# Introduction

## Overview

### What the course is about

A servo system is usually defined as a system whereby the motion and position of a mechanism is controlled using a feedback device, by which the system can detect errors and act to correct them. The corrective action can be performed using electric motors, or pneumatic or hydraulic cylinders.

This is a course of instruction about how electric servo systems work and in the optimal choice of servo motors and drives (amplifiers) to achieve a specified performance at minimum cost. Nevertheless much of the content applies to all servo systems irrespective of the type.

It is designed to help both those with little knowledge of the subject to become conversant and those with existing knowledge to appreciate the finer points of the subject. The content is modularized and covers everything from fundamentals to sophisticated applications. This allows users to skip subjects they are already comfortable with.

As will become apparent, it is impractical to manually calculate all possible permutations of a proposed system so the course content is also used to accompany the Cosmatt sizing software tool as the ultimate help system.

### What the user can expect to learn

A knowledge of servo systems and how to select them, including many of the more subtle aspects which can affect performance and selection.

### What they will be able to do once they have completed the course

To choose servo system components that will perform any required task to a specified standard and to do so at the minimum cost.

### What knowledge is a pre-requisite

(with links to online courses which will bring user up to speed)

High school level mathematics and basic engineering knowledge.

Pre-test

At this point to establish entry point – reversible if performance doesn’t match promise!

## Table of Contents

### Fundamentals

* Mass
* Inertia
* Radians
* Torque
* Power
* Units
* Resolution
* RMS
* Electrical quantities
* Bandwidth
* How a Servo Axis Works

### MoveProfiles

* Basic
* Advanced
* “Standard” Cams
* Custom Cams

### Load Types

* Rotary & Linear
* External Torque & Force
* Variable Inertia
* Variable Gravity-Torque

### Transmission

* Direct
* Tangential
* Screw
* Gearboxes

### Feedback Devices

* Encoder
* Resolver

### Servo Motor Types

* Rotary
* Linear
* Induction
* Stepper

### Servo Motor Selection

* Servo Motor Selection

### Servo Drive Selection

* Drives
* Shunts and Regeneration

### Control System

* PID Control
* Master and Slave
* Stability
* Servo System Accuracy
* Tuning

### Template Applications

* Rotary Knife
* Flying Shear
* Crank

### Simulation

### Commissioning a Servo System

* Commissioning a Servo System.md