What you should know for the final (minimum):

- definition of continuous time MC, Markov property, transition probabilities, generator
- representations of MC: infinitesimal (generator), jump-and-hold, transition probabilities, rate diagram and relations between them (in particular Q and $P(t)$)
- computing absorption probabilities and mean time to absorption
- computing stationary distributions for finite and infinite state MCs and interpretation of $(\pi_i)_{i=0}^{\infty}$
- basic properties of birth and death processes

- conditional density and conditional distribution
- computing probabilities and expectations using the law of total probability
- basic definitions related to renewal processes : renewal and interrenewal times, renewal function, age, excess life
- formula for $E(W_{N(t)+1})$
- asymptotic distribution of $N(t)$
- computing the asymptotic behavior of $M(t)$ (linear and constant term)
- asymptotic distribution of age and excess life
- asymptotic behavior of $E(\delta_t)$, $E(\gamma_t)$ and $E(\beta_t)$
- age replacement pocily example

- definition of martingales
- examples of martingales (additive, multiplicative, m. transform)
- maximal inequality for nonnegative martingales
- definition of BM
- BM as a Gaussian process
- basic properties of BM
- reflection principle
- computing probabilities of events for the zeros of BM
- computing probabilities of events for the reflected BM
- computing probabilities of events for BM with drift
- computing probabilities of events for geometric BM