Module 5

Section A: Planning Detailed Schedules

Term

Capacity utilization

Module 5

Section A: Planning Detailed Schedules

Term

Job status

Module 5

Section A: Planning Detailed Schedules

Term

Lead time

Module 5

Section A: Planning Detailed Schedules

Term

Queue time

Module 5

Section A: Planning Detailed Schedules

Term

Queue

Module 5

Section A: Planning Detailed Schedules

Term

Setup time

Module 5

Section A: Planning Detailed Schedules

Term

Setup

Module 5

Section A: Planning Detailed Schedules

Term

Internal setup time

A periodic report showing the plan for completing a job (usually the requirements and completion date) and the progress of the job against that plan.	Goods produced, or customers served, divided by total output capacity.
The amount of time a job waits at a work center before setup or work is performed on the job. [It] is one element of total manufacturing lead time. Increases in [this] result in direct increases to manufacturing lead time and work-in-process inventories.	1) A span of time required to perform a process (or series of operations). 2) In a logistics context, the time between recognition of the need for an order and the receipt of goods. Individual components [...] can include order preparation time, queue time, processing time, move or transportation time, and receiving and inspection time. Syn: total lead time. See: manufacturing lead time, purchasing lead time.
The time required for a specific machine, resource, work center, process, or line to convert from the production of the last good piece of item A to the first good piece of item B. Syn: setup lead time.	A waiting line. In manufacturing, the jobs at a given work center waiting to be processed. As [the number of these increases, so do their average time and work-in-process inventory.]
The time associated with elements of a setup procedure performed while the process or machine is not running. Ant: external setup time.	1) The work required to change a specific machine, resource, work center, or line from making the last good piece of item A to making the first good piece of item B. 2) The refitting of equipment to neutralize the effects of the last lot produced (e.g., teardown of the just-completed production, preparation of the equipment for production of the next scheduled item). Syn: changeover, turnaround time.

Module 5

Section A: Planning Detailed Schedules

Term

External setup time

Module 5

Section A: Planning Detailed Schedules

Term

Batch processing

Module 5

Section A: Planning Detailed Schedules

Term

Process batch

Module 5

Section A: Planning Detailed Schedules

Term

Run time

Module 5

Section A: Planning Detailed Schedules

Term

Machine hours

Module 5

Section A: Planning Detailed Schedules

Term

Wait time

Module 5

Section A: Planning Detailed Schedules

Term

Move time

Module 5

Section A: Planning Detailed Schedules

Term

Transit time

1) A manufacturing technique in which parts are accumulated and processed together in a lot. 2) A computer technique in which transactions are accumulated and processed together or in a lot. Syn: batch production.	The time associated with elements of a setup procedure performed while the process or machine is running. Ant: internal setup time.
The time required to process a piece or lot at a specific operation. [This] does not include setup time. Syn: run standards.	The quantity or volume of output that is to be completed at a workstation before switching to a different type of work or changing an equipment setup.
The time a job remains at a work center after an operation is completed until it is moved to the next operation. It is often expressed as a part of move time.	The amount of time, in hours, that a machine is actually running. [These], rather than labor hours, may be used for planning capacity for scheduling and for allocating costs.
A standard allowance that is assumed on any given order for the movement of items from one operation to the next. Syn: travel time.	The time that a job spends in transit from one operation to another in the plant.

Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Operation time	**Term** Operation setback chart
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Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Control board	**Term** Job shop scheduling
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Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Block scheduling	**Term** Throughput
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Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Visual management	**Term** Flow rate
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A graphical display of the bill of materials and lead-time information provided by the routing for each part. The horizontal axis provides the lead time from raw materials purchase to component manufacture to assembly of the finished product.	The total of setup and run time for a specific task. Syn: operation duration.
The production planning and control techniques used to sequence and prioritize production quantities across operations in a job shop.	A visual means of showing machine loading or project planning, usually a variation of the basic Gantt chart. Syn: dispatch(ing) board, planning board, schedule board. See: schedule chart.
The rate at which the system generates “goal units.” Because [this] is a rate, it is always expressed for a given time period—such as per month, week, day, or even minute. If the goal units are money, [this] is an amount of money per time period. In that case, [it] is calculated as revenues received minus totally variable costs divided by units of the chosen time period.	An operation scheduling technique where each operation is allowed a “block” of time, such as a day or a week.
Running rate; the inverse of cycle time; for example, 360 units per shift (or 0.75 units per minute).	A management system whereby every metric that matters, standardized work, and improvement approaches are displayed on the shop floor and in the office.

Module 5

Section A: Planning Detailed Schedules

Term

Production rate

Module 5

Section A: Planning Detailed Schedules

Term

Production activity control (PAC)

Module 5

Section A: Planning Detailed Schedules

Term

Continuous process control

Module 5

Section A: Planning Detailed Schedules

Term

Master route sheet

Module 5

Section A: Planning Detailed Schedules

Term

Production schedule

Module 5

Section A: Planning Detailed Schedules

Term

Priority control

Module 5

Section A: Planning Detailed Schedules

Term

Operations sequencing

Module 5

Section A: Planning Detailed Schedules

Term

Sequencing

The function of routing and dispatching the work to be accomplished through the production facility and of performing supplier control. [It] encompasses the principles, approaches, and techniques needed to schedule, control, measure, and evaluate the effectiveness of production operations. See: shop floor control.	The rate of production usually expressed in units, cases, or some other broad measure, expressed by a period of time (e.g., per hour, shift, day, or week). Syn: production level.
The authoritative route process sheet from which all other format variations and copies are derived.	The use of transducers (sensors) to monitor a process and make automatic changes in operations through the design of appropriate feedback control loops. Although such devices have historically been mechanical or electromechanical, there is now widespread use of microcomputers and centralized control.
The process of communicating start and completion dates to manufacturing departments in order to execute a plan. The dispatch list is the tool normally used to provide these dates and priorities based on the current plan and status of all open orders.	A plan that authorizes the factory to manufacture a certain quantity of a specific item. Usually initiated by the production planning department.
Determining the order in which a manufacturing facility is to process a number of different jobs in order to achieve certain objectives.	A technique for short-term planning of actual jobs to be run in each work center based upon capacity (i.e., existing workforce and machine availability) and priorities. The result is a set of projected completion times for the operations and simulated queue levels for facilities.

Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Job sequencing rules	**Term** Order priority
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Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Dispatching	**Term** Dispatching rule
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Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Operation due date	**Term** Dispatch list
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Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Capacity requirements	**Term** Limiting operation
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The scheduled due date to complete all the operations required for a specific order.	A set of priorities and conditions that specify the order in which jobs are processed because of scarce resources.
The logic used to assign priorities to jobs at a work center.	The selecting and sequencing of available jobs to be run at individual workstations and the assignment of those jobs to workers.
A listing of manufacturing orders in priority sequence. The dispatch list, which is usually communicated to the manufacturing floor via paper or electronic media, contains detailed information on priority, location, quantity, and the capacity requirements of the manufacturing order by operation. Dispatch lists are normally generated daily and oriented by work center. Syn: work center schedule, priority report.	1) The date when an operation should be completed so that its order due date can be met. It can be calculated based on scheduled quantities and lead times. 2) A job sequencing algorithm (dispatching rule) giving [higher priority to earlier of these.]
The operation with the least capacity in a series of operations with no alternative routings. The capacity of the total system can be no greater than [this. As long as this...] exists, the total system can be effectively scheduled by scheduling [this concept] and providing this operation with proper buffers. See: protective capacity, protective inventory.	The resources needed to produce the projected level of work required from a facility over a time horizon. [These] are usually expressed in terms of hours of work or, when units consume similar resources at the same rate, units of production.

Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Critical ratio	**Term** Primary work center
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Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Back scheduling	**Term** Operation start date
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Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Forward scheduling	**Term** Central point scheduling
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Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Finite forward scheduling	**Term** Overlapped schedule
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The work center where an operation on a manufactured part is normally scheduled to be performed. Ant: alternate work center.	A dispatching rule that calculates a priority index number by dividing the time to due date remaining by the expected elapsed time to finish the job. [This is calculated by dividing time remaining by work remaining. For example, a ratio less than 1.0 indicates the job is behind schedule, a ratio greater than 1.0 indicates the job is ahead of schedule, and a ratio of 1.0 indicates the job is on schedule.]
The date when an operation should be started so that its order due date can be met. Can be calculated based on scheduled quantities and lead times or on the work remaining and the time remaining to complete the job.	A technique for calculating operation start dates and due dates. The schedule is computed starting with the due date for the order and working backward to determine the required start date and/or due dates for each operation. Syn: backward scheduling. Ant: forward scheduling.
A variant of scheduling that employs both forward and backward scheduling, starting from the scheduled start date of a particular operation.	A scheduling technique where the scheduler proceeds from a known start date and computes the completion date for an order, usually proceeding from the first operation to the last. Dates generated by this technique are generally the earliest start dates for operations. See: forward pass. Ant: back scheduling.
A manufacturing schedule that “overlaps” successive operations. Overlapping occurs when the completed portion of an order at one work center is processed at one or more succeeding work centers before the pieces left behind are finished at the preceding work centers. Syn: lap phasing, operation overlapping, telescoping. See: send ahead. Ant: gapped schedule, overlapped production.	An equipment scheduling technique that builds a schedule by proceeding sequentially from the initial period to the final period while observing capacity limits. A Gantt chart may be used with this technique. See: finite loading.

Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term One less at a time	**Term** Queue management
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Module 5 *Section A: Planning Detailed Schedules*	**Module 5** *Section A: Planning Detailed Schedules*
Term Safety capacity	**Term** Capacity cushion
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Intermittent production	**Term** Transfer batch
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Specification	**Term** Lot sizing
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Tactics to deal with an excess number of items, such as products or customers, waiting in line for service.	A process of gradually reducing the lot size of the number of items in the manufacturing pipeline to expose, prioritize, and eliminate waste.
Extra capacity that is added to a system after capacity for expected demand is calculated. Syn: safety capacity. See: protective capacity.	In the theory of constraints, the planned amount by which available capacity exceeds current productive capacity. This capacity provides protection from planned activities (such as resource contention) and preventive maintenance and unplanned activities (such as resource breakdown, poor quality, rework, or lateness). [This] plus productive capacity plus excess capacity equals 100 percent of capacity. Syn: capacity cushion. See: protective capacity.
The quantity of an item moved between sequential work centers during production. See: batch, overlap quantity.	A form of manufacturing in which the jobs pass through the functional departments in lots, and each lot may have a different routing. See: job shop.
The process of, or techniques used in, determining lot size. See: order policy.	A clear, complete, and accurate statement of the technical requirements of a material, an item, or a service, and of the procedure to determine if the requirements are met.

Module 5
Section B: Scheduling and PAC Methods

Term
Flow manufacturing

Module 5
Section B: Scheduling and PAC Methods

Term
Machine-limited capacity

Module 5
Section B: Scheduling and PAC Methods

Term
Delivery schedule

Module 5
Section B: Scheduling and PAC Methods

Term
Balancing operations

Module 5
Section B: Scheduling and PAC Methods

Term
Operation/process yield

Module 5
Section B: Scheduling and PAC Methods

Term
Pull signal

Module 5
Section B: Scheduling and PAC Methods

Term
Mixed-model scheduling

Module 5
Section B: Scheduling and PAC Methods

Term
Line balancing

A production environment where a specific machine limits throughput of the process. See: constraint, throughput.	Syn: flow shop.
In repetitive just-in-time production, matching actual output cycle times of all operations to the demand or use for parts as required by final assembly and, eventually, as required by the market.	The required or agreed time or rate of delivery of goods or services purchased for a future period.
Any signal that indicates when to produce or transport items in a pull replenishment system. For example, in just-in-time production control systems, a kanban card is used as [this] to replenish parts to the using operation. See: pull system.	The ratio of usable output from a process, process stage, or operation to the input quantity, usually expressed as a percentage.
1) The balancing of the assignment of the tasks to workstations in a manner that minimizes the number of workstations and minimizes the total amount of idle time at all stations for a given output level. In balancing these tasks, the specified time requirement per unit of product for each task and its sequential relationship with the other tasks must be considered. See: uniform plant loading. 2) A technique for determining the product mix that can be run down an assembly line to provide a fairly consistent flow of work through that assembly line at the planned line rate.	The process of developing one or more schedules to enable mixed-model production. The goal is to achieve a day’s production each day. See: mixed-model production.

Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Excess capacity	**Term** Production reporting and status control
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Flow control	**Term** Material usage variance
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Input/output control (I/O)	**Term** Order release
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Earned hours	**Term** Count point
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A vehicle to provide feedback to the production schedule and allow for corrective action and maintenance of valid on-hand and on-order balances. Normally includes manufacturing order authorization, release, acceptance, operation start, delay reporting, move reporting, scrap and rework reporting, order close-out, and payroll interface. Syn: manufacturing order reporting, shop order reporting.	Capacity that is not used to either produce or protect the creation of throughput.
The difference between the planned or standard requirements for materials to produce a given item and the actual quantity used for a particular instance of manufacture.	A specific production control system that is based primarily on setting production rates and feeding work into production to meet these planned rates, then monitoring and controlling production. See: shop floor control.
The activity of releasing materials to a production process to support a manufacturing order. See: planned order release.	A technique for capacity control where planned and actual inputs and planned and actual outputs of a work center are monitored. Planned inputs and outputs for each work center are developed by capacity requirements planning and approved by manufacturing management. Actual input is compared to planned input to identify when work center output might vary from the plan because work is not available at the work center. Actual output is also compared to planned output to identify problems within the work center. Syn: input/output analysis. See: capacity control.
A point in a flow of material or sequence of operations at which parts, subassemblies, or assemblies are counted as being complete. [These] may be designated at the ends of lines or upon removal from a work center, but most often they are designated as the points at which material transfers from one department to another. Syn: pay point.	A statement reflecting the standard hours assigned for actual production reported during the period. Syn: earned volume.

Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Feedback	**Term** Tolerance
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Tolerance limits	**Term** Lower specification limit (LSL)
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Upper specification limit (USL)	**Term** Lean production
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Flexible workforce	**Term** Backflush
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Allowable departure from a nominal value established by design engineers that is deemed acceptable for the functioning of the good or service over its life cycle.	The flow of information back into the control system so that actual performance can be compared with planned performance.
In statistical process control, charting the line that defines the minimum acceptable level of random output. See: tolerance limits.	1) The upper and lower extreme values permitted by the tolerance. 2) In work measurement, the limits between which a specified operation time value or other work unit will be expected to vary. See: lower specification limit, upper specification limit. Syn: specification limits.
A philosophy of production that emphasizes the minimization of the amount of all the resources (including time) used in the various activities of the enterprise. It involves identifying and eliminating non-value-adding activities in design, production, supply chain management, and dealing with customers. [It also employs] teams of multiskilled workers at all levels of the organization and use highly flexible, increasingly automated machines to produce volumes of products in potentially enormous variety. [It] contains a set of principles and practices to reduce cost through the relentless removal of waste and through the simplification of all manufacturing and support processes. Syn: lean, lean manufacturing.	In statistical process control, the line that defines the maximum acceptable level of random output. See: tolerance limits.
A method of inventory bookkeeping where the book (computer) inventory of components is automatically reduced by the computer after completion of activity on the component's upper-level parent item based on what should have been used as specified on the bill of material and allocation records. This approach has the disadvantage of a built-in differential between the book record and what is physically in stock. Syn: explode-to-deduct, post-deduct inventory transaction processing. See: pre-deduct inventory transaction processing.	A workforce whose members are cross-trained and whose work rules permit assignment of individual workers to different tasks.

Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Production leveling	**Term** Mixed-model production
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Heijunka	**Term** Standardized work
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Takt time	**Term** Cycle time
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term One-piece flow	**Term** Corrective action
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Making several different parts or products in varying lot sizes so that a factory produces close to the same mix of products that will be sold that day. The mixed-model schedule governs the making and the delivery of component parts, including those provided by outside suppliers. The goal is to build every model every day, according to daily demand.	Syn: level production method.
A work process that is always carried out exactly the same way, preferably using the current best known way under which the output can be achieved.	In just-in-time philosophy, an approach to level production throughout the supply chain to match the planned rate of end product sales.
1) In industrial engineering, the time between the completion of two discrete units of production. For example, [if] motors [are] assembled at a rate of 120 per hour, [this] is 30 seconds. 2) In materials management, the length of time from when material enters a production facility until it exits. Syn: throughput time.	Sets the pace of production to match the rate of customer demand and becomes the heartbeat of any lean production system. Computed as the available production time divided by the rate of customer demand. For example, assume demand is 10,000 units per month, or 500 units per day, and planned available capacity is 420 minutes per day. [This] = 420 minutes per day ÷ 500 units per day = 0.84 minutes per unit. [This... means] that a unit should be planned to exit the production system on average every 0.84 minutes. Syn: tact time.
The implementation of solutions resulting in the reduction or elimination of an identified problem.	A concept in which items are processed directly from one step to the next, one unit at a time. This helps to shorten lead times and lines of communication, thus more quickly identifying problems.

Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Pacemaker	**Term** Stores
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Floor stocks	**Term** Kanban
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Visual control	**Term** Move card
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Production card	**Term** Labor efficiency
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1) Stored materials used in making a product. 2) The room where stored components, parts, assemblies, tools, fixtures, and so forth are kept.	In lean, the resource that is scheduled based on the customer demand rate for that specific value stream; this resource performs an operation or process that governs the flow of materials along the value stream. Its purpose is to maintain a smooth flow through the manufacturing plant. A larger buffer is provided for [this than for] other resources so that it can maintain continuous operation. See: constraint.
A method of just-in-time production that uses standard containers or lot sizes with a single card attached to each. It is a pull system in which work centers signal with a card that they wish to withdraw parts from feeding operations or suppliers. [This] Japanese word, loosely translated, means card, billboard, or sign, but other signaling devices such as colored golf balls have also been used. The term is often used synonymously for the specific scheduling system developed and used by the Toyota Corporation in Japan. See: move card, production card, synchronized production.	Stocks of inexpensive production parts held in the factory, from which production workers can draw without requisitions. Syn: bench stocks, expensed stocks.
In a just-in-time context, a card or other signal indicating that a specific number of units of a particular item are to be taken from a source (usually an outbound stockpoint) and taken to a point of use (usually an inbound stockpoint). It authorizes the movement of one part number between a single pair of work centers. The card circulates between the outbound stockpoint of the supplying work center and the inbound stockpoint of the using work center. Syn: move signal, conveyance card. See: kanban.	The control of authorized levels of activities and inventories in a way that is instantly and visibly obvious. A type of activity and inventory control used in a workplace organization where everything has an assigned place and is in its place.
The average of worker efficiency for all direct workers in a department or facility. Syn: worker efficiency.	In a just-in-time context, a card or other signal for indicating that items should be made for use or that some items removed from pipeline stock should be replaced. See: kanban.

Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term One-card kanban system	**Term** Two-card kanban system
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Inbound stockpoint	**Term** Outbound stockpoint
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Feeder workstations	**Term** VATI analysis
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Theory of constraints (TOC)	**Term** Constraint
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A kanban system where a move card and production card are employed. The move card authorizes the movement of a specific number of parts from a source to a point of use. The move card is attached to the standard container of parts during movement of the parts to the point of use. The production card authorizes the production of a given number of parts for use or replenishment. Syn: dual-card kanban system. See: one-card kanban system.	A kanban system where only a move card is employed. Typically, the work centers are adjacent; therefore, no production card is required. In many cases, squares located between work centers are used as the kanban system. An empty square signals the supplying work center to produce a standard container of the item. Syn: single-card kanban system. See: two-card kanban system.
The designated locations near the point of use on a plant floor to which material produced is taken until it is pulled to the next operation.	A defined location next to the place of use on a production floor. Materials are brought to [it] as needed and taken from it for immediate use. [These] are used with a pull system of material control.
In the theory of constraints, a procedure for determining the general flow of parts and products from raw materials to finished products (logical product structure). [The “V”] logical structure starts with one or a few raw materials, and the product expands into a number of different products as it flows through divergent points in its routings. The shape of an [“A”] logical structure is dominated by converging points. Many raw materials are fabricated and assembled into a few finished products. [The “T”] logical structure consists of numerous similar finished products assembled from common assemblies, subassemblies, and parts. An [“I”] logical structure is the simplest of production flows, where resources are shared between different products and the flow is in a straight line sequence (e.g., an assembly line). Once the general parts flow is determined, the system control points (gating operations, convergent points, divergent points, constraints, and shipping points) can be identified and managed.	An area of manufacture whose products feed a subsequent work area.
1) Any element or factor that prevents a system from achieving a higher level of performance with respect to its goal. [These] can be physical, such as a machine center or lack of material, but they can also be managerial, such as a policy or procedure. 2) One of a set of equations that cannot be violated in an optimization procedure.	A holistic management philosophy developed by Dr. Eliyahu M. Goldratt, based on the principle that complex systems exhibit inherent simplicity. Even a very complex system comprising thousands of people and pieces of equipment can have, at any given time, only a very, very small number of variables—perhaps only one, known as a constraint —that actually limit the ability to generate more of the system’s goal.

Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Constraints management	**Term** Overload
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Bottleneck	**Term** Capacity-constrained resource (CCR)
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Split lot	**Term** Drum-buffer-rope (DBR)
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Resource-limited scheduling	**Term** Resource-limited scheduling
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A condition in which the total hours of work outstanding at a work center exceed that work center's capacity.	The practice of managing resources and organizations in accordance with the theory of constraints (TOC) principles. See: theory of constraints.
A resource that is not a constraint but will become a constraint unless scheduled carefully. Any resource that, if its capacity is not carefully managed, is likely to compromise the throughput of the organization.	A facility, function, department, or resource whose capacity is less than the demand placed upon it. For example, [this type of] machine or work center exists where jobs are processed at a slower rate than they are demanded. Syn: bottleneck operation.
The theory of constraints method for scheduling and managing operations that have an internal constraint or capacity-constrained resource.	A manufacturing order quantity that has been divided into two or more smaller quantities, usually after the order has been released. The quantities of [this] may be worked on in parallel, or a portion of the original quantity may be sent ahead to a subsequent operation to be worked on while work on the remainder of the quantity is being completed at the current operation. The [purpose...] is to reduce the lead time of the order.
The scheduling of activities so that predetermined resource availability pools are not exceeded. Activities are started as soon as resources are available (with respect to logical constraints), as required by the activity. When not enough of a resource exists to accommodate all activities scheduled on a given day, a priority decision is made. Project finish may be delayed, if necessary, to alter schedules constrained by resource usage.	The scheduling of activities so that predetermined resource availability pools are not exceeded. Activities are started as soon as resources are available (with respect to logical constraints), as required by the activity. When not enough of a resource exists to accommodate all activities scheduled on a given day, a priority decision is made. Project finish may be delayed, if necessary, to alter schedules constrained by resource usage.

Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Drum schedule	**Term** Time buffer
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Buffer management	**Term** Control points
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Divergent point	**Term** Unplanned repair
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Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Occurrence factor	**Term** Waste exchange
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Protection against uncertainty that takes the form of time.	The detailed production schedule for a resource that sets the pace for the entire system. [It] must reconcile the customer requirements with the system's constraint(s).
In the theory of constraints, strategic locations in the logical product structure for a product or family that simplify the planning, scheduling, and control functions. [These] include gating operations, convergent points, divergent points, constraints, and shipping points. Detailed scheduling instructions are planned, implemented, and monitored at these locations. Other work centers are instructed to "work if they have work; otherwise, be prepared for work." In this manner, materials flow rapidly through the facility without detailed work center scheduling and control.	In the theory of constraints, a process in which all expediting in a shop is driven by what is scheduled to be in the buffers (constraint, shipping, and assembly buffers). By expediting this material into the buffers, the system helps avoid idleness at the constraint and missed customer due dates. In addition, the reasons items are missing from the buffer are identified, and the frequency of occurrence is used to prioritize improvement activities.
Repair and replacement requirements that are unknown until remanufacturing teardown and inspection.	An operation in a production process in which a single material/component enters and, after processing, can then be routed to a number of different downstream operations.
1) Arrangement in which companies exchange their wastes for the benefit of both parties. 2) An exchange service of valuable information between generators and potential users of industrial and commercial wastes, whereby a beneficial use rather than disposal is the end result. This service identifies both the producers and potential markets for by-products, surpluses, unspent materials, and other forms of solid waste that is no longer needed.	Within the repair/remanufacturing environment, the occurrence factor is associated with how often a repair is required to bring the average part to a serviceable condition (some repair operations do not occur 100 percent of the time). The factor is expressed at the operation level in the routing. See: repair factor, replacement factor.

Module 5
Section B: Scheduling and PAC Methods

Term
Process manufacturing

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Module 5
Section B: Scheduling and PAC Methods

Term
Process train

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Module 5
Section B: Scheduling and PAC Methods

Term
By-product

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Module 5
Section B: Scheduling and PAC Methods

Term
Co-product

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Module 5
Section B: Scheduling and PAC Methods

Term
Processor-dominated scheduling

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Module 5
Section B: Scheduling and PAC Methods

Term
Material-dominated scheduling (MDS)

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Module 5
Section B: Scheduling and PAC Methods

Term
Forward flow scheduling

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Module 5
Section B: Scheduling and PAC Methods

Term
Reverse flow scheduling

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A representation of the flow of materials through a process industry manufacturing system that shows equipment and inventories. Equipment that performs a basic manufacturing step, such as mixing or packaging, is called a process unit. Process units are combined into stages, and stages are combined [to form these]. Inventories decouple the scheduling of sequential stages within [this].	Production that adds value by mixing, separating, forming, and/or performing chemical reactions. It may be done in either batch or continuous mode. See: project manufacturing.
A product that is usually manufactured together or sequentially because of product or process similarities. See: by-product.	A material of value produced as a residual of or incidental to the production process. The ratio of [this] to primary product is usually predictable. [These] may be recycled, sold as-is, or used for other purposes. See: co-product.
A technique that schedules materials before processors (equipment or capacity). This technique facilitates the efficient use of materials. [It] can be used to schedule each stage in a process flow scheduling system. MRP systems use material-dominated scheduling logic. See: processor-dominated scheduling.	A technique that schedules equipment (processor) before materials. Facilitates scheduling equipment in economic run lengths and the use of low-cost production sequences. A scheduling method used in some process industries. See: material-dominated scheduling.
A scheduling procedure used in some process industries for building process train schedules. Starts with the last stage and proceeds backward (countercurrent to the process flow) through the process structure.	A procedure for building process train schedules that starts with the first stage and proceeds sequentially through the process structure until the last stage is scheduled.

Module 5 *Section B: Scheduling and PAC Methods*	**Module 5** *Section B: Scheduling and PAC Methods*
Term Mixed-flow scheduling	**Term** Probable scheduling
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Capacity	**Term** Theoretical capacity
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Required capacity	**Term** Budgeted capacity
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Capacity management	**Term** Capacity control
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A variant of scheduling that considers slack time to increase or decrease the calculated lead time of an order. Interoperation and administrative lead time components are expanded or compressed by a uniform “stretching factor” until no difference exists between the schedule of operations obtained by forward and backward scheduling. See: lead time scheduling.	A procedure used in some process industries for building process train schedules that start at an initial stage and work toward the terminal process stages. This procedure is effective for scheduling where several bottleneck stages may exist. Detailed scheduling is done at each bottleneck stage.
The maximum output capability, allowing no adjustments for preventive maintenance, unplanned downtime, shutdown, and so forth.	1) The capability of a system to perform its expected function. 2) The capability of a worker, machine, work center, plant, or organization to produce output per time period. Capacity required represents the system capability needed to make a given product mix (assuming technology, product specification, etc.). As a planning function, both capacity available and capacity required can be measured in the short term (capacity requirements plan), intermediate term (rough-cut capacity plan), and long term (resource requirements plan). Capacity control is the execution through the I/O control report of the short-term plan. Capacity can be classified as budgeted, dedicated, demonstrated, productive, protective, rated, safety, standing, or theoretical. See: capacity available, capacity required. 3) Required mental ability to enter into a contract.
The volume/mix of throughput on which financial budgets were set and overhead/burden absorption rates established.	Syn: capacity required.
The process of measuring production output and comparing it with the capacity plan, determining if the variance exceeds pre-established limits, and taking corrective action to get back on plan if the limits are exceeded. See: input/output control.	The function of establishing, measuring, monitoring, and adjusting limits or levels of capacity in order to execute all manufacturing schedules (i.e., the production plan, master production schedule, material requirements plan, and dispatch list). [It] is executed at four levels: resource requirements planning, rough-cut capacity planning, capacity requirements planning, and input/output control.

Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Productive capacity	**Term** Idle capacity
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Standard time	**Term** Capacity available
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Capacity required	**Term** Load
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Scheduled load	**Term** Planned load
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The available capacity that exists on nonconstraint resources beyond the capacity required to support the constraint. [It] has two components: protective capacity and excess capacity.	In the theory of constraints, the maximum of the output capabilities of a resource (or series of resources) or the market demand for that output for a given time period. See: excess capacity, idle capacity, protective capacity.
The capability of a system or resource to produce a quantity of output in a particular time period. Syn: available capacity. See: capacity, available time.	The length of time that should be required to (1) set up a given machine or operation and (2) run one batch or one or more parts, assemblies, or end products through that operation. Used in determining machine requirements and labor requirements. Assumes an average worker who follows prescribed methods, and allows time for personal rest to overcome fatigue and unavoidable delays. Also frequently used as a basis for incentive pay systems and as a basis of allocating overhead in cost accounting systems. Syn: standard hours. See: standard.
The amount of planned work scheduled for and actual work released to a facility, work center, or operation for a specific span of time. Usually expressed in terms of standard hours of work or, when items consume similar resources at the same rate, units of production. Syn: workload.	The capacity of a system or resource needed to produce a desired output in a particular time period. Syn: required capacity. See: capacity.
The standard hours of work required by planned production orders.	The standard hours of work required by scheduled receipts (i.e., open production orders).

Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Machine loading	**Term** Routing
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Machine center	**Term** Manufacturing calendar
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Rated capacity	**Term** Available time
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Availability	**Term** Utilization
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1) Information detailing the method of manufacture of a particular item. It includes the operations to be performed, their sequence, the various work centers involved, and the standards for setup and run. In some companies, [this] also includes information on tooling, operator skill levels, inspection operations and testing requirements, and so on. Syn: bill of operations, instruction sheet, manufacturing data sheet, operation chart, operation list, operation sheet, route sheet, routing sheet. See: bill of labor, bill of resources. 2) In information systems, the process of defining the path a message will take from one computer to another computer.	The accumulation by workstation, machine, or machine group of the hours generated from the scheduling of operations for released orders by time period. [This] differs from capacity requirements planning in that it does not use the planned orders from MRP but operates solely from released orders. It may be of limited value because of its limited visibility of resources.
A calendar used in inventory and production planning functions that consecutively numbers only the working days so that the component and work order scheduling may be done based on the actual number of workdays available. Syn: M-day calendar, planning calendar, production calendar, shop calendar. See: resource calendar.	A production area consisting of one or more machines (and, if appropriate for capacity planning, the necessary support personnel) that can be considered as one unit for capacity requirements planning and detailed scheduling.
The number of hours a work center can be used, based on management decisions regarding shift structure, extra shifts, regular overtime, observance of weekends and public holidays, shutdowns, and the like. See: capacity available, utilization.	The expected output capability of a resource or system. Capacity is traditionally calculated from such data as planned hours, efficiency, and utilization. [This] is equal to hours available × efficiency × utilization. Syn: calculated capacity, effective capacity, nominal capacity, standing capacity.
1) A measure (usually expressed as a percentage) of how intensively a resource is being used to produce a good or service. Compares actual time used to available time. Traditionally, calculated as the ratio of direct time charged (run time plus setup time) to the clock time available. [It] is a percentage between 0 percent and 100 percent that is equal to 100 percent minus the percentage of time lost due to the unavailability of machines, tools, workers, and so forth. See: efficiency, lost time factor, productivity. 2) In the theory of constraints, activation of a resource that productively contributes to reaching the goal. Over-activation of a resource does not productively [use] a resource. See: available time.	The percentage of time that a worker or machine is capable of working. [The formula for this equals ((S-B)/S) x 100% where S is the scheduled time and B is the downtime.]

Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Idle time	**Term** Activation
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Efficiency	**Term** Demonstrated capacity
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Productivity	**Term** Labor productivity
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Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Yield	**Term** Start date
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Putting a resource to work.	The time when operators or resources (e.g., machines) are not producing product because of setup, maintenance, lack of material, lack of tooling, or lack of scheduling.
Proven capacity calculated from actual performance data, usually expressed as the average number of items produced multiplied by the standard hours per item. See: maximum demonstrated capacity.	A measurement (usually expressed as a percentage) of the actual output relative to the standard output expected. [This] measures how well something is performing relative to existing standards; in contrast, productivity measures output relative to a specific input (e.g., tons/labor hour). [It] is the ratio of (1) actual units produced to the standard rate of production expected in a time period, or (2) standard hours produced to actual hours worked (taking longer means less [of this]), or (3) actual dollar volume of output to a standard dollar volume in a time period. For example: (1) There is a standard of 100 pieces per hour and 780 units are produced in one eight-hour shift; [this] is 780 ÷ 800 converted to a percentage, or 97.5 percent. (2) The work is measured in hours and took 8.21 hours to produce 8 standard hours; [this] is 8 ÷ 8.21 converted to a percentage, or 97.5 percent. (3) The work is measured in dollars and produces $780 with a standard of $800; [this] is $780 ÷ $800 converted to a percentage, or 97.5 percent.
A partial productivity measure in which the rate of output of a worker or group of workers per unit of time is compared to an established standard or rate of output. [This] can be expressed as output per unit of time or output per labor hour. See: machine productivity, productivity.	1) An overall measure of the ability to produce a good or a service. It is the actual output of production compared to the actual input of [resources, and] is a relative measure across time or against common entities (labor, capital, etc.). In the production literature, attempts have been made to define [its total] where the effects of labor and capital are combined and divided into the output. One example is a ratio that is calculated by adding the dollar value of labor, capital equipment, energy, and material, and so forth and dividing it into the dollar value of output in a given time period. This is one measure of [the total factor type of this.] See: efficiency, labor productivity, machine productivity, utilization. 2) In economics, the ratio of output in terms of dollars of sales to an input such as direct labor in terms of the total wages. Known as single factor productivity or partial factor productivity.
In project management, the time an activity begins; may be defined as [actual or planned].	The amount of good or acceptable material available after the completion of a process. Usually computed as the final amount divided by the initial amount converted to a decimal or percentage. In manufacturing planning and control systems, [this] is usually related to specific routing steps or to the parent item to determine how many units should be scheduled to produce a specific number of finished goods. For example, if 50 units of a product are required by a customer and [this is expected to be 70 percent,] then 72 units (computed as 50 units divided by .7) should be started in the manufacturing process. Syn: material yield. See: scrap factor, yield factor.

Module 5 *Section C: Creating Production and Service Schedules*	**Module 5** *Section C: Creating Production and Service Schedules*
Term Load profile	**Term** Alternate routing
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Module 5 *Section D: Managing Detailed Schedules and Scheduling Materials*	**Module 5** *Section D: Managing Detailed Schedules and Scheduling Materials*
Term Manufacturing order	**Term** Work order
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Module 5 *Section D: Managing Detailed Schedules and Scheduling Materials*	**Module 5** *Section D: Managing Detailed Schedules and Scheduling Materials*
Term Job enlargement	**Term** Job enrichment
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Module 5 *Section D: Managing Detailed Schedules and Scheduling Materials*	**Module 5** *Section D: Managing Detailed Schedules and Scheduling Materials*
Term Job rotation	**Term** Expedite
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A routing that is usually less preferred than the primary routing but results in an identical item. [This] may be maintained in the computer or off-line via manual methods, but the computer software must be able to accept alternate routings for specific jobs.	A display of future capacity requirements based on released and/or planned orders over a given span of time. Syn: load projection. See: capacity requirements plan.
1) An order to the machine shop for tool manufacture or equipment maintenance; not to be confused with a manufacturing order. Syn: work ticket. 2) An authorization to start work on an activity (e.g., maintenance) or product.	A document, group of documents, or schedule conveying authority for the manufacture of specified parts or products in specified quantities. Syn: job order, manufacturing authorization, production order, production release, run order, shop order, work order. See: assembly parts list, batch card, blend order, fabrication order, mix ticket, work order.
An increase in the number of tasks that an employee performs and an increase in the control over those tasks. It is associated with the design of jobs and especially the production worker's job. [It is also] an extension of job enlargement.	An increase in the number of tasks that an employee performs. [It] is associated with the design of jobs, particularly production jobs, and its purpose is to reduce employee dissatisfaction.
To rush or chase production or purchase orders that are needed in less than the normal lead time; to take extraordinary action because of an increase in relative priority. Syn: stockchase.	The practice of an employee periodically changing job responsibilities to provide a broader perspective and a view of the organization as a total system, in order to enhance motivation and provide cross-training.

Module 5

Section D: Managing Detailed Schedules and Scheduling Materials

Term

De-expedite

The reprioritizing of jobs to a lower level of activity. All extraordinary actions involving these jobs stop.