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| WI Youth Apprenticeship Logo | Engineering Drafting  Youth Apprenticeship |

# engineering DRAFTING

Engineering Drafting youth apprentices prepare engineering drawings using current industry software, integrating concepts of building materials, engineering practices, and mathematics. Apprentices must adhere to industry safety and security standards.

**Length of Apprenticeship:** One year. This pathway is the prerequisite to second year engineering programs.

# Required Competencies

Youth apprentices must become proficient in both general employability and occupation-specific competencies. All of these, and examples of how each can be demonstrated, are found in the following pages. A total of 13 occupational competencies must be learned for this occupation. Employers may substitute out two of these and should write in the competencies they are adding. Youth apprentices must be evaluated on these competencies at least two times each year of their apprenticeship.

|  |
| --- |
| **Competencies** |
| 1. Interpret technical drawings 2. Use measuring devices 3. Organize databases, files, and drawings 4. Reproduce documents and plans 5. Use engineering drafting software 6. Develop 2D (orthographic) view drawings 7. Develop 3D view models 8. Prepare auxiliary views 9. Prepare section views 10. Complete drawing dimensions 11. Apply lettering and basic annotation to drawings 12. Revise draft drawings 13. Participate on an engineering project |

# Post-Secondary Pathway Opportunities

There are several post-secondary pathway opportunities in this area. The following is a partial list.

* Civil Engineering Technology
* Mechanical Design Technology

|  |  |
| --- | --- |
| WI Youth Apprenticeship Logo | Engineering Drafting  Youth Apprenticeship  On-the-Job Learning Performance Standards Guide |

# Youth Apprentice information

|  |
| --- |
| Youth Apprentice Name |
| YA Coordinator |
| YA Consortium |
| School District |

# SIGNATURES

The On-the-Job Learning Performance Standards Guide includes a list of competencies youth apprentices learn through mentoring and training at the worksite.

Instructions for the Worksite Employers/Mentors and School-Based or YA coordinators: This document should be reviewed with the employer/mentor, school-based or YA coordinator on a regular basis with the youth apprentice to record progress and plan future steps to ensure completion of the required competencies. Mentors, school-based/YA coordinator, and the apprentice sign below.

**E****mployer/Mentor**

**1st Evaluation (Required) 2nd Evaluation (Required)**

|  |  |
| --- | --- |
| Employer/Mentor Signature | Employer/Mentor Signature |
| Employer/Mentor | Employer/Mentor |
| Business/Company | Business/Company |
| Date Signed | Date Signed |

**3rd Evaluation (Optional) 4th Evaluation (Optional)**

|  |  |
| --- | --- |
| Employer/Mentor Signature | Employer/Mentor Signature |
| Employer/Mentor | Employer/Mentor |
| Business/Company | Business/Company |
| Date Signed | Date Signed |

**School-Based and/or YA Coordinator**

**1st Evaluation (Required) 2nd Evaluation (Required)**

|  |  |
| --- | --- |
| School-Based and/or YA Coordinator Signature | School-Based and/or YA Coordinator Signature |
| School-Based and/or YA Coordinator | School-Based and/or YA Coordinator |
| School District or Organization | School District or Organization |
| Date Signed | Date Signed |

**3rd Evaluation (Optional) 4th Evaluation (Optional)**

|  |  |
| --- | --- |
| School-Based and/or YA Coordinator Signature | School-Based and/or YA Coordinator Signature |
| School-Based and/or YA Coordinator | School-Based and/or YA Coordinator |
| School District or Organization | School District or Organization |
| Date Signed | Date Signed |

**Youth Apprentice**

**1st Evaluation (Required) 2nd Evaluation (Required)**

|  |  |
| --- | --- |
| Youth Apprentice Signature | Youth Apprentice Signature |
| Youth Apprentice | Youth Apprentice |
| School District / High School | School District / High School |
| Date Signed | Date Signed |

**3rd Evaluation (Optional) 4th Evaluation (Optional)**

|  |  |
| --- | --- |
| Youth Apprentice Signature | Youth Apprentice Signature |
| Youth Apprentice | Youth Apprentice |
| School District / High School | School District / High School |
| Date Signed | Date Signed |

# employability Skills (TO BE COMPLETED BY yA EMPLOYER/MENTOR)

All youth apprentices must demonstrate the key employability skills listed below in order to complete the YA program. They do so by earning at least a "Meets Expectation" rating in each. **At least two evaluations are required each year of a youth apprenticeship.**  More columns are included below for those who choose to conduct more frequent reviews.

|  |  |
| --- | --- |
| **1** | ***Working to Meet Expectations:*** Needs improvement; requires much assistance and supervision; rarely displays this behavior |
| **2** | ***Meets Expectations:***  Meets entry-level criteria; requires some supervision; often displays this behavior |
| **3** | ***Exceeds Expectations:*** Exceeds entry-level criteria; requires minimal supervision; consistently displays this behavior |

|  | **Employability Skills** | **Rating** | | | |
| --- | --- | --- | --- | --- | --- |
| **Competency and Rating Criteria** | | **Year One Evaluation Rating** | | | |
| **Initial** | **Mid Year 1** | **Mid Year 2** | **Final** |
| 1. Develops positive work relationships with others.   *Examples of qualities and habits that the employee might exhibit include . . .*   * Interacts with others with respect and in a non-judgmental manner * Responds to others in an appropriate and non-offensive manner * Helps co-workers and peers accomplish tasks or goals * Applies problem-solving strategies to improve relations with others * When managing others, shows traits such as compassion, listening, coaching, team development, and appreciation | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Communicates effectively with others   *Examples of qualities and habits that the employee might exhibit include . . .*   * Adjusts the communication approach for the target audience, purpose, and situation to maximize impact * Organizes messages/information in a logical and helpful manner * Speaks clearly and writes legibly * Models behaviors to show active listening * Applies what was read to actual practice * Asks appropriate questions for clarity | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Collaborates with others   *Examples of qualities and habits that the employee might exhibit include . . .*   * Works effectively in teams with people of diverse backgrounds regardless of sex, race, ethnicity, nationality, sexuality, religion, political views, and abilities * Shares responsibility for collaborative work and decision making * Uses the problem-solving process to work through differences of opinion in a constructive manner to achieve a reasonable compromise * Avoids contributing to an unproductive group conflict * Shares information and carries out responsibilities in a timely manner | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Maintains composure under pressure   *Examples of qualities and habits that the employee might exhibit include . . .*   * Uses critical thinking to determine the best options or outcomes when faced with a challenging situation * Carries out assigned duties while under pressure * Acts in a respectful, professional, and non-offensive manner while under pressure * Applies stress management techniques to cope under pressure | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Demonstrates integrity   *Examples of qualities and habits that the employee might exhibit include . . .*   * Carries out responsibilities in an ethical, legal and confidential manner * Responds to situations in a timely manner * Takes personal responsibility to correct problems * Models behaviors that demonstrate self-discipline, reliability, and dependability | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Performs quality work   *Examples of qualities and habits that the employee might exhibit include . . .*   * Carries out written and verbal directions accurately * Completes work efficiently and effectively * Performs calculations accurately * Conserves resources, supplies, and materials to minimize costs and environmental impact * Uses equipment, technology, and work strategies to improve workflow * Applies problem-solving strategies to improve productivity * Adheres to worksite regulations and practices * Maintains an organized work area | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Provides quality goods or services (internal and external)   *Examples of qualities and habits that the employee might exhibit include . . .*   * Shows support for the organizational goals and principles by own personal actions * Displays a respectful and professional image to customers * Displays an enthusiastic attitude and desire to take care of customer needs * Seeks out ways to increase customer satisfaction * Produces goods to workplace specifications | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Shows initiative and self-direction   *Examples of qualities and habits that the employee might exhibit include . . .*   * Prioritizes and carries out responsibilities without being told * Responds with enthusiasm and flexibility to handle tasks that need immediate attention * Reflects on any unsatisfactory outcome as an opportunity to learn * Improves personal performance by doing something different or differently * Analyzes how own actions impact the overall organization * Supports own action with sound reasoning and principles * Balances personal activities to minimize interference with work responsibilities | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Adapts to change   *Examples of qualities and habits that the employee might exhibit include . . .*   * Shows flexibility and willingness to learn new skills for various job roles * Uses problem-solving and critical-thinking skills to cope with changing circumstances * Modifies own work behavior based on feedback, unsatisfactory outcomes, efficiency, and effectiveness * Displays a "can do" attitude | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Demonstrates safety and security regulations and practices   *Examples of qualities and habits that the employee might exhibit include . . .*   * Follows personal safety requirements * Maintains a safe work environment * Demonstrates professional role in an emergency * Follows security procedures * Maintains confidentiality | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Applies job-related technology, information, and media   *Examples of qualities and habits that the employee might exhibit include . . .*   * Applies technology effectively in the workplace * Assesses and evaluates information on the job * Assesses training manuals, website, and other media related to the job | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Fulfills training or certification requirements for employment   *Examples of this requirement may include . . .*   * Participation in required career-related training and/or educational programs * Passing certification tests to qualify for licensure and/or certification * Participation in company training or orientation | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. Sets personal goals for improvement   *Examples of this requirement may include . . .*   * Setting goals that are specific and measurable * Setting work-related goals that align with the organization's mission * Identifying strategies to reach goals * Reflecting on goal progress to regularly evaluate and modify goals | | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |

# Occupational Competencies (TO BE COMPLETED BY yA EMPLOYER/MENTOR)

Youth apprentices must earn a rating of at least "MEETS EXPECTATIONS" in each competency by the conclusion of the apprenticeship. A total of 13 competencies, 11 must be from the list below. If necessary, employers can substitute two competencies with other occupationally appropriate skills. Those skills should be added to the competency list for assessment. **At least two evaluations are required each year of a youth apprenticeship.**  More columns are included below for those who choose to conduct more frequent reviews.

|  |  |
| --- | --- |
| **1** | ***Working to Meet Expectations:*** Needs improvement; requires much assistance and supervision; rarely displays this behavior |
| **2** | ***Meets Expectations:***  Meets entry-level criteria; requires some supervision; often displays this behavior |
| **3** | ***Exceeds Expectations:*** Exceeds entry-level criteria; requires minimal supervision; consistently displays this behavior |

| **Occupational Competencies** | **Ratings** | | | |
| --- | --- | --- | --- | --- |
| **Competency and Rating Criteria** | **Evaluation**  **Minimum Rating of 2 EACH – Check Rating** | | | |
| **Initial** | **Mid Year 1** | **Mid Year 2** | **Final** |
| 1. **Interpret technical drawings**  * use technical terminology * identify basic elements of technical drawings * identify lines, views, symbols, and representations on the drawings * interpret auxiliary drawing information * identify tolerancing symbols in a technical drawing * interpret dimensions and scale on the drawings * use metric scale to properly read a drawing | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Use measuring devices**  * choose appropriate instrument or aid for measuring task * verify instrument is accurate for calibration * read measuring instrument accurately * scale proportions accurately * convert standard English measurement to metric and vice versa * apply formula and units for measurements * record measurements using symbols * clean and maintain instruments * store instrument(s) properly | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Organize databases, files, and drawings**  * select appropriate documents * code documents as required * save and store drawings and files to database * sort and retrieve drawings and data from databases * enter data and edit fields and documents * query to extract information from files and documents * create reports from queries * use appropriate computer codes, formatting, macros, charts, spreadsheets, etc. * verify data prior to entry/storage | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Reproduce documents and plans**  * save copies to computer storage devices * operate copy machines * operate printers, plotters, and scanners * number copies as required * document copies made | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Use engineering drafting software**  * use file management to search, create, copy, edit, and save drawing files * import/export drawings from/to various graphic formats * convert existing hard copy drawing to electronic format * draw or modify drawings * utilize drawing management standards * set up plot parameter * select appropriate scale * use coordinate systems * apply naming conventions, line types, and symbol/object management to drawing * apply notes and/or leaders to drawing * apply lettering, fonts, line thickness and type * check drawing * maintain drawings in the file management system | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Develop 2D (orthographic) view drawings**  * select proper views * identify types of lines for drawing * use line precedence * construct an orthographic drawing * show hidden features and centerlines * complete title block by selecting lettering style and size * apply proper thickness lines * check drawing * label and save to appropriate project | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Develop 3D view models**  * select proper view * lay out view corner * identify lines to be used * determine and utilize line precedence * draw 3D view models * show hidden features and centerlines as required * complete title block by selecting lettering style and size * apply proper thickness to lines * check drawing * label and save to appropriate project | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Prepare auxiliary views**  * select proper auxiliary plane * prepare auxiliary drawing * complete title block by selecting lettering style and size * apply proper thickness to lines * check drawing * label and save to appropriate project | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Prepare section views**  * select proper section view * prepare section drawing * complete title block by selecting lettering style and size * apply proper thickness to lines * check drawing * label and save to appropriate project | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Complete drawing dimensions**  * select views to be dimensioned * dimension views to standard * create/draw dimension lines * dimension views using appropriate style of dimensioning (coordinated, linear) * dimension complex shapes when appropriate (e.g., spheres, cylinders, tapers, pyramids) * apply appropriate line thickness and type to dimension, extension, and center lines * check drawing * perform GDT (Geometric Dimensioning and Tolerancing) | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Apply lettering and basic annotation to drawings**  * add lettering * create/draw dimension and extension lines * apply adequate drawing notations * use appropriate abbreviations * apply finish marks * check drawing | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Revise draft drawings**  * obtain all material (catalogs, calculations, references) pertaining to drawn item * check dimensioning, tolerances, and references to other drawings * check for complete calculations and dimensioning on all required documents * check material specifications are given in detail * check that all necessary drawing views are included * check clearances and interference between moving and adjacent parts * check the parts list on assembly drawings for sizes, catalog information, material, etc. * check appropriate unit of scale is indicated * review drawing revision (change) procedures * identify drawing to be modified * use engineering drafting software or draw manually * make modifications to drawing * construct a revision table on drawing * record changes properly on revision table * apply appropriate line thickness and type * check revised drawing * record to appropriate project family * number all view drawings and supporting documents as required * document checks and revisions | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| 1. **Participate on an engineering project**  * review the scope and phases of the design project with worksite professional * identify customer requirements * identify design specifications * research design constraints and criteria * identify possible design solutions with team * finalize design criteria and parameters * plan development process * evaluate project requirements * estimate required resources and budget * estimate time requirements * identify interdependencies * identify critical milestones * create model/prototype * test prototype * coordinate project steps with other project/departments * track critical milestones * track changes to engineering plans and costs * track progress of project * review plan activities completed and their results | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** | **1**  **2**  **3** |
| Competency Substitute (if you replaced a competency above, note the competency and rating) | **1**  **2**  3 | **1**  **2**  3 | **1**  **2**  3 | **1**  **2**  3 |
| Competency Substitute (if you replaced a competency above, note the competency and rating) | **1**  **2**  3 | **1**  **2**  3 | **1**  **2**  3 | **1**  **2**  3 |
| **Comments**: | | | | |

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