man and working environment, tools and equipment.
- Improve student capacity in critical evaluation of special cases of design.
- Acquire cooperative work skills in performing surveys and large samples exploitation.
- Identify techniques of ergonomic problems administration through analysis and evaluation to find most advantageous solutions.
- Identify possible strategies for setting up a safer and comfortable work environment and for minimizing workloads and enable the best arrangement of worker and work environment and tools.
- Study major considerations and requirements for the control of work environment and organization of equipment and work duties to realize best match for human capabilities
- Expand student capabilities of understanding and evaluating environments and workplaces that realize workers comfort and safety.

2 – Intended Learning Outcomes of Course (ILOs)

a) Knowledge and Understanding:

U_1	Define terms related to disability and handicapped
U_2	Identify characteristics of disabled users of products
U_3	Acknowledge the importance and methods of designing for the handicapped consumer.
U_4	Recognize design requirements for the disabled users of products
U_5	Distinguish women as a special case of product users
U_6	Categorize characteristics of female users of products
U_7	Admit the importance and methods of designing for women.
U_8	Recognize design requirements for the female users of products
U_9	Pregnant woman as a special design case study
U_{10}	Acknowledge the importance and methods of designing for children.
U_{11}	Recognize design requirements for the young users of products
U_{12}	Acknowledge the importance and methods of designing for the elderly consumer.
U_{13}	Identify characteristics of elderly users of products
U_{14}	Recognize design requirements for the elderly users of products
U_{15}	Describe cognitive skills such as perception, memorizing and reasoning
U_{16}	Distinguish basic concepts of motor response
U_{17}	and mental workload Study the influence of decision-making
U_{18}	Elevate awareness of the significance and concepts of skilled performance
U_{19}	Appreciate the significance of human-computer interaction
U_{20}	Assess the impact of work stress
U_{21}	Appreciate the significance of human reliability
U_{22}	Recognize the human information Handling
U_{23}	Categorize dynamic and static information display
U_{24}	Compare Audio and Graphical information display
U_{25}	Discuss elements of the thermal environment
U_{26}	Study Noise impact of human perception
U_{27}	Recognize the significance of lighting
U_{28}	Discuss individual differences in response to different classes of lighting
U_{29}	Recognize design requirements for Seating
U_{30}	Define basic communication skills and concepts
U_{31}	Evaluate resource management techniques
U_{32}	Be acquainted with work design essentials
U_{33}	Explore and be aware of materials handling techniques
U_{34}	Identify concepts of virtual organization, and participatory design
U_{35}	Recognize major workplace layout and planning considerations
U_{36}	Be familiar with elements of organizational culture
U_{37}	Be aware of major considerations of shift work
U_{38}	Understand control-display layout and compatibility aspects
U_{39}	Appreciate considerations of safety and health

b) Intellectual Skills

I_1	State the nature of ergonomics problems related to work place and work environment design
I_2	Resolve samples of ergonomics problems related to the relation between man and his working environment 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 the design for handicapped, elderly, children and women and other cases of special consumer.

I_5	Recognize and make effective recommendations in written and/or graphical form to correct human factors deficiencies in existing human-machine systems.
I_6	Identify questions or problems in the realm of human factors engineering appropriate for research.
I_7	Predict the most effective environmental factors affecting human work performance
I_8	Resolve problems of the interaction between special cases of consumers with their work, products and services offered for them.

c) Professional and Practical Skills

P_1	Practice using ergonomics values and methodologies in the design of clothing, dressing & grooming aids
P_2	Practice performing functional design of bedroom products for the special consumer
P_3	Investigate design criteria of cooking, drinking and tableware aids For the special consumer.
P_4	Design ergonomic conventional household tools for the handicapped and/or elderly within the house
P_5	Design ergonomically approved rehabilitation equipment or tools for the workplace
P_6	Design ergonomically accepted mobility aids products
P_7	Design ergonomically agreed upon elements of bathroom safety
P_8	Ability to identify the problem - ability to estimate cost - ability to diagnose
P_9	Practice the measurements of human body dimensions of sample of elderly or handicapped
P_{10}	Design a standard model of a working environment
P_{11}	Practice the measurements of lighting level and their impact on performance accuracy
P_{12}	Practice the measurements of noise level and their impact on human performance
P_{13}	Perform an ergonomic experiment to identify the major thermal environment elements affecting human performance
P_{14}	Perform an ergonomic experiment using pairs comparison for selecting the best design of a seat within the classroom
P_{15}	Describe in writing the meaning and importance of human factors engineering,.
P_{16}	Describe in writing and/or by illustrations human sensory, cognitive, and physical capabilities and limitations relevant to the design of human-machine systems.
P_{17}	Correctly apply human-machine system design principles to develop written and graphical design specifications.
P_{18}	Select and correctly use appropriate human-machine system analysis and design tools.
P_{19}	Describe in writing and/or by illustrations the human-machine systems engineering process.
P_{20}	Correctly apply the human-machine systems engineering process by developing analysis documents and design specifications for a simple human-machine system.
P_{21}	Design, conduct, and document an ergonomics experiment or other ergonomics study approved by the instructor.

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. Special Consumer Ergonomic Design	4	2	2	
• Ergonomic Design for the handicapped				
• Ergonomic Design for Women				
• Ergonomic Design for Kids				
• Ergonomic Design for the elderly				
2. Applications in design for the Special Consumer Ergonomics	4	2	2	
• Design practices to respond to problems of special consumers design				
3. Cognitive Ergonomics	4	2	2	
• Mental capacity				
• Perception, memory and reasoning capabilities				
• motor response				
• mental workload				
• decision-making	4	1		3
• skilled performance،				
• human-computer interaction	4	1		3
• work stress				
• human performance reliability				
4. Information Ergonomics				
• Human information Handling	4	1		3
• Dynamic and static information display				
• Audio information display	4	1		3
• information display				
5. Environmental Ergonomics	4	1	1	2
• Work environment design				
• Thermal environment				
• Noise	4	1		3
• lighting				
• Seating				
6. Organizational Ergonomics	4	1		3
• Communication				
• Human Resource management				
• Work design				
• Materials handling	4	1		3
• virtual organization				
• Ergonomics and system design				
• Workplace layout				
• Participatory design	2	1		1
• Organizational culture				

7. Work Ergonomic Applications	4	1		3
• Work Design				
• Material handling				
• Shift work				
• Control Display Design				
• Control design				
• Control-display layout				
• Control-display compatibility				
• Work safety Design	4	1		3
• Safety and health				
General review	2		2	
Practical exam	4			4
Written exam	2			
Total disregarding final exam time	60	17	9	34

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 special consumer design considerations.	Week	4
Assessment 2	Oral test or quiz	Week	5
Assessment 3	Report on work environment design	Week	6
Assessment 4	Med term examination	Week	7
Assessment 5	Report on environmental survey 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 – Muscle strength dynamometer - Grip Dynamometer – Light intensity meter – Digital Thermometer – Noise level Meter
- 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**