Mechatronics Assignment 1:

Present a 15 minute seminar on one of the topics listed below. Topics listed in red can be combined into single topic.

Electronic Elements :

1.Diodes (Types, characteristics, Application examples)

2.BJTs (Types, characteristics PNP, Application: Linear Amplifiers & Switching

3.FETs (Types, characteristics, Application: Linear Amplifiers and switching)

4.High current switching devices: Thyristors, Triacs, GTOs, IGBTs

5.Operational Amplifiers: Basics, need for feed-back, Inverting and Non-inverting configurations

6.Operational Amplifiers: Applications as Comparator, summing amplifier, integrator, differentiator, function generator, buffer

7. Precision Instrumentation amplifiers: construction, types of errors, CMRR etc..

8.Logic gates: TTL, AND, OR, NAND, NOR, NOT, Exclusive OR, Combinational circuits

9. Sequential digital circuits: Flip-flops (different types and applications)

10. Schmitt trigger, 555 Timer IC (Construction and applications)

11.Signal processing: Analog to digital converters (Types and principles)

12. Digital to analog converters (types and principles)

13.Microprocessors (General Architecture and use)

14.Microcontrollers (General Architecture and use)

15. Digital Signal processors (General Architecture and applications)

16.Network topologies (Industrial Bus Structures)

17. Communication protocols (for various types of communications)

18.Programmable logic controllers (Architecture, ladder diagrams)

19. Batteries as power sources (Types, characteristics, applications)

Mechanical Elements, especially, "motion Conversion Elements"

1.Gears (Transmission between parallel axes)

2.Gears (Transmission between non-parallel axes)

3.Planetary gears

4. Continuously variable (CV) Drives

5.Harmonic Drive

6.Couplings

7.Hydraulic couplings

8.Flexible shafts

9.Clutches (Transmission)

10.Unidirectional or free-wheeling clutches

11.Toothed belts

12.Chains and sprockets

13.Ball screws

14.Linear motion guides

15. Bearings with sliding contact (Hydrostatic and hydrodynamic lubrication)

16.Bearings with rolling contacts

17.Planar 4-bar mechanisms

18.Spatial 4-bar mechanisms

19.Springs

20.Friction models

21.Gears (Non-circular)