Objectives AC Circuits

Topic	Objectives
ac voltage	Explain how ac voltage is produced by a generator (22.7) Determine instantaneous voltage, amplitude and period of an ac voltage from a diagram, calculate its (angular) frequency (20.5) Draw simple phasor diagrams
Phase shift and impedance	Realise that current and voltage usually are not in phase Determine time shift between current and voltage from a diagram, calculate phase shift Explain phase shift with phasor diagram Calculate current amplitude from voltage and impedance
ac power	Calculate rms values of voltage and current Calculate effective power (23.3) Calculate phase shift from effective power and rms values
Transformer (22.9)	Describe how a transformer works Calculate voltage and current transformation for an unloaded and a short circuited transformer, respectively
Power losses in transmission lines (22.9)	Calculate (relative) power losses in transmission lines Explain why high-voltage transmission lines are used
Transmission of electric power	Sketch transmission of electric power (22.9) Explain how a ground fault interrupter works (22.4) Know functions of the three poles in a socket (phase, neutral wire, protective earthing)

Constant	Value
Household voltage in Europe	230 V/50 Hz
High-voltage	220 kV (national) or 380 kV (European grid)