

SK計劃課程 114-1授課教師教學內容

課程時間目前可能安排於:
 3-B、3-CD、5-B、5-78

*各教師課程內容規畫會另調整安排

- 114-1開課課程:個案研究、工業工程方法
- 114-2開課課程:個案研究、問題解決
- 115-1開課課程:個案研究、工業工程方法
- 115-2開課課程:個案研究、問題解決



Case study: Ergonomics 個案研究: 人因工程

1. Core Ability Direction

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- Problem finding & Problem solving.
- Develop an effective presentation narrative.
- 2. Prerequisite: Motion and Time Study, Ergonomics

3. Course Design: 24 hours

Hour	Content					
2	Lecture: Introduction of course and ergonomics					
2	Guided reading: Individual assignment					
2	Lecture: Ergonomic assessment in the workplace(NMQ+MSDs) and case studies					
2	КІМ					
2	Office Ergo					
-	Prepare mid-term exam					
2	Offline: read assgined office ergo					
2	Guided journal paper reading: Individual assignment					
2	1. Prepare ErgoOffice Questionnaire 2. Release questionnaire 3. Collect data					
2	4. Analyze data 5. Revise questionnaire					
2	Dronara final report slide 8 hard conv					
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2	Final presentation					





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(Service Quality and Crisis Management)



Case material is taken from Kung-Hwa Management Cases Collections



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Case Study

(Service Quality and Crisis Management)

Teaching Plan and Class Discussion:

- 1. Service Quality Perceived by Customers
- 2. Service Failure
- 4. Service Recovery
- 5. Crisis Management
- 6. Case study on Service Industry
 - Aviation, Hospital, Hotel, Catering industry...

Simulation – FlexSim and Witness

- Kendall notations and basic Statistics and Queueing Concepts 1 hour
- FlexSim Little Factory (2 hours)
 - Source, Sink, Queue, Processor
 - Conveyors, Stack, Transporter, AGV
 - Global Table, List
- Witness Little Factory (2 hours)
 - TBD

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- FlexSim Healthcare Little model (4 hours)
 - Process Flow
 - People Module
- Case study
 - Student Group Project



- 3D Model
 - Queue × 6 temporally place items

Simple Jobshop System

- General Process flow
 - Source Generate Token
 - Create Object Generate item (product)
 - Sink Destroy Token
- 3D Model
 - Queue × 6 temporally place items
 - Processor × 5 proceed items
- Tool Box
 - Item List
 - Global Table





Innovative Design – by Hsin Rau

• What Is TRIZ?

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- Key Discoveries
- Hierarchical View
- Seven Pillars
- Success Stories
- Global Innovation Index
- Applications & Organizations
- TRIZ and Systematic Innovation Tools (1)
 - Six Thinking Hats with Practice
 - Psychological Inertia
 - STC Operator
- TRIZ and Systematic Innovation Tools (2)
 - Ideality
 - Ideal Final Result
 - 9 Windows Method with Practice
 - S-curve



Innovative Design – by Hsin Rau

- TRIZ Solution Procedure (1)
 - Problem Definition
 - Function Analysis
 - Cause Effect Chain and Contradiction
 Analysis
- TRIZ Solution Procedure (2)
 - 40 Inventive Principles
 - Contradiction Matrix
 - Design Evaluation
- Final Project

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- Project Proposal
- Project Presentation

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Criterion 1				
Criterion 2				
Criterion 3				
Criterion N				
Overall				





Manufacturing/AI : CPS introduction

- Phase 1: Virtual system development
 - Platform: Automation Studio
 - 1. Introduction of technologies applied to manufacturing systems
 - 2. Process control introduction
 - a) Actuators

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- b) Electric control system (JIC and IEC standards)
- c) PLC and Ladder diagrams
- d) Sequential Function Charts (SFC)
- e) 3D virtual system development (Case study and existing equipment)

Note: Please refer to the figures (1) CPS development Plan and (2) CPS development details



Manufacturing/AI : CPS introduction

- Phase 2: CPS development
 - Platform: Automation Studio
 - 1. Introduction of physical control units
 - a) Mitsubishi
 - b) Omron

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- 2. Introduction of communication strategies
 - a) OPC severs
 - b) OPC DA/UA
 - c) Communications

Note: Please refer to the figures (1) CPS development Plan and (2) CPS development details





AI Technology for Computer Vision Application(1/2)

Object detection vs. image segmentation vs. image classification



Source: https://levity.ai/blog/what-is-an-image-classifier

- Course Objectives
 - To learn the SOTA Object Detection and image segmentation method : YOLOv9

AI Technology for Computer Vision Application(2/2)

Course Outline

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- What is Object Detection and Image Segmentation ?
- Fundamentals of Convolutional Neural Network (CNN)
- The Object Detection and Segmentation method : YOLOv9
- The implementation of YOLOv9 using Pytorch library
 - » Train a YOLOv9 model using the image training dataset
 - » Inference the image testing dataset using your YOLOv9 model



AI real-time Field Crowd Surveillance Application



Industrial Safety Surveillance Application



This course will focus on the GA, a very common type of **Metaheuristic Algorithm**, which is suitable for situations where the best answer is sought among many choices.

※GA is applicable to many Industrial Engineering problems in Management Science and Operations Research.

Course Objectives:



- $\checkmark\,$ Understand the basic concepts and operation principles of GA.
- $\checkmark\,$ Learn to design and implement simple GA to solve practical problems.
- ✓ Explore the practical applications of GA in management science and operations research.



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Metaheuristic Algorithm II **Travelling salesman problem (TSP)** *The application of metaheuristic algorithm.*

The **Travelling Salesman Problem (TSP)** is a classic combinatorial **Optimization** problem.

- The goal is to find the shortest possible route that allows a salesman to visit each city exactly once and return to the starting city.
- TSP is widely used in Logistics, Routing, and Scheduling applications.

Course Objectives:

- \checkmark Understand the definition and challenges of the TSP.
- ✓ Learn how to apply GA, PSO, and SA to solve the TSP and compare their effectiveness and characteristics.





Human factors in lighting and sound

• Learn about lighting-related knowledge

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- Understand the impact of lighting on user
- Learn about sound-related knowledge
- Understand the impact of sound on user







Human factors in lighting and sound

- Through experiments, understand the interaction between humans and lighting environments.
- Using deep learning, model human behavior in lighting environments.

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- Through experiments, understand the interaction between humans and sound environments.
- Using deep learning, model human behavior in sound environments.

