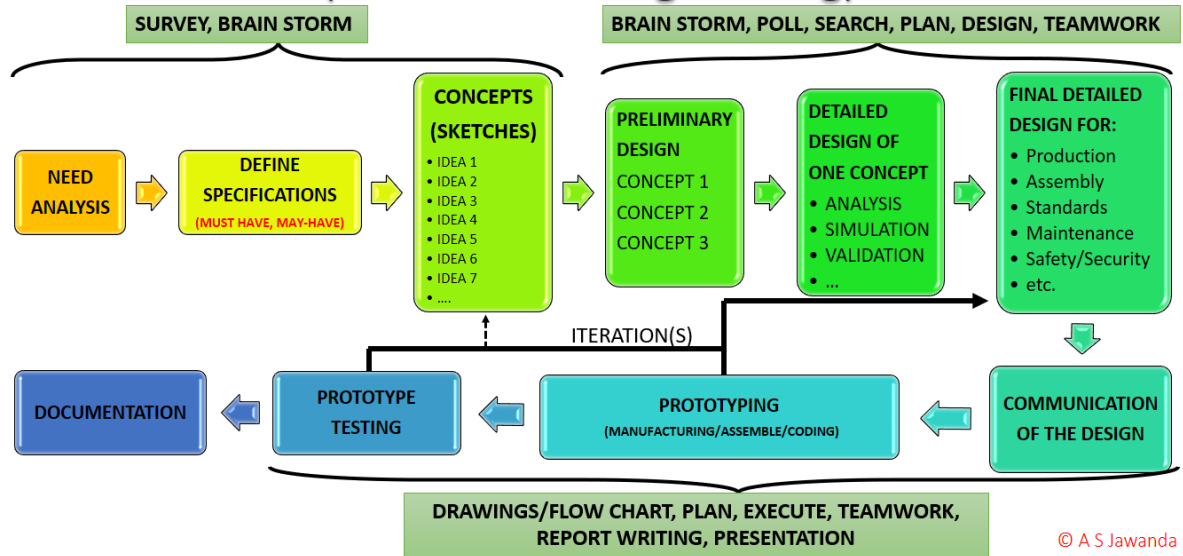


Mangonel

DESIGN PROCESS (Central to all Engineering)



© A S Jawanda

Aim: The objective of this course in this project is to bring together the various components of this course with a view to help you learn the **engineering design process** shown above to design, simulate and fabricate any engineered product. The design of a Precision Mangonel is used as an example to illustrate the steps involved and the implementation by a team of engineers. A 'Precision Mangonel' is designed and instrumented with the aim of firing a missile (ball) at a target which is detected by an electronic measuring circuit. The angle of launch of the missile is changed using a calibrated electro-mechanical targeting system. The velocity of launch of the missile is calibrated in the launching electro-mechanical system.

Theory: Related to the design of a Precision Mangonel, in the Electronics Laboratories you have successfully implemented, simulated and operated a micro-electronic system to allow you to measure as well as display the angular velocity of the arm. In the Mechanical Laboratories you have developed a discretized analytical model of trajectory dynamics and used this to generate a simulation tool to allow you study the influence of launch velocity, launch angle and drag on the flight path of the missile. In the Dynamics Laboratories, you have developed analytical skills in order to calculate the static and dynamic stresses in the Mangonel material so that the design remains safe when operated repeatedly. In addition, you have seen the assembly of a full Mangonel and videos of it from the point of view of performance.