**INSTRUCTOR NOTES: CHAPTER 4**

**PROCESS COSTING AND HYBRID PRODUCT-COSTING SYSTEMS**

**Learning Objectives**

. List and explain the similarities and important differences between job-order and process costing.

2. Prepare journal entries to record the flow of costs in a process-costing system with sequential production departments.

3. Prepare a table of equivalent units under weighted-average process costing.

4. Compute the cost per equivalent unit under the weighted-average method of process costing.

5. Analyze the total production costs for a department under the weighted-average method of process costing.

6. Prepare a departmental production report under weighted-average process costing.

7. Describe how an operation costing system accumulates and assigns the costs of direct-material and conversion activity in a batch manufacturing process.

**Chapter Overview**

I. Comparison of Job-Order Costing and Process Costing

A. Flow of costs

B. Differences between job-order and process costing

II. Equivalent Units: A Key Concept

1. Equivalent Units
   1. Stage of completion of the work-in-process ending inventory
   2. Equivalent-unit calculations
2. Conversion cost
3. Direct materials

III. Illustration of Process-Costing

A. The departmental production report

B. Weighted-average method

C. Steps in preparing the departmental production report

1. Analysis of physical flow of units

2. Calculation of equivalent units

3. Computation of equivalent-unit costs

4. Analysis of total costs

IV. Other Issues in Process Costing

A. Actual versus normal costing

B. Other cost drivers for overhead application

C. Subsequent production departments

V. Hybrid Product-Costing Systems

A. Operation costing for batch manufacturing processes

**Key Concepts**

**1. COMPARISON OF JOB-ORDER COSTING AND PROCESS COSTING**

1. **Both systems have similar objectives: accumulate total product costs and assign those costs to each unit manufactured.**
2. A company that uses a **job-costing system** **produces goods by order or in distinct batches**, and *the products tend to differ significantly from each other*.
3. With a **process-costing system,** a company works in a **repetitive production environment,** *manufacturing a large number of like units in a continuous flow.* Industries that use process costing include those involved with paper, petroleum, lumber, and chemicals.
4. *Cost accumulation:*
5. Costs in a job-order system are accumulated by job
6. Costs in a process-costing system are accumulated by department or process.
7. *Flow of costs:* The flow of costs through general ledger accounts is similar in both systems: through Work in Process, to Finished Goods, to Cost of Goods Sold. In a sequential production operation, each department establishes its own Work-in-Process account.

**2. EQUIVALENT UNITS**

1. **Equivalent units** is a key concept in process costing. The term refers to the amount of manufacturing activity that has been applied to a batch of physical units after adjusting for the stage of completion.

* If a batch of goods has been completed, the number of physical units and equivalent units will be the same.
* Units in the ending Work-in-Process Inventory are only partially completed and may be in different stages of production. For example, 100% of the materials may be present in the product, but only 50% of the conversion work (labor and overhead) may have been performed.
* **Conversion costs are usually assumed to be added continuously throughout the process in text problems.** Thus, if 100 units are 60% of the way through the process, the company is said to have performed 60 equivalent units of work during the period.

**Note:**none of the units in this example are completed. The firm is said to have done the work *equivalent* to manufacturing 60 finished units.

1. **Direct materials**, in contrast, are usually added at discrete points in text problems. When considering materials, determine at what point the ending in-process units are and evaluate whether or not the materials have been added.

* If added, the units are 100% complete with respect to materials; if not, the units are 0% complete.

1. *When computing the cost of a unit, we base the related calculations on equivalent units, not physical units*. This procedure puts fully-completed units *on the same measurement scale* as partially-completed units, thus avoiding the addition (combination) of "apples and oranges."
2. Next, the direct material cost and conversion cost is divided by the proper number of equivalent units. The cost to be used is a combination of current costs plus those costs in the beginning work-in-process inventory.

**Note:** *if we divide cost by total physical units, the results is a cost per unit that understates the true cost to make a finished product.*

**3. PRODUCTION REPORTS**

1. **Departmental production reports** are completed to disclose equivalent units and unit costs, along with the cost of completed production and the cost of the ending work-in-process inventory.
2. The text focuses on the **weighted-average method** of process costing because of the method's popularity in practice.

* Under this approach, all units completed during a period are assumed to be started and completed during that period.
* Another feature: Equivalent units are calculated without distinguishing as to whether the manufacturing activity occurred in current period or the preceding period.

1. Production reports have several sections, which are prepared as follows:

* *Step 1:* Analyze the physical flow of units.
* *Step 2:* Calculate the equivalent units for direct materials and conversion.
* *Step 3:* Calculate the cost per equivalent unit.
* *Step 4:* Analyze the total costs to determine the cost of completed production and the cost of ending work-in-process inventory. Step 4 is accomplished by multiplying equivalent units (step 2) by the equivalent-unit costs (step 3).

**4. OTHER ISSUES IN PROCESS COSTING**

1. ***Actual versus normal costing****:* Either actual or applied overhead (i.e., actual costing or normal costing) may be used with process costing.
2. The use of applied overhead smooths per-unit cost fluctuations attributable to changes in production levels, as was the case in job-costing systems.

* ***Cost drivers:***As in job costing, cost drivers should be chosen to provide an equitable allocation of overhead to products.
* If a driver other than labor is used, overhead and direct labor should be separated on the production report and not combined into one overall conversion-cost figure.

**5. HYBRID PRODUCT-COSTING SYSTEMS**

* Some processes have elements of both the job-cost environment and the process-cost environment, and companies turn to a third (hybrid) system known as **operation costing.**
* One example involves the manufacture of fruit juice, with similar conversion processes but different direct materials (e.g., artificial sweetener versus sugar).
* ***Direct materials*** *would be tracked by job, but the other cost elements would be more efficiently tracked by process.*
* ***Conversion costs*** *are applied to products by using a predetermined application rate.*