


HUMAN FACTORS ENGINEERING

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INTENDED AUDIENCE : Students belonging to disciplines like Industrial Engineering and Management, Agricultural Engineering Production Engineering, Manufacturing Science and Engineering, Mechanical Engineering and allied disciplines

INDUSTRY SUPPORT : Tata Steel, Tata Motors, L&T, Linde and similar such manufacturing organizations complying Industry 4.0 standards.

COURSE OUTLINE :

To introduce the basic concepts and the important issues (related to theory and application) inergonomics and human factors engineering for worksystem performance and product design improvement, and the use of these concepts and technologies to select jobs and situations in industries. The knowledge in the topics as mentioned in the course outline is essential to achieve these objectives. The course is intended to be designed for creating a knowledge-base of the state-of-the-art ergonomic/human factors-based worksystem in manufacturing and service organizations. The course is designed to teach the basic concepts and tools and techniques and methods employed in the broad area of human factors engineering focusing on anthropometric principles in the worksystem design, work capacity and fitness for work, work posture and body mechanics, design of physical environment, design of manual material handling tools and hand tools, and ergonomic performance of different kinds of worksystems.

ABOUT INSTRUCTOR :

Prof. Pradip Kumar Ray is presently Emeritus Professor at the Department of Industrial and Systems Engineering and Adviser, Vinod Gupta School of Management (VGSoM), Indian Institute of Technology (IIT), Kharagpur, India. He received his PhD (in 1991 in the field of Productivity Engineering and Management of Manufacturing and Service Functions) and MTech (IE & OR) (in 1981) degrees from IIT, Kharagpur, and Bachelor of Engineering in Mechanical Engineering (in 1979) degree from IIEST Shibpur, India. Professor Ray has more than forty years of diversified experience – eight years as Senior Industrial Engineer/Manager at General Electric Company of India and thirty two years of teaching and research experience at IIT, Kharagpur. A former Head of ISE department and Dean of VGSoM, Professor Ray is a certified Lead Assessor for ISO-9001 registration, and actively involved in a number of industrial consulting and research projects (29 such projects till date) in his interest areas. He is a member of several professional bodies, such as INFORMS and IIMM, and a Fellow of World Academy of Productivity Sciences (WAPS) and a Fellow of Ins titution of Engineers (India) and currently, Chairman, Production Engineering Division of its West Bengal State Centre. He is a recipient of P C M aha lanobis Awa rd of Opera tional Resea rch Soc iety of India (ORSI) for his outstanding contribution in the field of Engineering. Prof. Virendra Kumar Tewari, is presently the Director of IIT Kharagpur. He obtained his B.Tech.(Hons.) degree in Agricultural Engineering in 1979 from Indian Institute of Technology, Kharagpur, followed by M.Tech.(Farm Machinery & Power) and Ph.D(Engg.) from the same institute in 1981 and 1985 respectively .His field of specialization includes, Machinery Systems Design, Industrial Ergonomics and Safety, and Electronics Application in Farm Machinery Design. Professor Tewari has published more than 150 research papers in National and International peer reviewed journals and conference proceedings in the field of Tractor & Farm Machinery Design, Industrial Ergonomics & Safety and Precision Agriculture.He is also one of the key reviewers of research articles in International Journals like, Bio Systems Engineering, UK, International Journal of Industrial Ergonomics, USA, International Agricultural Engineering Journal, AIT, Bangkok, Safety Science, CIGR Journal, and NAAS, New Delhi. Professor Tewari is a Fellow of the National Academy of Agricultural Sciences, Indian Society of Agricultural Engineers and Institution of Engineers (India) and a long standing Member of the American Society of Agricultural and Biological Engineers, USA. He is also a Life Member of different Professional Societies such as, Indian Society for Technical Education, Indian Society of Weed Science, Association of Food Scientist of Technologist (India). Professor Tewari has successfully completed more than a dozen research projects in the field of Ergonomics & Safety, Farm Machinery Design, Precision Farming Technologies funded by several sponsoring agencies such as, ICAR, New Delhi; Williamson Magor& Co. Ltd., Kolkata; Tata Steel Co., Ltd., Jamshedpur etc.

COURSE PLAN :

Week 1: Introduction to Human Factors and Ergonomics
Week 2: Anthropometry in Workstation Design
Week 3: Physiology, Workload, and Physical Work Capacity
Week 4: Design of Manual Material Handling Tasks
Week 5: Ergonomic Design of Computer Workstations
Week 6: Industrial Application: Work Posture for Tasks, Hand Tool Design
Week 7: Measurement and Evaluation of Physical Environment: Visual Environment
Week 8: Measurement and Evaluation of Physical Environment: Thermal Environment and Vibratory Environment
Week 9: Measurement and Evaluation of Physical Environment: Auditory Environment

Week 10: Ergonomic Design for Manufacturing and Assembly
Week 11: Human Factors Principles and Design of Shift Work
Week 12: Ergonomic Performance of Worksystems