

Republic of the Philippines Department of Education

DepEd Complex, Meralco Avenue, Pasig City

STRENGTHENED SENIOR HIGH SCHOOL CURRICULUM TECHNICAL DRAFTING

Grade 11/12

Course Description:

This course is designed to enable learners to produce accurate, industry-standard technical drawings using both manual drafting tools and Computer-Aided Design (CAD) software. Learners will also be able to analyze and interpret technical drawings in architectural, structural, electrical, electronic, plumbing, sanitary, and mechanical layouts and details. Upon completion, learners are eligible to take assessments to earn National Certificate level II in Technical Drafting, higher education, and careers such as architectural drafting, engineering design, construction project support, and various construction industry sectors.

Elective: Technical Professional **Prerequisite:** None

Time Allotment: In Grade 11, 320 hours for two semesters, 8 hours per week. In Grade 12, 320 hours for one semester, 16 hours per week

Schedule: First/Second Semester

| CONTENT STANDARD | The learners demonstrate understanding of the fundamentals of technical drafting, tools and materials in manual drafting, mensuration and calculation, drafting conventions, architectural symbols, and details in producing architectural plans. | | | |
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| PERFORMANCE STANDARD | The learners create accurate technical drawings, and architectural plans observing relevant building | | | |
| | codes, standards, and conventions. | | | |
| LEARNING | COMPETENCIES | CONTENT | | |
| 1. Discuss technical drafting fundamentals | | Technical Drafting Fundamentals | | |
| | | History of Drafting | | |
| | | Trends in Drafting | | |
| | | Career & Business Opportunities | | |
| | | Importance of Drafting in Various Fields | | |
| | | • Types of Drafting (Nomenclature and Definition) | | |
| | | • Architectural | | |
| | | o Structural | | |
| | | Sanitary and Plumbing | | |
| | | Electrical and Electronic | | |
| | | o Mechanical | | |
| 2. Explain tools, materials a | and equipment in manual drafting | Tools, Materials and Equipment in Manual Drafting | | |
| 3. Perform mensuration and | 1 calculation | Mensuration and Calculation | | |
| | | Systems of Measurement | | |

| | Linear measurement | | |
|--|---|--|--|
| | Unit conversion | | |
| | Scale and Proportions | | |
| | Coordinates system | | |
| 4. Perform manual drafting conversions | Manual Drafting Conventions | | |
| | Title block and borders | | |
| | Alphabet of Lines | | |
| | Lettering | | |
| | Orthographic Projection and Pictorial Views | | |
| | Isometric Drawing | | |
| | Standard Drafting Symbols | | |
| | Gridlines and references | | |
| 5. Create architectural layout and details | Architectural Layout and Details | | |
| | Working drawing details | | |
| | General Notes and symbols | | |
| | Codes and Regulations | | |
| | Perspective | | |
| | Site Development Plan and Vicinity Map | | |
| | • Floor, ceiling and roof plans | | |
| | • Elevations and sections | | |
| | Schedule of doors and windows | | |

| CONTENT STANDARD | The learners demonstrate an understanding of drafting principles, techniques, and industry standards including mastering manual drafting, knowledge of various disciplines (architectural, structural, electrical, plumbing, mechanical). | | |
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| PERFORMANCE STANDARD | The learners create manual Structural, Electrical, Electronic, and Mechanical plans projects observing relevant building codes, standards, and conventions. | | |
| LEARNING COMPETENCIES CONTENT | | CONTENT | |
| 1. Create structural layout and details | | Structural Layout and Details | |
| | | General Notes and Symbols | |

| | Codes and regulations |
|--|--|
| | Foundation plan |
| | Framing plans |
| | Structural drawing details |
| 2. Create electrical and electronic layout and details | Electrical and Electronic Layout and Details |
| | General notes and symbols |
| | Codes and regulation |
| | Power system and diagram |
| | Auxiliary systems and layout |
| 3. Create sanitary and plumbing layout and details | Sanitary and Plumbing Layout and Details |
| | General notes and symbols |
| | Codes and regulations |
| | Hot and cold waterline |
| | Sanitary and plumbing |
| | Drainage systems |
| | Isometric sanitary diagram |
| 4. Create mechanical layout and details | Mechanical Layout and Details |
| | General notes and symbols |
| | Codes and regulation |
| | Heating, Ventilating, and Air -Conditioning (HVAC) |
| | Systems and Components |
| | Gas Piping |
| | Vertical / horizontal pedestrian / material conveyor |
| | system |
| | Fire protection system |

| CONTENT STANDARD | The learners demonstrate an understanding of CAD software installation, interface navigation, creation | | | |
|------------------------------------|--|--|--|--|
| | of 2D and 3D geometries, and produce accurate 2D architectural and structural plans in CAD | | | |
| PERFORMANCE STANDARD | The learners create 2D and 3D geometries, and detailed 2D architectural and structural plans projects | | | |
| | using CAD software observing relevant building codes, standards, and conventions. | | | |
| LEARNIN | G COMPETENCIES | CONTENT | | |
| 1. Perform installation and | l exploration of the Computer-Aided | Computer-Aided Design (CAD) Software | | |
| Design (CAD) Software | | Installation Procedures | | |
| | | Interface and Toolbars | | |
| | | Layers, Color, Line Types, Line Weight and Layer | | |
| | | Description in CAD | | |
| | | Drawing and Modification Commands | | |
| | | Advanced CAD Tools and Techniques | | |
| | | Plotting and printing | | |
| 2. Create 2D geometries and shapes | | 2D geometries and shapes | | |
| | | o Line | | |
| | | o Arc | | |
| | | o Spline | | |
| | | • Basic Shapes | | |
| | | Dimensioning, Coordinates, and Annotation | | |
| | | Tools | | |
| 3. Discuss 3D Computer A | lided Design User Interface | 3D Computer Aided Design User Interface | | |
| | | • Interface and Toolbars | | |
| | | o 3D Drawing and Modification Commands | | |
| 4. Create 3D Geometry | | 3D Geometries | | |
| | | o cylindrical | | |
| | | o rectangular | | |
| | | o cube | | |
| | | o spherical | | |
| E Create OD architesterrel | lamout and datails | Conical and pyramid OD Architectural Lement and Dataila | | |
| 5. Create 2D architectural | layout and details | 2D Architectural Layout and Details | | |
| | | Architectural layout | | |
| | | o Site Development | | |

| | Floor plan, Ceiling and Roof Plan |
|--|---|
| | Elevation and Section |
| | Architectural elements |
| | Doors, windows, and furniture |
| | Dimensioning techniques in architecture |
| | Annotating building components |
| | Creating and using blocks for repeated |
| | architectural features |
| | Plotting as-built coordinates |
| 6. Create 2D structural layout and details | 2D Structural Layout and Details |
| | Structural layout |
| | Foundation Plans and Details |
| | Framing Plans |
| | Structural Drawing Details |
| | Annotating structural components with material |
| | specifications and dimensions |
| | Creating layers for different structural elements |

| CONTENT STANDARD | The learners demonstrate an understanding in using Computer-Aided Design (CAD) software to create detailed 2D and 3D drawings of various building systems, and compute project cost estimate align to | | | |
|---|---|---|--|--|
| | the industry standards. | | | |
| PERFORMANCE STANDARD | The learners create 2D and 3D Con | nputer-Aided Design (CAD) layouts project integrating Electrical, | | |
| | Electronic, Mechanical plans, Architectural Model and compute project cost estimate observing | | | |
| | relevant building codes, standards, and conventions. | | | |
| LEARNING COMPETENCIES | | CONTENT | | |
| 1. Create 2D electrical and electronic layout and details | | 2D Electrical and Electronic Layout and Details | | |
| | | Electrical and Electronic layout | | |
| | | Lighting and Power System | | |
| | | Auxiliary System | | |
| | | Electrical Symbols and Conventions | | |

| | • Annotating electrical drawings with power load | | |
|---|---|--|--|
| | requirements | | |
| 2. Create 2D sanitary and plumbing layout and details | 2D Sanitary and Plumbing Layout and Details | | |
| | Sanitary and Plumbing Layouts | | |
| | Hot and Cold Waterline Supply | | |
| | Drainage and Vent System | | |
| | Sanitary and Plumbing Details and Symbols | | |
| | Isometric sanitary diagram | | |
| | Plumbing Fixture Placement and Notation | | |
| 3. Create a 2D mechanical layout and details | 2D Mechanical Layout and Details | | |
| | Mechanical layouts | | |
| | • Heating, ventilating, and air-conditioning (HVAC) | | |
| | or | | |
| | refrigeration | | |
| | Gas piping | | |
| | Vertical / horizontal pedestrian / materials | | |
| | conveyor system | | |
| | Fire protection system | | |
| | Mechanical Symbols and Standards | | |
| | Dimensioning and Notation for HVAC Systems | | |
| 5. Create 3D architectural model | 3D architectural model | | |
| | Architectural layout | | |
| | Importing 2D Drawings | | |
| | Floors, Walls, Ceiling, Doors, Windows, Stairs, | | |
| | Railings, Roof, Balcony and Terrain surface | | |
| 6. Compute project cost estimation | Project Cost Estimation | | |
| | Direct cost | | |
| | Indirect cost | | |
| | Contingency | | |
| | Miscellaneous cost | | |

GLOSSARY

| Annotation: | The addition of notes or explanations on a drawing to provide additional information. | | |
|------------------------------|--|--|--|
| Architectural: | Relating to the design and construction of buildings and other physical structures. | | |
| CAD (Computer-Aided Design): | Software used to create precise drawings and models in various fields such as architecture and engineering. | | |
| Codes and Regulations: | Standards set by governing bodies that dictate the legal requirements for construction and safety in building design. | | |
| Conventions: | Accepted practices or standards within a field, such as symbols and formats used in technical drawings. | | |
| Dimensioning: | The process of adding measurements to a drawing to specify the size and location of features. | | |
| Framing Plans: | Drawings that illustrate the structural framework of a building, including beams, columns, and support systems. | | |
| Geometries: | The study and representation of shapes, sizes, and properties of space, often represented in two or three dimensions. | | |
| HVAC: | An acronym for Heating, Ventilation, and Air Conditioning; systems used to regulate indoor climate. | | |
| Interface: | The layout and tools that allow a user to interact with software, including buttons, menus, and display areas. | | |
| Isometric Diagram: | A three-dimensional representation of an object, where the three axes appear equally foreshortened. | | |
| Layer: | A level in a drawing that can hold different elements, allowing for better organization and management of complex designs. | | |

| Layout: | The arrangement or plan of elements in a drawing, such as the positioning of walls, doors, and windows in architectural design. |
|---------------------|--|
| Mensuration: | The measurement of geometric figures and their parameters, such as area, volume, and dimensions. |
| Nomenclature: | The standardized system of symbols, abbreviations, and terms used to clearly and consistently represent different elements of a design on a drawing, ensuring accurate interpretation by all involved parties. |
| Proficiency: | The skill and ability to perform tasks with a high degree of competence and accuracy. |
| Plotting: | The process of printing or displaying a technical drawing, often in a specific scale or format. |
| Symbols: | Standardized icons used in technical drawings to represent various elements or fixtures. |
| Technical Drafting: | The process of creating precise drawings that convey the details and specifications of structures, machines, or systems. |

| TOOLS, | MATERIALS | AND | EQUIPMENT |
|--------|-----------|-----|-----------|
|--------|-----------|-----|-----------|

| TOOLS | MATERIALS | EQUIPMENT |
|--|---|--|
| Drawing board T-square Triangle Scale Technical pens and pencils Erasers Drawing templates Sharpeners | Tracing Paper Blueprint Pen/pencil Ink Paper Flash Drive CAD Software | Computer Set Operating System: Windows 10 or newer. Processor: Intel Core i5 or equivalent for smooth performance. RAM: Minimum 8GB for handling large files. |

| Graphics Card: Dedicated GPU for |
|--|
| rendering 3D models. |
| Storage: SSD preferred for faster |
| loading; ample capacity |
| recommended. |
| Monitor: High-resolution with good |
| color accuracy for detailed work. |
| Printer |
| • Plotter |

REFERENCES

Autodesk. (n.d.). Autodesk learning hub for AutoCAD and Revit. Autodesk. Retrieved from https://www.autodesk.com/learn/ondemand/curated/autocad-quick-start-guide

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Jefferis, A., & Madsen, D. A. (2016). Architectural drafting and design (7th ed.). Cengage Learning.

MyCADsite. (n.d.). Tutorials on CAD design and drafting. Retrieved from https://www.mycadsite.com/tutorials.html

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