Course Name	**SINAMICS G120 with starter**	
Course Code	**EES01**	
Course Objective	To introduce students to the concept and operation of G120 drive	
		Duration of course = 24 hrs.
Lecture/Lab wise breakup		**Number of hours**
1	**AC MOTOR AND DRIVE** Need of Variable Frequency Drive-Types of Motor, Basics of AC Motor, speed variation of AC motors, reversal & braking-Detailed Block diagram of AC Drive-Inverter principle, PWM technique and power switching device	8
2	**SINAMICS G – 120 DRIVE** Specifications, range, features and hardware details of Sinamics G120-Block diagram of the product, terminal details-Parameter structure and quick commissioning procedure- working with programmable binary and analog inputs and outputs- Control and status word-Using BOP-2, IOP-Set point channel-Signal flow	8
3	**VARIOUS CONTROL MODES AND HANDS ON PRACTICE** Various control modes for Sinamics- G120 and principle of vector control-Using various .Data sets - CDS, DDS-Different types of Braking Methods-Special functions available in various control units of Sinamics G120 family-Positioning possibilities using Sinamics G120-Using Free Function Blocks-STARTER demonstration and practice	8
Course Outcome	After the course you are able to be correctly commission the inverter and adapt it to address the particular application. You know suitable inverter functions and parameter settings for a wide range of applications. Students can make a data backup, and taking the appropriate measures when faults occur.	

Course Name	**SIMOCODE AC-MOTOR CONTROL (LVSM)**	
Course Code	**EES02**	
Course Objective	The course objective is to become familiar with the devices and how the SIMOCODE pro system functions and fail-safe functions.	
		Duration of course= 24 hrs.
Lecture/Lab wise breakup		**Number of hours**
1	**NEED OF SIMOCODE** Traditional panel Concept-Advantages and disadvantages of traditional Panel-Need of SIMOCODE-Expectations from SIMOCODE-Concept of intelligent MCC-Overview including Pro C, PRO S and Pro V versions.	8
2	**SIMOCODE ES 2007** Overview and use of SIMOCODE ES 2007/TIA Portal including: - Configuration of a Reverse starter-Explanation of parameters- Basic unit operation-Operator panel configuration Expansion modules connected to PRO V-Use of control station to choose suitable ON/OFF operations from various-Control stations-Use of logic modules including truth tables, signal conditioning, timers, counters,-flashing, flickering-Diagnostic functions in SIMOCODE ES 2007 software-Maintenance, service data and online trends-Use of graphic charts-How to use of memory module and addressing plug-Introduction of SIMOCODE into an automation system Configuration of SIMOCODE ES via TIA Portal hardware configuration -Hands on practice and application discussion	16
Course Outcome	After the end of the course student will understand simocode configuration, parametrization and communication	

Course Name	**LV Switch Gear and protections**	
Course Code	**EES03**	
Course objective: - This course introduces basic electrical protection using circuit breakers and relays		
	Duration of course = 20 hrs.	
Lecture/Lab wise breakup		**Number of hours**
1	**INTRODUCTION TO SWITCH GEAR** Introduction and basic principles of low-voltage switchgear, switching Principles-Basic Concepts of fault level, current carrying capacity-Principle of selectivity and cascading	4
2	**TYPES OF CIRCUIT BREAKERS** Function and operation of 3WL & 3WT circuit Breakers-Installation and de-installation of the standard Accessories-Introduction in protection settings of circuit breakers(characteristic curves)-Overview of communication regarding 3WL air circuit breakers(Only theory)-Maintenance Instructions-Function and operation of 3VA & 3VT MCCB-Installation and de-installation of the standard Accessories-Overview of communication regarding 3VA MCCB-Function and operation of HRC fuse and Switch Disconnect or Fuse-Function and operation of Contactors-SIRIUS Brand, features, Benefits, RLT Contactor, Vacuum Contactor product range, Features-Compactness DOL, RDOL-Overload Relays, Motor Protection Circuit Breaker function and operation. Introduction of Soft-starter, working principle and range.	16
Course Outcome	Upon completing course student understands different protection schemes adopted in power system, operation of various switchgear equipment and protection of different electrical equipment.	

Course Name	**SINAMICS DC Master 6RA80**	
Course Code	**EES04**	
Course Objective	This course shows you how to adapt the parameter settings for the converter in line with the application and DC motor.	
		Duration of course = 32 hrs.
Lecture/Lab wise breakup		**Number of hours**
1	**BASICS OF DC DRIVE** Basics of DC Drive: - a) Basic DC Motor equations b) Three phase-controlled converter Thyristor accessories c) PI Controller d) Block diagram of DC Drive e) Braking & Reversal/ Single & Multi quadrant Drive f) Optimization g) Speed variation techniques	8
2	**SINAMICS DC MASTER DRIVE** Structure and functional principles of the SINAMICS DC MASTER converter: Control Unit CUD, Power Module, excitation circuit, interfaces- Commissioning and parameterization activities using the BOP20 and AOP30 operator panels as well as the STARTER PC program- BICO Technology, Binary Inputs & Outputs- Procedures for commissioning and functional checks- Optimizing current regulation and closed-loop speed control, automatic optimization	8
3	**FUNCTION BLOCK DIAGRAMS** Function block diagrams: Setpoint channel, inputs/outputs, free function blocks-Concept of CDS and DDS-Using Micro Memory Card: Structure and data backups-Information on Drive Control Charts (DCC)-Drive-end interface to PROFIBUS / PROFINET-Expansions with Terminal Modules and Sensor Modules via DRIVE-CLiQ-Parallel connections and peer-to-peer interfaces Thyristor Checking-Operating states, alarms, and fault codes-Service functions: Trace, measurement functions, diagnostic memories-Practical exercises with AOP30 and STARTER on training equipment	16
Course Outcome	After completed the course, students will be familiar with the functions of a converter and the respective interfaces. Students will also be able to commission a converter quickly and reliably.	