RV College of Engineering®, Bengaluru – 59

(Autonomous Institution affiliated to VTU, Belagavi)

Department of Industrial Engineering and Management

29.09.2025

IM233AI- Work Systems Design SEE Guidelines (2025-2026)

1. Introduction

The final practical examination for the Work Systems Design course will be conducted in a project-based mode. Students must work in teams to develop a prototype, model, digital solution, or framework addressing a work systems design problem. The evaluation will be conducted in an exhibition format at the semester end. Students must visit a **manufacturing industry, hospital, IT company, service sector, or campus facility** to **observe real-world systems**, identify gaps, and propose **improvements through prototypes, models, or frameworks**.

2. Team Formation

- Each team should consist of **three students**.
- Teams must be formed at the beginning of the semester.
- Once formed, teams cannot be changed unless approved by the Lab In-Charge under special circumstances.

3. Project Topic Selection

- The Lab In-Charge will provide a **suggestive list of project topics** related to work systems design.
- Teams may select a topic from the list or propose their own, with prior approval.
- The topic must be finalized within **two weeks** from the start of the semester.

4. Project Execution

Each team must work systematically on their project, following these stages:

1. **Problem Identification** – Define a real-world work systems design problem and justify its relevance.
2. **Objective Setting** – Clearly outline the goals and expected outcomes.
3. **Literature Review** – Summarize existing research, models, and case studies relevant to the chosen topic. Highlight gaps your project aims to address. (Minimum 20 journal papers to be referred)
4. **Methodology** – Describe approach, tools (e.g., layout analysis, simulation, line balancing, ergonomics, lean tools).
5. **Analysis & Results** – Present data, observations, findings.
6. **Prototype Development** – Build a **physical/digital model, system, or layout** demonstrating the solution.

5. Final Evaluation & Exhibition

- Conducted in **exhibition mode**.
- Teams will display their prototype/system/framework and explain its functionality.
- Projects will be assessed by faculty and external evaluators using predefined rubrics.

6. Project Report Submission

- A concise **project report** must be submitted before the final exhibition.
- The report should be in IEEE format which should include **abstract, keywords, introduction, literature review, methodology, results/discussion, conclusion, and references**.
- Each team must also prepare a **poster (A1 size)** summarizing their project. The poster

should highlight the **problem, objectives, methodology, prototype/model, and key findings** in a visually engaging manner. Format for poster will be shared.

- All deliverables (**Poster, IEEE paper**) must be submitted in **PDF format** via email as per instructions.

7. Plagiarism Policy:

- Plagiarism in the report, poster, or IEEE paper must be **less than 10%** (checked via Turnitin/Drill Bit/Urkund or equivalent).
- AI-generated content plagiarism (AI writing detection tools) must be **less than 5%**.
- Any work exceeding these limits will be **rejected or returned for revision**.

8. Evaluation Rubric (50 Marks)

Criteria	1-2 Marks (Needs Improvement)	3-4 Marks (Satisfactory)	5-6 Marks (Good)	7-8 Marks (Very Good)	9-10 Marks (Excellent)
Problem Identification & Relevance (10)	Unclear, weak relevance	Defined but lacks depth	Clear but moderate relevance	Well-defined with good justification	Highly relevant, justified, significant
Innovation & Creativity (10)	No originality	Basic/common idea	Some creativity	Innovative with practical elements	Highly innovative, novel solution
Prototype/Model Development (10)	Poorly developed, lacks functionality	Basic model with limited use	Functional but limited usability	Well-developed, functional	Highly functional, polished, industry-ready
Practicality & Real-World Application (5)	Not feasible	Limited applicability	Somewhat practical	Practical with minor refinements	Highly practical, real-world ready
Data Collection & Research (5)	No supporting data	Minimal research	Some relevant data	Good supporting data	Extensive, strong, data-driven
Presentation & Communication (10)	Unclear, poor delivery	Basic, lacks engagement	Structured but moderate	Clear, engaging	Highly professional, impactful

9. Important Dates

- **Team Formation Deadline**: 13.10.2025
- **Topic Selection Deadline**: 17.10.2025
- **Project Progress Review 1**: 10.11.2025 to 14.11.2025
- **Project Progress Review 2**: 22.12.2025 to 27.12.2025
- **Report/Poster/Prototype Submission Deadline**: 05.01.2026 to 11.01.2026
- **Final Exhibition & Evaluation (SEE)**: 03.02.2026 to 13.02.2026

10. Suggestive Project Topics

(i) Work Systems Design Project Ideas

- **Manufacturing / Production**
  - Assembly Line Balancing – Optimizing workstation allocation to minimize idle time and improve throughput.

- Plant Layout Redesign – Proposing an improved factory/workshop layout to reduce material handling effort.
- Time & Motion Study of a Manufacturing Task – Analyzing and optimizing manual processes for efficiency.

- **Logistics & Supply Chain**
  - Warehouse Layout Optimization – Reducing travel distance in material picking.
  - Milk-Run Scheduling for Material Supply – Designing a route-based system to replace multiple point-to-point deliveries.
  - Queue Management System in Loading/Unloading Docks – Reducing waiting time for trucks at warehouses.
- **IT / Service Systems**
  - Digital Workflow Automation for Attendance/Records – Reducing manual errors and delays in data management.
  - Call Center Shift Scheduling – Designing schedules that balance workload and reduce employee fatigue.
  - Canteen Queue Optimization – Improving layout and ordering process to minimize wait time.
- **Healthcare**
  - Patient Flow Optimization in Outpatient Department (OPD) – Reducing waiting time and improving service flow.
  - Shift Scheduling for Nurses/Doctors – Balancing workload and minimizing fatigue.
  - Redesign of Diagnostic Lab Workflow – Improving sample handling, testing, and reporting efficiency.
- **Education / Institutional Systems**
  - Classroom Layout Redesign for Space Utilization – Optimizing seating arrangement for better visibility, comfort, and flow.
  - Library Book Circulation Process Improvement – Reducing turnaround time for issue/return.
  - Transport Scheduling for Students & Staff – Optimizing bus routes and timings to reduce delays.

(ii) Lean Systems Project Ideas

- **Education Institutions**
  - 5S Implementation in College Laboratories – Improving lab organization and safety using Sort, Set in Order, Shine, Standardize, Sustain.
  - Value Stream Mapping of Library Book Circulation – Identifying bottlenecks in issuing/returning books and reducing lead time.
  - Canteen Food Service Flow Optimization – Reducing waiting times in queues using lean layout and pull system.
- **IT Sector / Services**
  - Lean Process Mapping for Student Attendance/Exam Result Processing – Digitizing workflows to cut delays and redundancy.
  - Reducing Wastage in IT Helpdesk Support Tickets – Applying lean concepts to minimize repetitive tickets and improve first-time resolution.
  - Kaizen in Software Development Teams – Identifying small improvements in task allocation and sprint planning.
- **Manufacturing Sector**
  - Line Balancing in Assembly Operations – Reducing idle time and improving throughput in a small assembly line.
  - SMED (Single Minute Exchange of Dies) for Quick Changeovers – Reducing setup/changeover times in a machine shop.

- Kanban-Based Inventory Management – Designing a simple pull system to minimize overstock and stockouts.
- Waste Elimination Study in a Welding/Workshop Area – Identifying and reducing defects, motion waste, and waiting time.

- **Hotel & Hospitality Industry**
  - Lean Layout Design for Hotel Kitchen – Streamlining food preparation flow to reduce travel distance and waste.
  - Reducing Food Waste in Buffets – Applying lean measurement tools to balance preparation with demand.
  - Housekeeping Kaizen Project – Time and motion study to reduce wasted steps in room cleaning.
- **Healthcare Industry**
  - Lean Patient Flow in Outpatient Department (OPD) – Reducing patient waiting time using value stream mapping.
  - Inventory Optimization for Hospital Pharmacy – Using Kanban and pull systems to reduce expired or overstocked medicines.

(iii) Ergonomics Related Project Ideas

- **Education Institutions**
  - Ergonomic Redesign of Classroom Furniture – Chairs and desks designed to reduce posture-related discomfort.
  - Backpack Redesign for Students – Weight distribution to minimize back and shoulder strain.
  - Computer Lab Workstation Ergonomics Study – Optimizing desk height, monitor position, and seating.
- **IT / Office Workplaces**
  - Smart Posture Monitoring System for IT Employees – Wearable/device that alerts users about poor posture.
  - Ergonomic Redesign of Keyboard/Mouse – Prototype to reduce wrist strain (carpal tunnel risk).
  - Standing Desk Prototype – Adjustable workstation design to alternate between sitting and standing.
- **Manufacturing Sector**
  - Workstation Layout Redesign for Assembly Line Workers – Reducing reach and motion fatigue.
  - Ergonomic Hand Tool Design – Reducing grip force and strain for tools like pliers, screwdrivers, or hammers.
  - Anti-Fatigue Floor Mat Design – For operators who stand long hours on shop floors.
- **Hotel & Hospitality Industry**
  - Housekeeping Ergonomics Study – Redesign of cleaning tools/equipment to reduce bending and back injuries.
  - Ergonomic Luggage Handling Trolley Design – For bellboys to minimize musculoskeletal stress.
  - Kitchen Ergonomics Improvement – Optimal counter height and tool arrangement to reduce strain.
- **Healthcare Industry**
  - Ergonomic Patient Handling Device – Safer lifting/transfer mechanisms for nurses and caregivers.
  - Ergonomic Wheelchair Redesign – Improving maneuverability and comfort for patients.
  - Hospital Bed Redesign – Adjustable features to reduce strain on both patients and caregivers.

(iv) Safety-Related Project Ideas

- **Education Institutions**
  - Fire Evacuation Route & Signage Redesign – Optimizing classroom/lab evacuation with clear routes and maps.
  - Campus Transport & Pedestrian Safety Study – Improving zebra crossings, bus stops, and student walking zones.
  - Workshop Safety Audit – Identifying risks in college workshops and proposing redesigns for safer equipment layout.
- **IT Sector / Offices**
  - Emergency Evacuation Simulation for IT Buildings – Route optimization and signage improvement.
  - Cable Management & Electrical Safety in Workstations – Reducing tripping and fire hazards in offices.
  - Night-Shift Fatigue Detection System – Monitoring alertness of IT staff working long hours.
- **Manufacturing Industry**
  - Machine Guarding Redesign – Developing protective barriers to prevent operator injuries.
  - IoT-Based Hazard Detection System – Detecting gas leaks, fire, noise, or vibration hazards.
  - PPE (Personal Protective Equipment) Ergonomic Redesign – Designing safer, more comfortable helmets, gloves, or masks.
- **Hotel & Hospitality Sector**
  - Fire & Emergency Preparedness in Hotels – Evacuation drills, signage redesign, and safety dashboards.
  - Kitchen Safety System – Gas leakage detection and safer workflow for hotel kitchens.
  - Housekeeping Safety Audit – Identifying injury risks and redesigning cleaning equipment.
- **Healthcare Sector**
  - Safe Patient Lifting System for Nurses – Prototype of mechanical/assistive devices to prevent back injuries.
  - Fall Detection System for Elderly Patients – Wearable or sensor-based monitoring and alert system.
  - Hospital Emergency Evacuation Simulation – Planning safe exit routes for patients, including those with mobility issues.

29/9/25
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(Lab Incharge)

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10/10/25
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