

OLLSCOIL NA hÉIREANN, GAILLIMH
NATIONAL UNIVERSITY OF IRELAND, GALWAY

SEMESTER II EXAMINATIONS 1999-2000

BE INDUSTRIAL ENGINEERING AND INFORMATION SYSTEMS

Human Factors Engineering IE438

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Instructions:

Time Allowed: 3 Hours

Attempt: 5 Questions

Show all your work clearly

Use separate answer books for each section

Section A: Ergonomics of the Workplace

Question

Marks

Q.1 Write short notes on **four** of the following:

5x4

- NIOSH Lifting Equation 1991
- Procedure for anthropometric design
- Posture assessment
- Considerations in choosing a sitting, standing or sit-standing work posture
- Design for manufacturing assembly
- Primary problems associated with shiftwork

- Q.2** (a) Explain what you understand by the terms: **2x3**
- Carpal Tunnel Syndrome
 - Cubital Tunnel Syndrome
 - Thoracic Outlet Syndrome
- (b) Describe the main risk factors in the development of Carpal Tunnel Syndrome. **8**
- (c) Give examples of manufacturing jobs and their elements associated with these risk factors. **6**
- Q.3** (a) Outline the main categories of constraints in anthropometrics. **8**
- (b) Discuss body-size variations in the context of workplace design. **12**
- Q.4** (a) Outline Corlett and Clark's (1995) iterative approach to design. **8**
- (b) Describe in detail the approach they recommend to designing for safety. **12**

Section B: Human and Organisational Aspects of Operations

- Q.5** Write short notes on four of the following: **5x4**
- The roles of the supervisor in Supervisory Control
 - Mechanistic job design
 - HITOP skill requirements for Advanced Manufacturing Technology (AMT)
 - Disadvantages of lean production
 - Knowledge, Skill and Ability (KSA) requirements for teamwork
 - Sociotechnical design of sawmills in Sweden
- Q.6** What are the practices that distinguish Lean Manufacturing from traditional manufacturing? How do these impact on work organisation? Use examples where appropriate to illustrate your answer. **20**
- Q.7** (a) Distinguish between The Two-Factor Theory of job design, The Job Characteristics Model approach to job design and the Sociotechnical Systems approach to job design. **14**
- (b) What are the main practical suggestions that have arisen as a result of the three approaches above? **6**

- Q.8** (a) Define a disturbance in the context of Advanced Manufacturing Technology (AMT). Identify the main types of disturbance in AMT. **8**
- (b) Outline a number of techniques that can be used to identify hazards and assess risks at the design stage of an (AMT) advanced manufacturing system. Describe in detail one of these using examples where appropriate to illustrate your answer. **12**