

ATME COLLEGE OF ENGINEERING

13th KM Stone, Bannur Road, Mysore - 570 028



DEPARTMENT OF ELECTRICAL & ELECTRONICS ENGINEERING

NOTES

Course: Computer Aided Electric Drawing

Course Code: 21EE741

Semester: VII

Prepared by

Maria Sushma S

Asst. Professor

Department of EEE,

ATME College of Engineering

INSTITUTIONAL VISION AND MISSION

VISION:

- ☐ Development of academically excellent, culturally vibrant, socially responsible and globally competent human resources.

MISSION:

- ☐ To keep pace with advancements in knowledge and make the students competitive and capable at the global level.
- ☐ To create an environment for the students to acquire the right physical, intellectual, emotional and moral foundations and shine as torchbearers of tomorrow's society.
- ☐ To strive to attain ever-higher benchmarks of educational excellence.

Department Vision and Mission

Vision:

To produce Electrical & Electronics Engineers through greatest quality of technical education, technical skill training and intellectual capacity building of individuals.

Mission:

- ☐ To provide knowledge to students that builds a strong foundation in the basic principles of electrical engineering, problem solving abilities, analytical skills, soft skills and communication skills for their overall development.
- ☐ To offer outcome based technical education.
- ☐ To encourage faculty in training & development and to offer consultancy through research & industry interaction.

Program Educational Objectives (PEOs)

PEO1:

To produce Electrical and Electronics Engineers who will exhibit the technical and managerial skills with professional ethics for the societal progress.

PEO2:

To make students continuously acquire, enhance their technical and socio-economic skills and also to be globally competent.

PEO3:

To impart the experience of research and development to students so that they develop abilities in offering solutions to relevant diverse career path.

PEO4:

To produce quality engineers with a team leading capabilities, also show good coordination to contribute towards real time application of projects

Program Outcomes (POs)

Engineering Graduates will be able to:

PO1: Engineering Knowledge: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the solution of complex engineering problems.

PO2: Problem Analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO3: Design / Development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

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PO6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO7: Environment and sustainability: Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.

PO8: Ethics: Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.

PO9: Individual and team work: Function effectively as an individual and as a member or leader in diverse teams, and in multidisciplinary settings.

PO10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO11: Project management and finance: Demonstrate knowledge and understanding of the engineering management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO12: Life-long learning: Recognize the need for and have the preparation and ability to engage in independent and lifelong learning in the broadest context of technological change.

Program Specific Outcomes (PSOs)

Graduates will develop the abilities to:

PSO1: Apply the concepts of Electrical & Electronics Engineering to evaluate the performance of power systems and also to control industrial drives using power electronics.

PSO2: Demonstrate the concepts of process control for Industrial Automation, design models for environmental and social concerns and also exhibit continuous self- learning.

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Computer Aided Electrical Drawing

Module-1

Winding Diagrams:

- (a) Developed Winding Diagrams of D.C. Machines: Simplex Double Layer Lap and Wave Windings.
- (b) Developed Winding Diagrams of A.C. Machines:
- (c) Integral and Fractional Slot Double Layer Three Phase Lap and Wave Windings.
- (d) Single Layer Windings – Un-Bifurcated 2 and 3 Tier Windings, Mush Windings, Bifurcated 3 Tier Windings. Single line diagrams of generating stations and substations.

Module-2:

Single Line Diagrams: Single Line Diagrams of Generating Stations and Substations Covering Incoming Circuits, Outgoing Circuits, Busbar Arrangements (Single, Sectionalised Single, Main and Transfer, Double Bus Double Breaker, Sectionalised Double Bus, One and a Half Circuit Breaker Arrangement, Ring Main), Power Transformers, Circuit Breakers, Isolators, Earthing Switches, Instrument Transformers, Surge or Lightning Arresters, Communication Devices (Power-Line Carrier) and Line Trap

Module-3:

Electrical Machine Assembly Drawings Using Design Data, Sketches or Both:

Transformers - Sectional Views Of Single And Three Phase Core And Shell Type Transformers .

Module-4:

Electrical Machine Assembly Drawings Using Design Data, Sketches or Both:

D.C. Machine - Sectional Views of Yoke with Poles, Armature and Commutator dealt separately.

Module-5:

Electrical Machine Assembly Drawings Using Design Data, Sketches or Both:

Alternator – Sectional Views of Stator and Rotor dealt separately

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Module-2

GENERATING STATIONS & SUBSTATIONS

Objective : To draw the Single line diagrams of generating stations and substations.

Steps to create substation diagram:

Substation:

Before creating single line diagram of a generating station, we have to create the symbols and store them as blocks.

To draw a line:

The common sequence are as follows

1. **Command:** Type 'line' and press enter.
2. Specify the starting point of the line.
3. Specify the next point of the line.

To create lightning Arrester:

1. Type 'rec' in the command prompt.
2. Specify the first point p1.
3. Specify the second point p2.
4. Type 'line' in the command prompt.
5. Continue the same steps as for drawing a line.

To create the ground symbol:

1. Type trim command in the command prompt. Draw a polygon using the command polygon.
2. Select cutting edges.
3. Select the object that define the cutting edges or which we want to trim.
4. Press enter.

To create potential transformer (P.T) :

1. Type the command ARC.
2. Specify the starting and ending point.
3. Repeat the same procedure to get required number of turns.
4. The resultant will be

To create current transformer:

This is done using ARC command and the procedure as far as PT is repeated.

To create circuit breaker (CB):

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1. Type command circle .specify center of circle.
2. Expand the circle as required.
3. Create 2 more circles within the bigger circle in the same method.

To create Bus bar:

1. Type the command rectangle.
2. Specify the starting and ending point.
3. To fill the required portion of the rectangle with solid use HATCH command.
4. Specify the boundary to be hatched.
5. Click Ok. The symbol will be filled with solid.

To create outgoing lines:

1. Form a line as before.
2. Type 'polygon' in the command prompt. Specify number of sides as 3.
3. We get.
4. Fill the solid in the triangle using hatch command.

To create TEXT:

1. Type text command.
2. Select the starting
3. Specify height of the text and press enter.
4. Then type the required text.

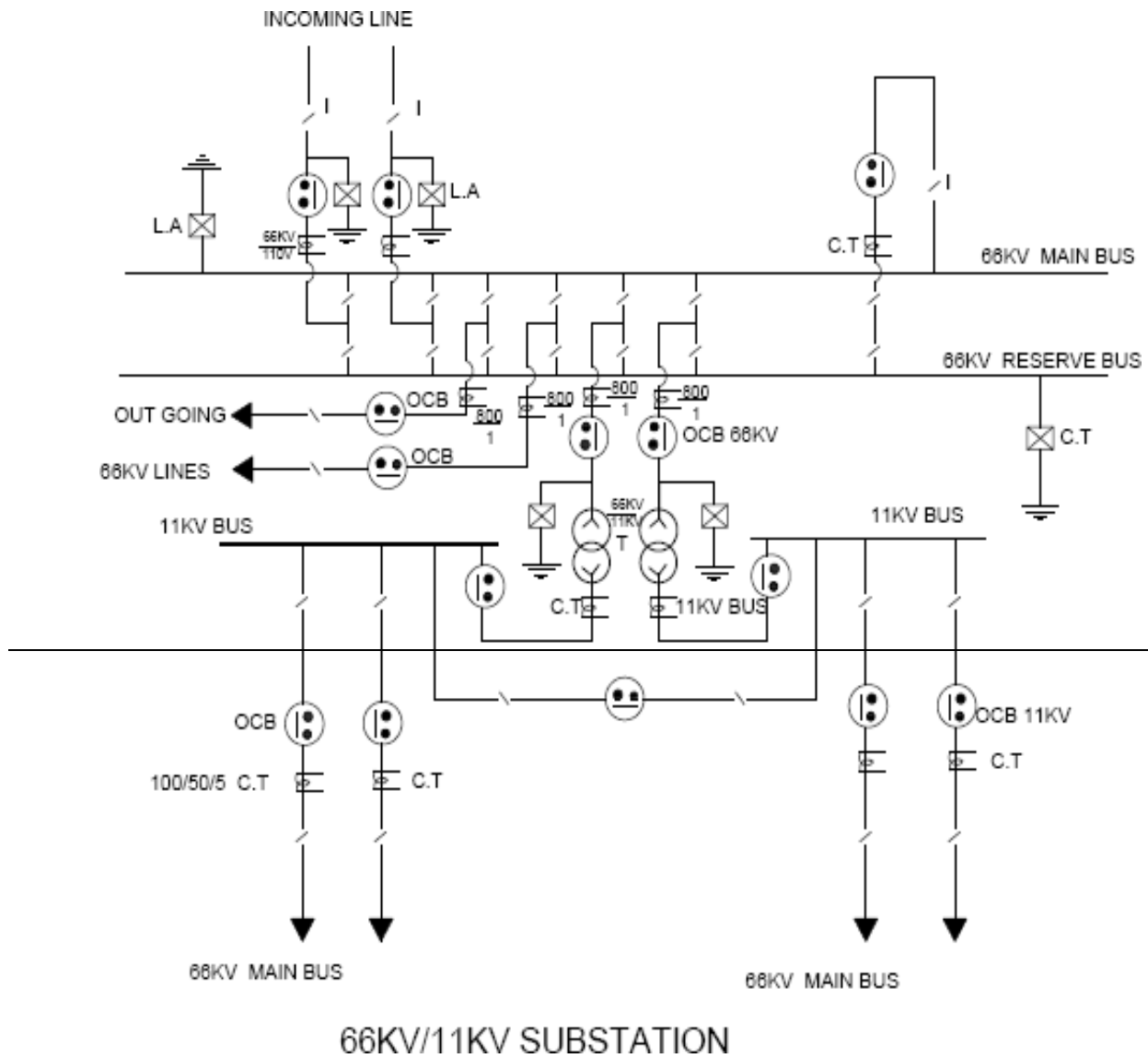
To store all the symbols in library:

1. Go to Pull down menu
2. Select block, select make.
3. Give the name for the symbol.
4. Click on insert, select the block. click ok, symbol will be stored in library.

To insert block from the library:

1. Click on insert, select the block.
2. Select the name box and type the name given to the required symbol.
3. Click ok.

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Outcome: students will be able to analyse the single line diagram of generating stations and substations