Unit-4

FLEXIBLE MANUFACTURING SYSTEM (FMS)

What is Flexible Manufacturing System?

- A flexible manufacturing system (FMS) is a form of flexible automation in which several machine tools are linked together by a material-handling system, and all aspects of the system are controlled by a central computer.

School of Mechanical Engineering

Course Code : BAUT4001 **Course Name: CAD/CAM**

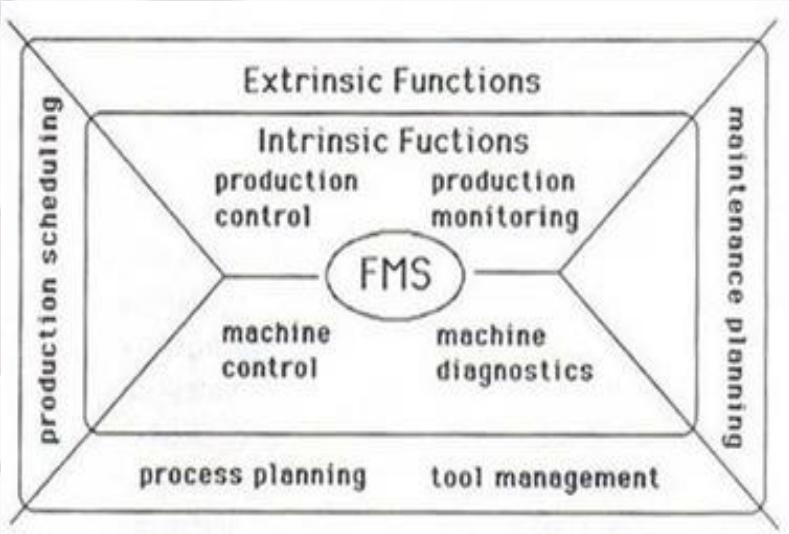
FMS

Name of the Faculty:Mr. Shrikant Vidya **Program Name: B.Tech (Auto)**

What are The Features of FMS?

- An FMS is distinguished from an automated production line by its ability to process more than one product style simultaneously.
- At any moment, each machine in the system may be processing a different part type.
- FMS can let us make changes in production schedule in order to meet the demands on different products.

- New product styles can be introduced into production with an FMS, so long as they are to be used on the products that the system can process.
- This kind of system is, therefore, ideal when there are likely to be changes in demands.



Distinguishing Characteristics:

- An automatic materials handling subsystem links machines in the system and provides for automatic interchange of work pieces in each machine
- Automatic continuous cycling of individual machines
- Complete control of the manufacturing system by the host computer
- Lightly manned, or possibly unmanned

There are three levels of manufacturing flexibility

1-Basic Flexibilities

- *Machine flexibility* - the ease with which a machine can process various operations
- *Material handling flexibility* -a measure of the ease with which different part types can be transported and properly positioned at the various machine tools in a system
- *Operation flexibility* - a measure of the ease with which alternative operation sequences can be used for processing a part type

2-System flexibilities:

- Volume flexibility
- Expansion flexibility
- Routing flexibility
- Process flexibility
- Product flexibility

3-Aggregate flexibilities

- Program Flexibility
- Production Flexibility
- Market Flexibility

Major historical developments

- Weaving Looms with paper tapes,
- NC machines with paper tapes
- Hard wired NC machines
- Computer controlled NC machines (CNC)
- Direct Numerical Control (DNC)

Components of FMS Systems

- Robotics
- Material Handling / Transport
- Machines
- Manual / Automated Assembly Cells
- Computers
- Controllers
- Software
- Networks


Fastems

Benefits of FMS

FMS systems are intended to solve the following problems:

- Reduced work in process
- Increased machine utilization
- Better management control
- Reduced direct and indirect labor
- Reduced manufacturing lead-time
- Consistent and better quality
- Reduced inventory

The Disadvantages of FMS

- Expensive, costing millions of dollars
- Substantial pre-planning activity
- Sophisticated manufacturing systems
- Limited ability to adapt to changes in product
- Technological problems of exact component positioning and precise timing necessary to process a component

Future Benefits of FMS

- Technology will make 100% inspection feasible
- Computer diagnosis will improve estimation of machine failure, and guide work crews repairing failures
- The use of robots that have vision, and tactile sensing
- Minimum human labor in manufacturing systems
- More sophisticated tools with increased computing power
- Better management software, hardware, and fixturing techniques
- Developed standards that will let us install new machines easily

Future Benefits of FMS

- Reduced marketing of products
- Custom orders for customers will be made immediately with exact specifications
- Improved network systems between manufacturers and suppliers

Differences Between FMS and FMC

FMS

- Has four or more machines
- Larger and more sophisticated computer control system
- Minimized effect of machine breakdowns

FMC

- Has two or three machines
- Simpler computer control system
- Limited error recovery by fewer machines

In studying FMS, we need to keep in mind what Peter Drucker said: "We must become managers of technology not merely users of technology".