

# Setting Up A Registered Apprenticeship Program



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A Step-by-Step Guide for the Design and Implementation of  
The Registered Apprenticeship Training Model  
For High-Skilled Occupations

**U.S. DEPARTMENT OF LABOR  
EMPLOYMENT AND TRAINING ADMINISTRATION  
OFFICE OF APPRENTICESHIP**



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## FORWARD

The demand for the training and development of highly-skilled workers is increasing. Consequently, the American industry need for the training of skilled workers is critical.

One of the best approaches for the training and development of these skilled workers is the formalized Registered Apprenticeship system. This training method has proven to be one of the most cost effective, productive and efficient means of preparing workers for success.

At present, there are more than 1,000 occupations that are apprenticeable in all major industries throughout the United State and the list is continuously growing mostly due to the rapidly changing economy.

The purpose of this guide is to describe how Registered Apprenticeship programs may be developed and implemented in any industry and for any high-skilled occupations requiring training and skill development that take one or more years to learn.

Registered Apprenticeship is designed to keep pace with the rapidly changing methods in training and development. This is one reason why technology-based training, as well as time-based training, is designed on the basis of need and application to the employer/industry/organization.

Employers and labor management organizations should be constantly examining their skilled worker training needs to determine if the Registered Apprenticeship model of training is the best method for meeting their needs.

Registered Apprenticeship is the key to the development of a highly skilled and productive work force. This method of training gives the employee, in many cases, a career track that allows them to grow and develop with the organization. It enhances their skills while giving them the opportunity to progress in a system that rewards them with progressive pay and responsibilities. These have been known factors in contributing to the commitment of employees to continue to grow and remain within the organization (employee retention and satisfaction).

## REGISTERED APPRENTICESHIP

**Registered Apprenticeship** is an effective method of training workers:

- Over 1,000 apprenticeable occupations
- Systematic and cost-effective training (Return on Investment)
- Technology-based, competency-based
- Time-based and technology-based training (Hybrid model)
- Training conducted by qualified mentors/trainers
- Includes on-the-job learning and related instruction
- Wage progressions are tied to skills attainment

**The Program Sponsor** is typically an employer/organization/industry that needs a highly trained workforce capable of producing quality products and/or services at a high skills level.

The sponsor may be in any industry, such as:

- Advanced Manufacturing
- Transportation
- Healthcare
- Energy
- Green Products and Services
- Communications
- Services

**Apprentices** are employees who are subject to the same rules and policies governing other employees in the firm or organization.

They are called apprentices because they are:

- Learning a skilled occupation on the job
- In a variety of duties and tasks
- Over a period of at least 2,000 hours
- Under a written agreement with an employer
- Receiving job-related technical instruction

Apprentices are selected based on the employer/sponsor/organization/industry entry-level requirements.

- Minimum age qualifications
- Education level
- Educational components directly related to job competencies
- Other specific qualifications articulated in relation to the job by the employer/sponsor/organization/industry

## GETTING STARTED

An apprenticeship program may be established for one or more apprentices, depending on the needs of the employer/sponsor/organization/industry. There are two courses of action open to the employer/sponsor/organization/industry based on whether or not the employer is affiliated with a labor management organization.

### **If there is no Labor/Management Program agreement:**

1. Develop a Registered Apprenticeship advisory group, made up of the company/business personnel and the person responsible for the training and development of skilled workers.
2. Assess the knowledge and skills required for the occupation or occupations to be included in the program.
3. Secure the cooperation of the workers and craft supervisors who will be expected to provide the apprentices with the direction and supervision on the job.
4. The Registered Apprenticeship advisory group will decide the course for the training and the related instruction for the occupation or occupations and choose from a variety of providers of the educational components. Examples are: related instruction provided by the community college system, technology-based learning providers (or a combination of the two), or the development of in-house related courses sanctioned by the U.S. Department of Labor, Office of Apprenticeship or State Apprenticeship Agency.
5. Appoint an Registered Apprenticeship contact to maintain the standards of training prescribed by the advisory group for the occupations involved, length of training, selection procedure, affirmative action plan, wages, tests, number to be trained, etc.
6. These standards and operations have to be approved by the U.S. Department of Labor in the Registered Apprenticeship certification process.
7. A complete outline of the program and the details of operations should be written up as a set of Registered Apprenticeship standards. National and local registration agencies will assist in the development of the Registered Apprenticeship standards.

*Note:* Employers/Sponsors/Organizations/Industry and Labor Management entities are usually the key initiators of the Registered Apprenticeship registration process. These organizations would contact the U.S. Department of Labor, Office of Apprenticeship and State Apprenticeship Agencies either at the national or regional levels to develop the Registered Apprenticeship program.

### **If there is a Labor/Management Program agreement:**

1. Discuss the proposed program with the appropriate labor management organization official if the training involves employees who would be covered by the collective bargaining agreement.
2. Set up a joint labor/management Registered Apprenticeship committee to administer the program. The committee should have equal representation of labor and management, perhaps three from each.

3. The joint labor/management committee will arrange for necessary related instruction with either the community college system, technology-based learning providers (or a combination of the two), or the development of in-house related courses sanctioned by the U.S. Department of Labor, Office of Apprenticeship or State Apprenticeship Agency.
4. The joint labor/management committee should agree on a set of standards for training, including occupations, length of training, selection procedure, affirmative action plan, wages, number of apprentices to be trained, etc.
5. Basic details should be in writing and approved as the standards of the Registered Apprenticeship program.
6. If the labor management organization expresses no interest in jointly administering the Registered Apprenticeship program, the company should obtain a waiver from the labor management organization to continue the Registered Apprenticeship program process.

### **Technical Assistance:**

Technical assistance is available in the planning and development of a Registered Apprenticeship program.

1. There are general guidelines for developing procedures and standards recommended by the U.S. Department of Labor, Office of Apprenticeship, or a State Apprenticeship Agency.
2. There are published standards of apprenticeship in many occupations and industries which may be of invaluable assistance in helping to develop a program for the employer/organization/industry.
3. We recommend that you contact other employers involved with Registered Apprenticeship so that they may share their approaches and the successes they have had in the implementation and planning process. The Office of Apprenticeship would be happy to provide you with a listing of Registered Apprenticeship programs in your area.
4. There are Apprenticeship and Training Representatives (ATRs) from the U.S. Department of Labor, Office of Apprenticeship or from State Apprenticeship Agencies who are ready and willing to assist you in the development of a Registered Apprenticeship program.
5. Registered Apprenticeship has many combinations that can be utilized to develop the related instruction and complementary learning processes. Many of these assessments of training needs and related courses can be developed by the community college system. In some cases, with the right assessment, it may be noted that these courses already exist within the community college and vocational systems. Some Registered Apprenticeship programs opt to develop their own in-house training, while others use technology-based instruction developed by outside providers to complement their Registered Apprenticeship programs. We highly recommend a combination of all of these methods, based on your needs and requirements. The Office of Apprenticeship has key consultants in all of these areas and is willing to assist you in their development and approval of the approach and work processes designed for the on-the-job learning and related instruction components of Registered Apprenticeship.

## **RECOMMENDED MINIMUM STANDARDS**

Basic standards for Registered Apprenticeship programs have been established by the Secretary of Labor.

To conform to these minimum standards, a Registered Apprenticeship program must contain provisions for the following:

1. The starting age of an apprentice to be not less than 16.
2. Equal Employment Opportunity
3. Selection of apprentices on the basis of qualifications alone.
4. Apprentice receives training and experience on the job.
5. Organized training and learning
6. A progressive wage schedule
7. Assigned supervision
8. Standardized evaluations
9. Training records are maintained
10. Mentor-Mentee relationship
11. Certification

## BASIC PROVISIONS

There is a guide to help list what should be a part of the provisions in any Registered Apprenticeship program.

1. **Occupations:** Determine what occupation or types of jobs will be covered by the program. It could be an occupation or trade from the basic list (see Appendix 4), or it could be potentially new apprenticeable occupations.
2. **Work processes:** List the major on-the-job training process for each occupation separately (see Appendix 2). Will these processes develop the all-around skilled worker you need?
3. **Allocation of work training time:** Determine the relative difficulty and importance of each work process and allocate the amount of training time, that is, the time the apprentice is expected to work on the particular process to become proficient.
4. **Term of apprenticeship:** In most traditionally apprenticeable occupations the term of apprenticeship is well recognized. If you do not know what the term of apprenticeship should be, and you do not know of a standard practice for the occupation, list the work processes and set down opposite each process the amount of time it is agreed should be appropriate for each one. When everyone is satisfied about the time, total up the hours and convert into months and years. This should give you a fairly accurate idea of the time required.
5. **Apprentice qualifications:** What qualifications will applicants need to enter your program? These qualifications should be clear, objective and subject to both equal opportunity and the Americans with Disabilities Act. The general qualifications for Registered Apprenticeship are at least a high school diploma or GED. There is generally an assessment of an applicant's background to determine what skills and requirements they have that are related to or can be accredited to the occupation for which they are to be trained.
6. **Related classroom instruction:** Registered Apprenticeship can apply to jobs requiring highly technical skills and knowledge that should be transferrable in an on-the-job learning environment. The apprentice will receive classroom instruction related to the skills related to the occupation. There is recommended a minimum of 144 hours a year of related classroom instruction. This instruction can take place in the setting of either in a university/community college setting or it can be delivered through industry-tailored, technology-based instruction.
7. **Number of apprentices:** The number of apprentices to be trained is usually determined by a ratio of apprentices to skilled workers. Such a ratio is based on the facilities available for employing and training apprentices, consistent with proper supervision, training, safety and on future employment opportunities. Since the apprentice is mentored by a trained and qualified skilled worker, the quality of training largely depends on the number of skilled workers (job mentors) available to instruct the apprentices. Ratios vary with each industry and occupation, but must insure that safety and comprehensive training occur in the workplace.
8. **Apprentice wage:** A common method of expressing the apprentice wage or at least of arriving at it is a percentage of the skilled workers rate. There should be a progressively increasing schedule of wages with increases at least every 6 months. The increases should be scheduled throughout the Registered Apprenticeship to provide both a monetary incentive and reward for steady progress on the job. During the last period of the Registered Apprenticeship, the



apprentice should reach 85 to 90 percent of the rate paid a skilled worker in the occupation. Depending upon the organization's needs and wage structure, the Office of Apprenticeship will work with the employer/organization/industry to develop a wage system consistent with their needs.

9. **Supervision of apprentices:** Apprentices are customarily under the immediate supervision of a skilled worker (mentor) to whom they have been assigned. In most cases Registered Apprenticeship programs may have a person responsible for the apprentice or apprentices and that person is designated or employed on a part-time or full-time basis and assigned the responsibility for carrying out the program. In some cases, the Registered Apprenticeship responsibilities are carried out by the employer themselves.
10. **Apprenticeship agreement:** The Registered Apprenticeship program requires the signing of an agreement of Registered Apprenticeship between the apprentice, the program sponsor and the appropriate Registration Agency. The agreement should contain: (a) home address and date of birth of the apprentice; (b) name of the employer; (c) term of apprenticeship; (d) wage schedule; (e) length of probationary period; (f) an outline of the work process schedule; (g) number of hours per year the apprentice agrees to attend classes. Subjects, and name of the school; (h) any special provisions such as credit allowed for previous experience; (i) signatures of the employer and apprentice. If a labor management organization is involved, its approval is necessary. If a joint Registered Apprenticeship committee exists, the agreement would be approved by such a committee.

## **ON-THE-JOB LEARNING**

The Registered Apprenticeship program should be established on the basis of what the apprentice must do and know in order to perform the operations of the job in a safe and satisfactory manner.

Selecting the skilled workers who will conduct the training and acquainting them with the job to be done is an important first step.

They should be thoroughly skilled in those phases of the occupation they are going to teach.

They should be definitely interested in the progress of apprentices on the job.

In teaching skills the job instructor will ordinarily proceed as follows:

1. Question apprentices as to what they know about the operation or process.
2. Demonstrate the function of each operation by illustrating each new process or steps, emphasizing key points and safety precautions.
3. Require the apprentice to perform the operations for each of the key processes, and have check off for each performance measure and the quality performance measures for all of the processes.
4. The apprentice should then be assessed by the mentor in his/her performance of the each of the operations. After successful completion of the operation the mentor surveys and evaluates the performance to his or her level of satisfaction to indicate that the apprentice can perform the task without additional training and supervision.
5. The mentor should reinforce the training/learning objectives to ensure that the apprentice has the ability to carry out the methods, processes and skills at the required performance levels.

## **COST OF REGISTERED APPRENTICESHIP**

Registered apprentices are paid wages while they learn and as a rule, these apprentices are mentored and supervised by the person responsible for the training and development of that individual. The concept of the structured on-the-job training is one that allows the apprentice to be productive while developing and learning new skills in the performance of that job and/or occupation. The employer/sponsor/organization/industry is able to assess the apprentice's performance, initiate improvements in the development of skills and to periodically increase the training and production of the apprentice themselves. This is a win-win proposition for the employer/sponsor/organization/industry and the apprentice as the apprentice wages are designed to increase as his/her individual productivity increases. The usual starting rate for the apprentice is generally 50% of the top line salary rate for the occupation. These wage progressions are set up on an incremental basis and tied to the successful completion of the apprentice's training/full certification.

Additional information on costs should be determined by both the investment that both the employer and the apprentice make in establishing the apprenticeship program for the particular employer/sponsor/organization/industry.

## KEY POINTS

A few important items should be kept in mind when planning a Registered Apprenticeship program.

1. **Registered Apprenticeship committee:** The decision whether there is to be a joint Registered Apprenticeship committee rest solely with the employer and the labor management organization. Its functions are decided the same way. These might include: general supervision of the program, selection and enrollment of apprentices, arranging for their employment with the employer, if more than one employer is involved (in cases of Registered Apprenticeship programs sponsored through employer associations), keeping the employer and the labor management organization informed on the progress of apprentices, and checking and evaluating the performance of individual apprentices.
2. **Pre-employment tests:** Evaluation of applicants is usually made by the management, the labor management organization, or by the joint Registered Apprenticeship committee (if such is established). Aptitude testing is available through the local office of the State employment service if desired by the program sponsor. School records should be checked. The main purpose of the tests are to help screen out individuals who do not have the aptitude, solid interest, and other personal qualities necessary to succeed in the occupation.
3. **Credit for previous experience:** Programs should include a provision on credit for experience in the occupation or trade related skills. It could be in this language: The apprentice's experience in the occupation will be evaluated and appropriate credit will be allowed for the term of apprenticeship for such experience. The apprentice allowed credit for previous experience will be advance to the wage level appropriate to the amount of credit awarded.
4. **Equal opportunity:** All application, testing and selecting procedures, as well as employment and training must be conducted on the basis of equal opportunity without regard to race, color, creed, sex, or national origin. This equality of selection and employment will ensure compliance with Federal and State laws and regulations, which provide for nondiscrimination in Registered Apprenticeship.
5. **Registration of programs:** Registered Apprenticeship programs and apprenticeship agreements are registered with the State Apprenticeship Agency or the U.S. Department of Labor, Office of Apprenticeship if they meet their standards. Registration is entirely voluntary. By registration, however, a contribution is made to the national pool of information on Registered Apprenticeship programs and the number of apprentices in training. The U.S. Department of Labor, Office of Apprenticeship maintains a current record of trends, statistics, and data on training information of value to employer, labor and to industry as a whole.
6. **Minimum wages laws:** If your apprentices are subject to wage and hour provisions of the Fair Labor Standards Act, it will be necessary to start apprentice wage rates, at least at the minimum statutory rate. Related supplemental classroom instruction does not include time spent by the apprentice in performing his or her regular duties. Thus, it will be necessary to determine beforehand in the written agreement whether (1) the apprentice will be paid for classroom attendance but the hours not considered hours of work or, (2) the apprentice will attend class without being paid or the hours counted or, (3) the apprentice will attend class as part of the regular workweek and will be paid the regular rate.
7. **Certificate of completion:** A provision is customarily included stating that each apprentice shall

be awarded, after satisfactorily completing his or her apprentice training, a Certificate of Completion of Apprenticeship. In connection with registered programs, such a certificate is available from the State Apprenticeship Agency or from the U.S. Department of Labor, Office of Apprenticeship, if there is no State agency.

## **APPENDIX 1: HOW TO ALLOCATE WORK TIME**

What will be the number of work hours for the apprentice? Will it be 8,000, 6,000, or 2,000 hours?

For an example of how to allocate work time, let us assume that there are 12 different work processes or major operations. Some of these processes may require more training time than others.

We recommend that you consult with the Office of Apprenticeship National or Regional ATR's on developing work processes for high skilled occupations.

## **APPENDIX 2: SCHEDULE OF WORK PROCESS - EXAMPLES**

Registered Apprenticeship programs usually list all of the various work processes and assign each process an approximate number of hours for learning. They also usually contain a statement either preceding or following the schedule which states something like the following:

*The order in which the work training experience is obtained need not necessarily follow the sequence of the schedule of work processes, but during the term of apprenticeship the apprentice will be given at least the minimum number of hours of experience scheduled for each process.*

Appearing on the next several pages is an illustration of detailed work process schedules for the occupations of Bio-Manufacturing Technician, and Electrician – Journeyworker, respectively.

## Schedule of work processes: Bio-Manufacturing Technician

### Competencies and Tasks of Bio-MANUFACTURING TECHNICIAN (DOWNSTREAM)

Conducts specific manufacturing operations, such as CIP/SIP of equipment, column chromatography, ultrafiltration, diafiltration, protein purification operations, monitoring control devices								
<b>COMPETENCIES/TASKS</b>								
<b>1. Adhere to GMPs (Good Manufacturing Practices )</b>								<b>OJL Hours: 300</b>
<b>Task A:</b> Gown personnel	a. Enter gown room	b. Don gowning materials in correct order per SOP (Standard Operating Procedures)						
<b>Task B:</b> Follow procedures	a. Train on SOP	b. Use procedures to do tasks	c. Record and report all deviations from normal processing					
<b>Task C:</b> Train personnel	a. Find qualified trainer	b. Identify deficient area for training	c. Conduct training	d. Assess trainee	e. Document training procedure or task			
<b>Task D:</b> Complete batch documentation	a. Perform task per procedure	b. Document appropriately into batch document	c. Verify independently that task was done accurately	d. Record and capture events accurately and clearly	e. Document events in real time			
<b>Task E:</b> Review batch documentation	a. Obtain completed documentation	b. Verify that all entries are accurate	c. Sign document as completed	d. Distribute to Quality Assurance				
<b>Task F:</b> Label and apply status to equipment and materials	a. Obtain labels	b. Identify status	c. Record accurately	d. Attach to equipment				
<b>Task G:</b> Maintain open lines of communication	a. Exchange information efficiently about status of work day	b. Organize tasks assigned	c. Complete task in framework of a team	d. Comprehend assigned tasks	e. Respect authority	f. Voice concerns to upper management	g. Plan between functional departments	h. Use communication tools effectively
<b>Task H:</b> Maintain safe working environment	a. Use PPE (Personal Protective Equipment)	b. Follow appropriate safety procedures	c. Review MSDS guidelines as necessary	d. Clean spills in real time	e. Dispose of waste properly	f. Report all incidents to safety department	g. Adhere to alarms	



COMPETENCIES/TASKS								
<b>2. Prepare Solutions</b>								<b>OJL Hours:</b> <b>250</b>
<b>Task A:</b> Weigh raw materials	a. Obtain raw material required	b. Verify from label that material is released for use	c. Standardize balance	d. Determine amount of raw material needed from batch documentation	e. Dispense in appropriate environment	f. Formulate solution by mixing dispensed materials		
<b>Task B:</b> Filter solutions	a. Use appropriate filter	b. Filter into appropriate vessel						
<b>Task C:</b> Sample and test solution	a. Remove in-process assays	b. Ensure for passing results prior to transfer						
<b>Task D:</b> Transfer solution to use point	a. Identify receiving area	b. Transfer under appropriate conditions						
<b>3. Clean Environment and Equipment</b>								<b>OJL Hours:</b> <b>350</b>
<b>Task A:</b> Clean environment	a. Use appropriate agent	b. Use correct amounts of cleaning agent						
<b>Task B:</b> Perform clean in place	a. Obtain SOP	b. Set manual valves	c. Download automated sequence	d. Monitor sequence in process	e. Close clean system			
<b>Task C:</b> Perform steam in place	a. Obtain SOP	b.. Set manual valves	c. Download automated sequence	d. Pressure test Vessel	e. Steam system at appropriate temperature	f. Cool to room temp with air pressure	g. Shut down system	
<b>Task D:</b> Autoclave materials	a. Clean material	b. Wrap material	c. Load autoclave	d. Ensure for passing run				
<b>Task E:</b> Depyrogenate material	a. Clean material	b. Wrap material	c. Load Depyro	d. Ensure for passing run				
<b>Task F:</b> Wash glassware and small equipment	a Soak equipment	b. Rinse equipment	c. Dry equipment	d. Label equipment	e. Store equipment			

COMPETENCIES/TASKS								
<b>4. Pack Columns</b>								<b>OJL Hours: 450</b>
<b>Task A:</b> Assemble column body	a. Obtain and soak new frits and O-rings	b. Install frits and O-rings to flow adapters						
<b>Task B:</b> Sanitize column body	a. Soak column body in caustic	b. Rinse column until cleaning solution removed						
<b>Task C:</b> Slurry resin	a. Add slurry buffer to desired ratio	b. Shake vigorously	c. Pour into column body					
<b>Task D:</b> Pack resin to specifications	a. Flow buffer to specification	b. Remove air	c. Lower top flow adapter to resin surface	d. Measure bed height	e. Calculate column volume			
<b>Task E:</b> Prepare column for process use	a. Test column for efficiency	b. Calculate HETP (Height Equivalent to Theoretical Plate) and asymmetry	c. Clean resin for preparation for use	d. Sample prepared column as required				
<b>5. Perform Protein Purification</b>								<b>OJL Hours: 650</b>
<b>Task A:</b> Receive product from upstream processing	a. Initiate transfer sequence	b. Mix product	c. Sample product	d. Prepare tanks and equipment for process steps	e. Sample and test product			
<b>Task B:</b> Perform chromatography steps	a. Clean column with appropriate buffer	b. Equilibrate column with appropriate buffer	c. Load column with product	d. Elute product from column	e. Regenerate column			
<b>Task C:</b> Filter product as necessary	a. Pressurize holding tank	b. Assemble filter train	c. Bleed air from filter	d. Monitor transfer	e. Integrity test filter once transfer complete			
<b>Task D:</b> Perform UF/DF (Ultrafiltration/Diafiltration) and viral removal steps	a. Assemble filters into UF skids	b. Clean skid	c. Integrity test filters	d. Concentrate product	e. Exchange buffer	f. Integrity test filters	g. Insert filter into house	h. Run test program
<b>Task E:</b> Bulk fill purified product	a. Sterilize final product containers	b. Clean room and BSC/LFH (Biological Safety Cabinet/Laminar Flow Hood)	c. Pool final product into final containers	d. Integrity test filter	e. Transfer for further processing			
<b>Task F:</b> Troubleshoot process	a. Respond to alarms	b. Identify abnormal conditions	c. Communicate instances of abnormality to subject matter experts	d. Use data management systems to identify trends				

<b>Task G:</b> Sample and manage process testing	a. Remove volume needed for test from vessel	b. Standardize test equipment	c. Aliquot sample to appropriate containers	d. Prepare solutions as necessary for particular test	e. Analyze results	f. Deliver sample for testing or to appropriate location	g. Record results	h. Discard unused sample quantity
<b>Task H:</b> Operate and use control systems	a. Operate methods for chromatography steps	b. Download CIP/SIP (Clean In Place/Steam in Place) sequences	c. Run data systems for batch reporting	d. Use IT platforms required for business systems	e. Operate quality systems (LIMS (Laboratory Information Management System) & change control)			

**Total OJL Hours:**

**2000**

## **Schedule of work processes: Electrician - Journeyman**

- |   |             |
|---|-------------|
| <b>1. Preliminary Work</b>  | <b>600</b>  |
| A. Learning the names and uses of the equipment in the trade, such as kind, size, and use of cable, wire, boxes, conduits, and fittings, witches, receptacles, service switches, cutouts, etc.                  |             |
| B. Learning names and uses of the various tools used in assembling this material, care of these tools, and other instructions necessary to familiarize the apprentice with the material and tools of the trade. |             |
| C. Safety   |             |
| <b>2. Residential and Commercial Rough Wiring</b>   | <b>2500</b> |
| A. Assisting in getting the material from stockroom.  |             |
| B. Loading truck and unloading material and equipment on the job.   |             |
| C. Laying out the various outlets, switches, receptacles, and other details of the job from blueprints or by direction of the Superintendent of construction.   |             |
| D. Laying out the system with materials to be used, where they are to be placed, and other details as to how they shall be run.   |             |
| E. Cutting wires, cables, conduit and raceway; threading and reaming conduit, boring and cutting chases under the direction of the journeyperson  |             |
| F. Installing various kinds of wires, cables and conduits in accordance with requirements.  |             |
| G. Assisting journeyperson in pulling wires, attaching wires to fishtape, and keeping wires from kinds of abrasions.  |             |
| H. Connecting conductors to switches, receptacles, or appliances with proper methods of splicing, soldering and typing.   |             |
| I. Installing service switches or load center and subfeeders and fastening up these parts, running raceways and pulling in conductors under the direction of journeyperson electricians.                        |             |
| J. Assisting in preparing lists of materials used, including names, number of pieces, or number of feet, etc., for office records.  |             |
| K. Loading unused material and cleaning up job area.  |             |
| <b>3. Residential and Commercial finish Work</b>  | <b>1500</b> |
| A. Connecting and setting witches, receptacles, plates, etc.  |             |
| B. Installing proper size and types of fuses for each circuit.  |             |
| C. Installing and connecting various kinds of fixtures.   |             |
| D. Tracing and polarity of conductors and devices.  |             |
| E. Testing the circuit for grounds and shorts and locating and correcting job defects.  |             |
| F. Assisting journeyperson in installing and completion of the National Board of Fire   |             |
| G. Underwriters and special local regulations-proper sizes of wires, services, conduits, etc.   |             |
| <b>4. Industrial Lighting and Service Installation</b>  | <b>2000</b> |
| A. Installing rigid conduit, electric metallic tubing BX armored cable wiremolds on all types of heavy electrical equipment and major-size service entrance installation.                                       |             |
| B. Wiring all types (gas, oil, stoker, etc.) of heating equipment.  |             |

C. Installing wiring and controls for air conditioning.

**5. Troubleshooting** **1000**

A. Repairing all kinds of electrical work.

B. Checking out trouble and making repairs under supervision of electrician.

C. Checking out trouble and making repairs without supervision.

**6. Motor Installation and Control** **400**

A. Installing overcurrent devices.

B. Checking for proper installation and rotation.

C. Installing replacement motors.

D. Analyzing motor circuits and trouble-shooting.

E. Installing emergency generators and controls.

F. Installing pushbuttons, pilot lights, relays, timing devices, and interlocking controls.

**TOTAL OJL HOURS:** **8000**

### APPENDIX 3: HOW TO DETERMINE CREDIT FOR EXPERIENCE

This is the suggested form to be used in determining the amount of credit to be allowed for previous trade experience. The work process and target hours have been entered in columns (1) and (2). Have the apprentice/applicant complete columns (4), (5) and (6). Then the program sponsor completes the final column (6) to determine the preliminary estimate. A final determination of hours credited towards the term of apprenticeship is made by the program sponsor at any time during the probationary period. See the section in the Standards of Apprenticeship that references credit for previous experience.

Trade Machinist Term of Apprenticeship 8,000 hours Detailed Trade Breakdown	Filled in by JAC <sup>1</sup> or employer	Filled in by applicant			Filled by JAC or employer
	Number of hours required for each process	Approximate hours spent in training for each operation	Approximate hours spent doing each operation on actual job assignment	Applicant=s estimate of competence on each operation (circle one) a-limited, b-moderate, c-broad	Preliminary estimate of remaining apprenticeship term
(1)	(2)	(3)	(4)	(5)	(6)
Drill press operations: Drilling..... Filing..... Polishing..... Counterboring..... Countersinking, etc.....  Lather operations: Facing..... Undercutting..... Drilling, etc.....				a b c a b c a b c a b c a b c  a b c a b c a b c	

<sup>1</sup> JAC means Joint Apprenticeship Committee.

### Carpenter Apprentice Recordkeeping Report

Name		Address					City			
Employer		Address					City			
Month	Year	Employer or craft supervisor verify and sign above					Give job address above			
Total Hours required	850	1,500	1,200	1,700	500	750	1,000	500	Hours of related instruction	Instructors verification
Schedule	A Form building	B Rough Framing	C Outside Finishing	D Inside Finishing	E Hardware Fitting	F Layout	G Care of Tools	H Misc. Processes		
Hours carried forward										
Date									Total school hours above	
Monday										
Tuesday										
Wednesday										
Thursday										
Friday										
Saturday										
Monday										
Tuesday										
Wednesday										
Thursday										
Friday										
Saturday										
Sunday										
Total hours to date										

Remarks can be written on reverse side

Enter grand total above

## APPENDIX 4: SOME OCCUPATIONS LEARNED THROUGH APPRENTICESHIP

The following is a representative list of occupations recognized as apprenticeable:

Airframe & Power Plant Mechanic	Lithographic plate maker
Automobile-body repairer	Locomotive electrician
Automobile-mechanic	Logistics Engineer
Baker	Machinist
Biomedical equipment technician	Marble setter
Boilermaker	Millwright
Bricklayer	Miner
Building Maintenance Repairer	Model maker
Camera repairer	Molder
Carpenter	Nurse Assistant
Cement mason	Office-machine Servicer
Child Care Development Specialist	Office Manager/Administrative Services
Compositor	Ornamental Ironworker
Construction Driver	Painter
Cook	Paralegal Assistant
Cosmetologist	Paramedic
Dairy equipment repairer	Pipefitter
Dental Assistant	Plasterer
Die maker	Plumber
Drafter	Police Officer
Electrician	Powerhouse mechanic
Electronics Technician	Printer
Embalmer	Prosthetics technician
Emergency medical technician	Roofer
Engraver	Sheet-metal worker
Farm equipment mechanic	Shipfitter
Firefighter	Small Engine Mechanic
Fire medic	Surgical Technologist
Floral designer	Teacher Aid
Furniture finisher	Telecommunications Technician
Glazier\	Television-and-radio repairer
Hotel Associate	Terrazzo worker
Health Unit Coordinator	Tile setter
Illustrator	Toolmaker
Instrument mechanic	Upholsterer
Interior designer	Violinmaker
Internetworking Technician	Watch repairer
Lather	Water treatment-plant operator
Licensed Practical Nurse	Youth Development Practitioner



## **APPENDIX 5: STATE AND REGIONAL CONTACTS**

The following link contains a complete directory of State and Regional Apprenticeship offices, which you should contact if you would like more information or are interested in starting a Registered Apprenticeship program:

<https://21stcenturyapprenticeship.workforce3one.org/page/contact>