Topics in final

1. Optical filters: Fabry-Perot resonator, fiber bragg grating, acoustic-optic filter and Mach-Zehnder filter; Δf_{FSR}, finesse, Bragg condition for grating, linewidth; mechanisms for tuning and principle of operation, e.g. interference.
2. Laser and LED: power as function of current, spectral response, modulation response, divergence angle; radiation frequency and material; lasing requirements, 3 radiative processes, threshold gain and resonant freq.
3. Detector: photo-current (APD and PIN diode), responsivity, quantum efficiency, cut-off wavelength and detector circuit; modulation response, circuit time and transit time; thermal noise and shot noise (PIN diode, APD, AC and DC signals); BER in thermal limited digital system and shot noise limited digital system; $\Delta\tau_{sys}$ that considers rise time in transmitter, receiver and fiber and its relation to data rate R_b.
4. Special light sources: VCSEL, DBR and DFB laser, tunable laser, WGR integrated with a source, supercontinuum sources and direct &

external modulation (electro-optics, electroabsorption and electrorefraction).

5. Multiplexer/Demultiplexer: Prism, grating, AWG, WGR, MZ filter, acousto-optic filter and add/drop filter or multiplexer.
6. Optical amplifier: SOA, EDFA, PDFA, SRS, SBS; EDFA parameters -- pump wavelengths and power, output wavelength and power, ASE noise, WGR with optical amplifier.
7. Switches & other components: wavelength converter, OPLL, directional coupler, ring resonator, optical equalizer, isolator & circulator, MEMS, OADM.
8. Networks: coherent vs. incoherent detection, analog vs. digital receivers, multiplexing vs. multiple access; TDM or TDMA, FDM or FDMA, WDM or WDMA and CDMA; switching consideration (reduce cross connects & internal blocking), circuit switching vs. packet switching; effect of network topology on loss and dynamic range.