Saudi Arabia Development and Training Center (DTC) : Training Course Guide (1)

No.	Course Title	Course Contents	The Participants will be capable for:	Target Level (Participant's Qualification)	Instructor
E1	**PLC Basic Function (LOGO!)** *Location DTC *Duration 5 days *No. of Trainee 5-10 *On-site training is possible.	The features of PLC, Basic functions of PLC (AND, OR, NOT, NAND, NOR, XOR), Special functions of PLC. (on delay, off delay, on/off delay, programmed timer. Time chart), Software simulation of PLC, PLC programming (Ladder programs and function block diagrams)	Conducting ladder circuits, logical symbols, Boolean algebra and truth tables. Conducting ladder diagram and function block diagram programming. Conducting graphical PLC programming and software simulation. Handling of PLC.	Beginners of PLC. Participants need basic knowledge of electricity and electronics. It is desirable to understand logical theories or circuits. Basic PC operation skill is required.	CP
E2	**PLC STEP7** *Location DTC *Duration 5 days *No. of Trainee 5-10 *On-site training is possible.	The features of PLC, Hard ware configuration, Basic functions of PLC (AND, OR, NOT, NAND, NOR, XOR), Special functions of PLC (on delay, off delay, on/off delay, programmed timer, time chart), Software simulation of PLC, PLC programming (Ladder and function block diagrams)	Conducting ladder diagrams, logical symbols, Boolean algebra and truth tables. Conducting ladder diagram and function block diagram programming. Conducting graphical PLC programming and software simulation. Handling of PLC.	Beginners of PLC. Participants need basic knowledge of electricity and electronics. It is desirable to understand logical theories and circuits. Basic PC operation skill is required.	CP
E3	**Pneumatics & Electro-pneumatics** *Location DTC *Duration 5 days *No. of Trainee 5-10	The feature of pneumatics, Pneumatic elements & Electro-pneumatic elements (many kinds of valves, cylinders, switches, solenoid and etc.), Structure of Pneumatic circuits.	Conducting how it works pneumatic and electro-pneumatic elements. Conducting how to assemble a pneumatic and electro- pneumatic circuit. Handling of pneumatic and electro-pneumatic.	Beginners of pneumatics. It is desirable to understand logical theories and circuits.	CP
E4	**PLC & Pneumatics** *Location DTC *Duration 5 days *No. of Trainee 5-10	Pneumatic control, Electro-pneumatic control, PLC programming, Pneumatic and PLC combined control	Conducting how to assemble pneumatic and PLC combined circuits and its control.	Experienced people of PLC. Participants need basic knowledge of electricity and electronics. Basic PC operation skill is required.	CP
E5	**Mechatronics (1) PLC** *Location DTC *Duration 5 days *No. of Trainee 5-10	FMS station control by COSMIL PLC, Simulation of Process model, Loading PLC program, Selection of work space windows, User specified workspace, Manual operation, Fault simulation, Controlling with external PLC, Controlling with real PLC	Conducting how to handle COSMIL PLC software. Conducting how to control a mechatronics equipment. Conducting a simulation technique of PLC. Conducting a fault simulation.	Experienced people of PLC and pneumatics. Participants need knowledge of basic electricity and electronics. Basic PC operation skill is required.	CP
E6	**Mechatronics (2) Robotics** *Location DTC *Duration 5 days *No. of Trainee 5-10	Arm robot control by COSMIL Educational (Using a kind of robot model), Know-haw (How to solve the tasks), Description of the model, Select a component, I/O connection, Robotics programming	Conducting an arm robot control. Conducting a robot control programming. Handling of an arm robot.	Experienced people of PLC and pneumatics. Participants need basic knowledge of electricity and electronics. Basic PC operation skill is required.	CP
E7	**Power Electronics (1)** *Location DTC *Duration 5 days *No. of Trainee 5-10	Virtual instrument operation by UniTr@in and VI starter: *Power Electronics (1) by UniTr@in and virtual instrument. • Learn about most line-commutated converter circuits • Analyze the voltage and current characteristics of the individual circuits • Analyze the effect of a freewheeling arm • Hole storage effect (transistor storage effect) • Learn the control characteristics of the line-commutated converters • Learn how triggering works with an ignition transformer • Converter circuits (Controlled & uncontrolled : M1, B2, B6)	Conducting how to use a virtual instrument. Conducting line-commutated converter circuits. Conducting how to analyze power electronics circuits. Conducting how to give the trigger to the circuits.	Participants need basic knowledge of electricity and electronics. Participants need basic knowledge of semiconductors. Basic PC operation skill is required.	CP
E8	**Power Electronics (2)** *Location DTC *Duration 5 days *No. of Trainee 5-10	Virtual instrument operation by UniTr@in and VI starter: *Power electronics (2) by UniTr@in and virtual instrument. • Power semiconductors • Generating variable DC voltage using PWM (Pulse Width Modulation) • Single quadrant operating mode • Four quadrant operating mode • Control response • Effect of operating frequency • Resistive and resistive-inductive load • FFT analysis of harmonics	Conducting how it works power semiconductors. Conducting PWM control of DC voltage. Conducting quadrant operating mode. Conducting FFT analysis of harmonics.	Participants need basic knowledge of power electronics. Basic PC operation skill is required.	CP

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E9	**Drive Technology** *Location DTC *Duration 5 days *No. of Trainee 5-10	Speed control with single converter, Speed control with double converter, 4-quadrant operation and power recovery, Line analysis and P-/PI-/PID controllers, Optimizing the controller, Speed control in 1 to 4-quadrant operation with and without secondary current control	Conducting several kinds of speed control operations.	Participants need basic knowledge of power electronics. Basic PC operation skill is required.	CP
E10	**Automatic Control Technology (1)** *Location DTC *Duration 5 days *No. of Trainee 5-10	Virtual instrument operation by by UniTr@in and VI starter: *Control Technology (1) by UniTr@in and L@bSoft • Operating principles of open-loop and closed-lop control technology • How basic control technology elements are characterized on the basis of their time responses • The design and operation of conventional continuous and discontinuous controllers, in particular the PID controller • Structure of the closed control loop, how responses to set point changes and disturbance variables are assessed • Designing PID controllers based on optimization guidelines in the time domain • Control loop analyses and synthesis in the frequency domain • Automatic controls with discontinuous controllers, in particular two-position and three-position controllers	Conducting how to use a virtual instrument. Conducting operating principles of open-loop and closed-lop control technology. Conducting time response of control elements. Conducting the design and operation of PID controller. Conducting a structure of the closed loop control.	Participants need basic knowledge of electricity and electronics. Basic PC operation skill is required.	CP
E11	**Automatic Control Technology (2)** *Location DTC *Duration 5 days *No. of Trainee 5-10	Virtual instrument operation by by UniTr@in and VI starter: *Control technology (2) by UniTr@in and L@bSoft • Real control system (Temperature control, Speed control, Lighting control) • Step response • Reference and disturbance variables • Timing diagrams • Bode plots • Locus diagram	Conducting some kinds of real control examples. Conducting control fundamental functions and its characteristics. (Step response, reference and disturbance variables, timing diagrams, Bode plots, locus diagram)	Participants need basic knowledge of electricity and electronics. Basic PC operation skill is required.	CP
E12	**Automatic Control Technology (3)** *Location DTC *Duration 5 days *No. of Trainee 5-10	*Automatic control technology (3) by CLP 20: • Parameter adjustment, programming and operating a PLC system • Project planning and operating an Operator panel • Parameter adjustment and operating a frequency converter • Project planning and operating a field-bus system • Optimizing the parameters to the various adjustable work machines	Conducting an automatic control system operation. Conducting an automatic control system (Parameter adjustment, control by PLC, frequency converter, field bus system and etc.)	Participants need basic knowledge of control technology. Participants need basic knowledge of PLC programming.	CP
E13	**Industry Automation & Drive System Seminar** *Location DTC Electric *Duration 5 days *No. of Trainee 10-20	Importance of Industry Automation, Automatic control theory, Motor drive system, Power electronics, Drive System Innovations by Micro-Processor Introduction, General Form for Industry Automation System, based on Three Layers Structure Control System	Conducting an automation total system outline. Getting some kinds of teaching methodology in the field of industry automation and drive system.	Participants need basic knowledge of electricity and power electronics.	JE
M1	**3D CAD** *Location DTC *Duration 5 days *No. of Trainee 8	3D CAD (Autodesk Inventor): 2D Sketch, 3D Sketch, Dimension and Constraint, Part Feature, Parametric editing, Assembly, Sheet Metal, Stress and Moment Analysis, Exercise of Solid Modeling.	Understanding of 3D CAD (Solid Modeler) Technology and mastering Solid Modeling of miscellaneous products.	Junior to Medium level engineers (BSc in Mechanical Engineering), 1-10 years related job experience.	CP JE
M2	**CNC Machining** *Location DTC *Duration 5 days *No. of Trainee 8	3D CAM (Modela Player 4, Rhino CAM), CNC Machine (ROLAND MDX-650, MDX-20): CNC Machining Technology, 3D CAM (2-axis, 3-axis, 4-axis), Surface Editing, G-code, Cutting Condition, Exercise of 3D CAM and CNC Machining.	Understanding of CNC Machining Technology and 3D CAD/CAM (Surface Modeler, 4-axis machining). Mastering operation of CNC Machining and 3D CAD/CAM.	Junior to Medium level engineers (BSc in Mechanical Engineering), 1-10 years related job experience.	CP JE
M3	**Laser Cutting** *Location DTC *Duration 5 days *No. of Trainee 6	CAD/CAM (One CNC), Laser Cutting Machine (AMADA Quattro 1000w): Laser Cutting Technology, CAD/CAM Command, Exercise of CAD/CAM, Machine Start-up & setting, operation, exercise of Laser Cutting Machine.	Understanding of Laser Cutting Technology and CAD/CAM. Mastering operation of Laser Cutting Machine and CAD/CAM.	Junior to Medium level engineers (BSc in Mechanical Engineering), 1-10 years related job experience.	CP JE

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C1	**3D CAD: AutoCAD Architecture 2008** *Location DTC *Duration 5 days *No. of Trainee 6	Feature of BIM (Building Information Modeling), Basic operation of AutoCAD Architecture 2008, Create small project, basic presentation.	Understanding features of BIM and Mastering operation for AutoCAD Architecture 2008.	Basically instructor of Architecture Department and CAD trainer who have an experience of drawing and using AutoCAD.	CP JE
C2	**3D CAD: Revit Architecture 2008** *Location DTC *Duration 5 days *No. of Trainee 6	Feature of BIM (Building Information Modeling), Basic operation of Revit Architecture 2008. Create small project, basic presentation.	Understanding features of BIM and Mastering operation for Revit Architecture 2008.	Basically instructor of Architecture Department and CAD trainer who have an experience of drawing and using AutoCAD.	CP JE
C3	**Project Management** *Location DTC *Duration 5 days *No. of Trainee 6-12	The project Management in Construction, Scope, Time, Cost, Human Resources, Communication, Risk, Procurement, Quality, Integration. Introduce the Ms Project 2007 and Primavera	To manage the construction project.	BSc in construction.	CP JE
C4	**Project Management: MS-Project 2007** *Location DTC *Duration 5 days *No. of Trainee 6	Microsoft Project Pro 2007 software: Operating in Microsoft Project Pro2007, Assigning Calendar to a Project, Editing Calendar, Scheduling with Resources, Scheduling With Cost, Monitoring Progress.	Understanding Microsoft Project Pro 2007, create a project with activities and resources, calculate a schedule, analyze resource/cost data.	BSc in construction who have an experience in Project Management subject.	CP JE
C5	**Project Management: Primavera** *Location DTC *Duration 5 days *No. of Trainee 6	Primavera software: Navigating in P3e (Praimavera Project Planner for the Enterprise), Enterprise Project Structure(EPS), Organizational Breakdown Structure(OBS), Creating Project, Creating a Work Breakdown Structure(WBS), Adding Activities, Scheduling.	Understanding Primavera P3e, create a project with activities and resources, calculate a schedule, analyze resource/cost data.	BSc in construction who have an experience in Project Management subject.	CP JE
C6	**Architectural Technology**	Introducing latest information about architectural technology such as new material, technical reference books, sample model and modern techniques. *These modules are planned to be provided in the training courses mentioned above.	Understanding the latest technology and the situation in the construction field.	Instructor in construction.	CP JE

***E1 – E13:** Electrical Training Courses
***M1 – M3:** Mechanical Training Courses
***C1 – C6:** Construction Training Courses
***Abbreviation of Instructor:** CP=Saudi Counterpart Personnel, JE=Japanese Expert, LC=Local Consultant, FC=Foreign Consultant