I. Circadian rhythms
   Sleep is part of a 24 sleep-wake rhythm
   Sleep is an active process – not just the absence of brain activity
   2 active processes – sleep and wakefulness
   The term circadian rhythms
   Jean Jacques d’Ortous de Mairan’s plant demonstration of circadian rhythm
   The body’s circadian rhythms – e.g. body temperature
   The suprachiasmatic nucleus of the hypothalamus
   Jet lag

II. Neuroanatomical and neurochemical mechanisms
    Transection, stimulation and lesion studies of the brain
    sites of wakefulness – Moruzzi
    sites of sleep
    REM sites
    Onset and offset of REM sleep
    Neurochemical regulation of awake and sleep and REM and Non-REM
    adrenergic  serotonergic  cholinergic  glutamatergic
    Glutamate is involved in stimulation of awake
    GABAergic (gamma-aminobutyric acid) – is mainly inhibitory and
    located in the hypothalamus and basal forebrain and thalamus
    adenosine - accumulates in basal forebrain
    hypocretin/orexin - hypothalamus

III. Human studies of sleep
    The sleep lab
    Sleep is not a homogeneous state
    The stages of sleep
    Cycling in sleep
    REM vs Non-REM sleep
    Characteristics of REM sleep
    Heart and respiratory function in sleep
    Changes with age

IV. Sleep deprivation gives hints as to function of sleep
    Cognitive, mood, personality, motor changes
    REM deprivation – REM pressure and REM rebound

V. Sleep disorders
    Insomnia – hypersomnia – parasomnia – biological clock
    Narcolepsy - disorder of excessive sleepiness
    The tetrad – cataplexy, sleep paralysis, hypnagogic/hypnopompic
    Sleep apnea
    Sleep walking
    REM sleep behavior disorder
Relevant reading: chapters 47 and 48 in “Principles”