**Techno India NJR Institute of Technology**



**Course File**

**Human Safety (**7AG6-60.1**)**

Shambhu P.Choubisa

(Assistant Professor)

**Department of Mechanical**



**Course Overview:**

Course Description & Objectives: To impart the fundamental knowledge to the student on the importance of human engineering and safety in the field of agriculture machinery.

Objectives of the human factors approach should be to: a) Conduct the planning, reviewing, prioritization, coordination, generation, and updating of valid and timely human factors information to support agency needs; b) Develop and institutionalize formal procedures that systematically incorporate human factors considerations into agency activities; and, c) Establish and maintain the organizational infrastructure that provides the necessary human factors expertise to agency programs.

1. **Course Outcomes:**

| **CO. NO.** | **Cognitive Level** | **Course Outcome**  |
| --- | --- | --- |
| 1 | Synthesis | Understand the importance of human factors and their application in system development.  |
| 2 | Synthesis |  Understand the effect of visual, auditory and factual displays in human performance. |
| 3 | Synthesis |  Understand the importance of optimum work-rest cycles in endurance.  |
| 4 | Synthesis | Revise b& able to ideally design the work space in accordance to anthropometry. |
| 5 | Synthesis | Revise the general understanding of safety features and regulation acts in farm machinery.  |

**Course Outcome Mapping with Program Outcome:**

| **Course Outcome**  | **Program Outcomes (PO’s)** |
| --- | --- |
| **CO. NO.** | **Domain Specific (PSO)** | **Domain Independent (PO)** |

| **Course Outcome** | **PO1** | **PO2** | **PO3** | **PO4** | **PO5** | **PO6** | **PO7** | **PO8** | **PO9** | **PO10** | **PO11** | **PO12** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| CO1 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| CO2 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 1 |
| CO3 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 1 |
| C04 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 1 |
| C05 | 0 | 0 | 2 | 0 | 0 | 2 | 1 | 1 | 0 | 1 | 0 | 1 |
| **Average** | 0.00 | 0.00 | 2.00 | 0.00 | 0.00 | 1.40 | 1.00 | 0.60 | 0.60 | 1.00 | 0.40 | 1.00 |

**Course Coverage Module Wise:**

| **Lecture No.** | **Unit** | **Topic** |
| --- | --- | --- |
| 1 | **1** | **INTRODUCTION:** Objective, scope and outcome of the course. |
| 2 | **2** | **HUMAN FACTORS IN SYSTEM DEVELOPMENT-** Basics |
| 3 | 2 | Concept of system |
| 4 | 2 | Basic processes in system development |
| 5 | 2 | Performance reliability |
| 6 | 2 | Human performance |
| 7 | 2 | Visual display |
| 8 | 2 | Major Types of display |
| 9 | 2 | Use of display  |
| 10 | 2 | Auditory and factual display |
| 11 | **3** | **MEASUREMENT OF ENERGY** |
| 12 | 3 | Types of energy , types of work |
| 13 | 3 | Measurement of energy |
| 14 | 3 | Direct & Indirect method |
| 15 | 3 | Energy cost of different activities |
| 16 | 3 | Acceptable work load |
| 17 | 3 | Noise & vibration |
| 18 | 3 | Noise measurement |
| 19 | 3 | Vibration measurement |
| 20 | 3 | Noise and vibration measuring equipment |
| 21 | **4** | **ANTHROPOMETRY-**Basics  |
| 22 | 4 | Basic ergonomic design principles |
| 23 | 4 | Equipment used for anthropometric dimensions |
| 24 | 4 | Procedure for measuring anthropometric dimensions |
| 25 | 4 | Arrangement of workplace  |
| 26 | 4 | Use of workplace |
| 27 | 4 | Effect of atmospheric condition on Anthropometry  |
| 28 | 4 | Various heat exchange processes |
| 29 | 4 | Heat exchange performances  |
| 30 | 4 | Anthropometry engineering applications |
| 31 | **5** | **DANGEROUS MACHINE REGULATION ACT** |
| 32 | 5 | DMR – applications , use  |
| 33 | 5 | Basics of industrial safety  |
| 34 | 5 | Industrial safety training |
| 35 | 5 | Rehabilitation & Compensation to accident victims  |
| 36 | 5 | Types of industrial accident & how to avoid or minimizes it. |
| 37 | 5 | Safety gadgets for spraying |
| 38 | 5 | Safety gadgets for thrashing  |
| 39 | 5 | Chaff cutting |
| 40 | 5 | Tractor & trailer operation |

TEXT BOOKS:

1. Ernest and Mc Cormick, E.L. (1970). Human factors in engineering and design. Mc Graw Hill Co., New York.
2. Grandjean, E. (1988). Fitting the task to the man. Taylor and Francis, London.
3. Human Engineering & safety by Er. N. K. Chhuneja Prof. Santokh Singh

**Assessment Methodology:**

1. Practical exam in lab where they have to prepare practical model related to thermodynamic laws .(Once in a week)
2. Assignments one from each unit.
3. Midterm subjective paper where they have to attempt numericals.
4. Final paper at the end of the semester subjective.

**Teaching and Learning resources unit-wise:**

**Unit-1**

1. INTRODUCTION: Objective, scope and outcome of the course.

Video Tutorials: https://www.youtube.com/watch?v=H6WQfS6S3V4

Theory conceptshttps://drive.google.com/file/d/1t5sFu7mjJ0GdmgVDPCeARVuFB9gJVIJ4/view?usp=sharing

Sample Quiz:<https://www.proprofs.com/quiz-school/story.php?title=topic-6-product-design>

 **Unit-2**

1. HUMAN FACTORS IN SYSTEM DEVELOPMENT- Basics

Video Tutorials: https://www.youtube.com/watch?v=v-eltsixu4I

Theory concepts: https://drive.google.com/file/d/1t5sFu7mjJ0GdmgVDPCeARVuFB9gJVIJ4/view?usp=sharing

Sample Quiz:https://www.proprofs.com/quiz-school/story.php?title=topic-6-product-design

 **Unit-3**

**A.** MEASUREMENT OF ENERGY( Direct & Indirect)

Video Tutorials:https://www.youtube.com/watch?v=bCjaT\_WtwTU

Theory concepts:https://drive.google.com/file/d/1t5sFu7mjJ0GdmgVDPCeARVuFB9gJVIJ4/view?usp=sharing

Sample Quiz:<https://www.proprofs.com/quiz-school/story.php?title=topic-6-product-design>

 **Unit-4**

**A.** Anthropometry

Video Tutorials: <https://www.youtube.com/watch?v=HD3HtwXTztA>

Theoryconcepts:https://drive.google.com/file/d/1t5sFu7mjJ0GdmgVDPCeARVuFB9gJVIJ4/view?usp=sharing

Sample Quiz: https://www.proprofs.com/quiz-school/story.php?title=topic-6-product-design

**Unit-5**

1. Dangerous machinne regulation act

Video Tutorials: https://www.youtube.com/watch?v=opYiIrcN-jE

Theory concepts: <https://drive.google.com/file/d/1t5sFu7mjJ0GdmgVDPCeARVuFB9gJVIJ4/view?usp=sharing>

Sample Quiz: https://www.proprofs.com/quiz-school/story.php?title=topic-6-product-design