

Your Study Guide For: Concepts and Trends of Drafting

Guiding Thought:

Researching and understanding the modern applications of drafting and design will help you visualize the potential of what you are about to learn.

- I have prepared this Study Guide to help you learn the objective(s) below. Each of the following statements breaks the objective(s) down into smaller pieces. Just as a map is used to guide you to a destination, use these sentences to guide you in your study.

Objectives: *Understand BIM, and Rapid Prototyping; Understanding Industrial Design, Sustainable Design, and LEED; Understanding Career Options.*

By the end of this lesson you will be able to:

1. ***Define the following drafting terms***

- CAD – Computer Aided Drafting
- CADD – Computer Aided Drafting and Design
- ANSI – American National Standards Institute

2. ***Identify different drafting career areas***

- Engineering – the design, building, and use of engines, machines, and structures
- Manufacturing – to make something on a large scale using machinery
- Electrical – dealing with electricity and the use of circuits in machines
- Transportation – Systems used to move cargo from one location to another
- Fabrication – process of creating or inventing a product
- Construction – the building of some type of structure
- Architecture – the art of designing structures and buildings
- Public Utilities – Municipal systems such as electrical, water, sewer, gas, phone
- State & Local Government – Design of public facilities, parks, planning, and zoning.
- Armed Service – Design and production of military vehicles, armor, weapons, etc.

- Colleges & University – Study and teaching of drafting related trades.
3. ***Explain the following Concepts and Trends***
- **BIM – Building Information Modeling**
 - Provide insight for creating and managing building infrastructure projects
 - Process of managing building data through the design of a virtual model of the building and every part used to build it.
 - Includes information for all parts including manufacturer, quantity, location...
 - Advantages
 - Faster
 - More Economical
 - Less Environmental Impact
 - **Rapid Prototyping**
 - Quickly provide a scale model of a physical part or assembly by using data from three dimensional (3D) CAD design to fabricate the part.
 - There are a variety of methods used in 3D printing
 - Stereolithography (SLA) – Heat Activated Resin (liquid)
 - Fused Deposition Modeling (FDM) – Melted Plastic Filament
 - Selective Laser Sintering (SLS) – Heat Activated Plastic Powder
 - Electronic Beam Melting (EBM) – Melted Metal Powder
 - Laminated Object Manufacturing (LOM) – Built-up Layers
 - **Industrial Design** – application of art and science to solve problems related to a products form, use ergonomics, development, marketability, and profitability.
 - **Sustainable Design (or Environmental Design)** – The idea of designing objects in a manner that is socially, economically, and ecologically responsible.
 - **LEED (leadership in Energy & Environmental Design)** – developed by the U.S. Green Building Council to encourage environmentally responsible building and design techniques.
4. ***Identify Basic Drafting Jobs***
- **Drafting Trainee**
 - Job Description - Assists with drawing preparation and performs support tasks
 - Typical Education/Training Required - HS Diploma including drafting classes and/or apprenticeship during HS
 - **Junior Drafter**
 - Job Description - Prepares drawings under direction of Drafting Technician or Senior Detailer

- Typical Education/Training Required – 1+ years of HS drafting & Associates Degree in drafting technology
- **Drafting Technician (Drafter)**
 - Job Description – Prepares drawings with less supervision than Junior Drafter
 - Typical Education/Training Required – Associates Degree in drafting technology & 1 year experience
- **Design Drafting Technician**
 - Job Description – Combines design and drafting skills, interpretation of Designer's sketches and Engineer's details
 - Typical Education/Training Required – Associates Degree in drafting technology & 1 year experience
- **Designer**
 - Job Description – Works with Engineers and Drafters to turn conceptual design into usable production drawings and specifications
 - Typical Education/Training Required – Associates Degree & 5+ years experience, knowledge of design processes and drawing requirements
- **Checker**
 - Job Description – Experienced Drafter who checks drawings created by Drafting Technicians for accuracy and completeness
 - Typical Education/Training Required – Associates Degree & 5+ years experience, knowledge of design processes and drawing requirements
- **Senior Detailer**
 - Job Description – Especially skilled in understanding details of how things work and go together, capable of detailing complex parts and making details understandable
 - Typical Education/Training Required – Associates Degree & 5+ years experience and knowledge of drawing requirements.
- **Engineer**
 - Job Description – Uses technical drawings to communicate ideas and products for manufacturing or construction
 - Typical Education/Training Required – 4 Year Degree in a Engineering Specialty & State Licensure
 - Additional Information
 - Many companies employ teams of engineers for the following:
 - Research and Development (improvement)
 - Development Engineer (invention)
 - Project Engineer (implementation)

- Design Engineer (typical)
- Technical Illustrator (illustrations)

5. ***Identify Branches of Engineering***

- **Aerospace**
 - Design aircraft for public, commercial, and military use. Includes spacecraft.
- **Architecture**
 - Design of buildings, structures, and construction
 - 4-5 year Degree and licensed by state
 - Can specialize in an area like Landscape Architecture, City Planner, Interior Design
 - Create designs around client desires while balancing aesthetics, function, and code requirements
 - Drawings include floor plans, foundation, site, elevation, electrical, plumbing, heat & air, etc.
- **Civil**
 - Designs structures, environmental systems, and various construction projects (Bridges, Dams, Roads, Tunnels, etc.)
 - Arguably the oldest engineering profession
 - Design and analysis of materials and structural systems for buildings, aircraft, etc.
- **Electrical/Electronic**
 - Design electrical devices, controls, mechanisms, and electrical systems.
 - Works with transmission of electricity, analog and digital circuits, and communications.
- **Mechanical**
 - Focused on how things work and work together.
 - Design and manufacture of products, machines, and the machines that fabricate them.
 - The most universal form of engineering and basis of all other branches.

* Keep this in your Portfolio at all times. This will be an excellent tool for preparing for Unit Tests, the Midterm, and the Final Exam.