

# Topic Synopsis (SGUS Robotics and Automation)

## 1. Certificate in Essential Skills to Enhance Employability

This certificate covers essential communication areas which include emotional intelligence (EQ), digital marketing and essential job search skills. It introduces key concepts in the areas of data and visual analytics using Power BI, statistics and cyber security. It introduces key concepts in the areas of data and visual analytics using Power BI, statistics and cyber security.

### **Topic 1: Emotional Intelligence (EQ) for Career Decision Making**

This 2 days' workshop is an enhanced training in which participants will acquire job-seeking related skills, capabilities and the ability to expand employment opportunities.

Emotional Intelligence (EQ) facilitates career decision-making process and leads to decisions that can achieve greater satisfy career-related interests, values, and aspirations. Emotions experienced during this process have implications for the perception of risk related to specific career options, the kind of self-exploration individuals will engage in, and how information related to career choice will be processed.

Through EQ, participants will be able to cope and learn to manage one's self-awareness which affect their overall well-being and decision making.

### **Topic 2: Getting ready for Your Next Job**

This course equips participants with the essential job search skills, knowledge and tools that will allow them to present themselves positively on paper, in person and on professional networking sites.

Participants will learn how to craft resumes that get the attention of prospective employers and recruiters and pivot their experiences to succeed and leave a good impression at job interviews (face-to-face or digital). This course also helps jobseekers to get started on using the popular professional networking site, LinkedIn, to create a professional brand for job search and networking.

### **Topic 3: Digital Marketing with Personal Branding**

This course introduces students to tools for establishing a personal brand online and importance of establishing digital marketing strategy to promote their own personal brand.

### **Topic 4: Visual Analytics using Power BI**

The course aims to equip the participant with the following:

**Knowledge and Understanding:** An understanding of how a dashboard works; its advantages and disadvantages and how it will be useful at workplaces.

**Intellectual skills:** How to apply the knowledge received during the course in developing the dashboard and using DAX functions, filters etc.

**Practical skills:** Participants will be developing their own dashboard. This exercise will enable them to show their creativity, skills obtained from the course and a satisfaction from attending the Power BI course.

Transferable skills and personal qualities: The knowledge and skills acquired from this course can be used at workplaces especially for those involved in KPI reporting, dashboard development or someone who have regular management meetings.

By the end of the course, learners will be able to:

- Upload data & and create data models
- Use DAX functions to enhance dashboards
- Associate links between variables for visual and descriptive analytics
- Find hindsight and insights from dashboard

#### **Topic 5: Cyber Security for Non-IT Professionals**

The objectives of the course is to create awareness and understanding of common cyber threats, both at home and at work. Typical mitigation methods will be discussed to help participants make better use of the available cyber security tools to protect themselves against cyber adversaries.

Upon completion of this course participants will be able to:

- Relate what is Cyber Security what are at stake
- Examine common threats (e.g. Phishing, malware)
- Use common mitigation methods
- Use basic wireless and smartphone security
- Outline security related laws (e.g. PDPA, CMA)

## **2. Certificate in Sectoral Fundamentals for Mechanical Engineering**

This certificate introduces fundamentals knowledge and skills in mechanical engineering, which includes thermofluid power, mechanics of materials & machines and engineering materials.

### **Topic 1: Thermofluid Power**

This topic provides trainees with fundamental knowledge and basic principles in the Second Law of Thermodynamics Power Cycles, Air compressors, Conservation of Momentum and Conservation of Energy. Hands-on laboratory classes will reinforce the concepts learnt and will allow to develop robust practical skill-sets on the topics studied.

### **Topic 2: Mechanics of Materials and Machines**

This covers basic concepts of Direct Stress and Strain, Shear Force and Bending Moment Diagrams, First and Second Moment of Area, Bending Theory, Torsion Theory, Torque and Moment of Inertia, Work Power Energy, Simple Lifting Machines and Centripetal Force. These will enable trainees to apply these to analyse the forces and stresses acting on simple engineering structures and machines.

### **Topic 3: Engineering Materials**

This topic introduces the basic properties and applications of general engineering materials such as steel, cast iron, aluminium, copper, thermo-setting and thermo-plastics. Trainees will also be taught the practical skills in mechanical testing, common Non-Destructive Testing (NDT) and metallographic techniques, as well as the knowledge in heat treatment of metallic materials and casting processes.

### **3. Certificate in Job Specialisation for Manufacturing Specialist**

This certificate provide trainees will essential skills and competencies in advanced manufacturing.

#### **Topic 1: Robotic Integration and Programming**

This topic introduces the basics of robot hardware, software and their integration. It includes micro-controller, display components, actuators and sensors. Trainees will get to design, build and test an autonomous robot system.

#### **Topic 2: Industrial Automation**

This topic provides knowledge of automated control operations in local manufacturing industries. It includes pneumatics, relay control system, programmable logic controller, actuators and sensors.

#### **Topic 3: Program and Operate Robots in Manufacturing**

Trainees will be equipped to apply robot safety, robot terminology, basic robot operations, robot pendant operations, controller error handling and robot programming. They will also learn how to program and operate a robot for a pick and place application.

#### **Topic 4: Programmable Logic Controllers**

This topic covers fundamental concepts and examples to understand the operation and capabilities of programmable logic controllers as an important tool for factory automation. Simple control strategies using ladder diagram are implemented.