

ELG4139: Design Aspects of Power Supply



A power supply converting AC line voltage to DC power must perform the following functions at high efficiency and at low cost:

- **Rectification:** Convert the incoming AC line voltage to DC voltage.
- **Voltage transformation:** Supply the correct DC voltage level(s).
- **Filtering:** Smooth the ripple of the rectified voltage.
- **Regulation:** Control the output voltage level to a constant value irrespective of line, load and temperature changes.
- **Isolation:** Separate electrically the output from the input voltage source.
- **Protection:** Prevent damaging voltage surges from reaching the output; provide back-up power or shut down during a brown-out.

Midterm 2

- Draw a block diagram for a laptop computer power supply system to run three basic loads: hard disk drive, microprocessor, and display backlighting.
- Design an appropriate transformer.
- Design an appropriate battery charger to charge a 12 V battery with a power rating of 90 W considering a charging frequency of 2 kHz and maximum current ripples of 15% of the charging current.
- Design a suitable converter for the hard disk drive.
- Design a suitable converter for the microprocessor.
- Design a suitable converter for the display black lighting.