Outline of *Artificial Intelligence (AI) and Robotic Arm*

Course core configuration products	DOBOT magician (education edition), DOBOT magician (basic edition), mini assembly line
Course description	Using the magician products as a carrier, students can understand AI technology and applications, and try to create new AI projects. Combined with the STEAM education model for multi-disciplinary integration, PBL and the spiral approach are used to guide students to explore the world of AI, recognize hardware and software, and comprehensively develop their problem-solving ability, innovative materialization ability, computer literacy and thinking from different perspectives.
Course objectives	Develop the students' ability to solve problems in various aspects in the K12 stage and enhance students' scientific investigation spirit, practical ability and autonomous learning ability through the robotic arm and Blockly graphic programming. Students: • actively enjoy learning, and this love of learning will be sustained throughout their lives • can understand and analyze AI • can develop strategies for solving problem and testing solutions • can use a variety of technologies within a design process to identify and solve problems by creating new, useful or imaginative solutions • act to make a positive difference to the lives of others and to the environment
Period planning	13 lessons, and 39 tutorials (45-60 minutes per tutorial)

Period arrangement	Course name	Teaching contents	Knowledge areas of related disciplines
Lesson I	A Brief History of AI	1 AI overview 2 AI status 3 AI application cases	AI, intelligent manufacturing and modern industry
Lesson II	Invisible Strength	1 Understand the application of AI in the logistics industry, experience the	AI and logistics, physical (atmospheric pressure

		existence of atmospheric pressure and differential pressure, and understand the action principle of the suction cup type robotic arm through experiments. 2 Grasp the mouse control, the Cartesian coordinate system control and the joint coordinate control in the basic use method of the robotic arm. 3 Compare the three control methods to complete the project of handling paper cups.	and differential pressure) and engineering
Lesson III	The Magic "Hand"	1 Understand the application of the robotic arm in industry through the case of container handling 2 Solve the Tower of Hanoi problem with the robotic arm 3 Learn the connection mode between the robotic arm and the controller and complete the game	Robotic arm and industry, technology, engineering and mathematics
Lesson IV	Robot Painting Contest	1 Understand the application of AI in art through the robot painting contest 2 Learn the principles of robotic arm painting, and install the writing and drawing kit of the robotic arm 3 Complete the project of drawing with the robotic arm	AI and art, fine art, art design and engineering
Lesson V	Wonderful Stacking	1 Review the three industrial revolutions, understand the fourth industrial revolution, process and principle of 3D printing 2 Install and become familiar with the 123D Design software interface 3 Design pen container model with 123D	The fourth industrial revolution, science, art design and mathematics
Lesson VI	Cool Creation	1 Explore the application of 3D printing technology in aerospace 2 Complete the aircraft modeling	3D and aerospace, mathematics, art, art design and engineering

		3 Understand and install the 3D printing kit 4 Learn to use the Repetier Host slicing software	
Lesson VII	Magician on Wood Bricks	1 Understand the woodcarving flow and tools, design and manufacture rubber stamp 2 Understand the use of laser engraving 3 Safely use the laser engraving, design and engrave personalized LOGO	Technology, engineering, art design and science
Lesson VIII	Programming Control Magician	1 Understand the brief history of programming languages, learn the Blockly programming interface and the basic functions 2 Function of items handling achieved via programming 3 Complete the handling task by using the robotic arm after commissioning	A brief history of programming languages, engineering and graphic programming
Lesson IX	Wisdom of Circulation	1 Understand the essence of circulation through the experiment of mind mapping and reclamation of waste paper 2 Use the flow chart to understand the counting process of the circulating operation completed by the machine 3 Task of circulating sealing completed using programming	Mind mapping, environmental protection, science, mathematics, graphical programming and engineering
Lesson X	Domino	1 Experience the joy that AI brings to life through domino building 2 Draw the flow chart, and use the programming to implement the sequential movement of the robotic arm and perform required actions 3 Carry out competition concerning building of dominoes, summarize the problems encountered during the	AI and life, mathematics, art design, engineering and graphic programming

		competition and put forward the solutions	
Lesson XI	Smart Assistant	1 Understand the inconveniences faced by the disabled in life and the help of high-tech equipment, reflecting the concept of the Internet of Things 2 Understand the hazard of not unplugging charger and draw the flow chart for unplugging the charger regularly 3 Regularly unplugging the charger with robotic arm through programming	Internet of Things, mathematics, engineering and graphic programming
Lesson XII	Vibrant Musical Sound	1 Understand the application of AI in music by AI composition 2 Analyze the music programming of the *Two Tigers* by means of the top-down method 3 Play *Two Tigers* with the robotic arm through programming	AI and music, science, engineering and graphic programming
Lesson XIII	Great Challenge of Intelligent Manufacturing	1 Understand the age of industry 4.0 and the method of building an intelligent factory 2 Understand the difference and relation of motion planning, trajectory planning and route planning 3 Analyze the process flow chart of the great challenges of intelligent manufacturing handling procedure in a contrary way, develop thinking from different perspectives, including thinking from an engineering perspective 4 Complete the process of the great challenge of intelligent manufacturing sorting through self-writing, checking and error correction, and develop problem-solving ability	Industry 4.0, intelligent factory, science, engineering and graphic programming

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