

# ECE 750 - Real-Time Computing Systems

## COURSE OUTLINE

1. Introduction to Real-Time Systems (0.5 week)
  - distinguishing characteristics of real-time applications
  - notions of guarantee
2. Uniprocessor Scheduling (2.5 weeks)
  - Rate monotonic and Earliest Deadline First algorithms
  - Deferrable server, Sporadic server, Total Bandwidth Server
  - Chetto & Chetto and slack stealing
3. Resource management (1.5 weeks)
  - Priority inheritance and priority ceiling
  - Stack resource protocol
4. Multiprocessor/Multi-core scheduling (2 weeks)
  - Hard deadline guarantees
  - Bidding, focussed addressing, load sharing
  - Resource reclaiming
5. Time-constrained communication (1 week)
  - multiple access networks
  - point-to-point networks
6. Fault-tolerance (1 week)
  - Fault models: fail-stop, omission, timing, Byzantine
  - Interactive consistency: exact and approximate agreements
  - Clock synchronization
7. Real-time kernels (1 week)
  - <https://www.osrtos.com/>
8. Timing analysis and verification (1 week)
  - WCET

- Cache management
- Pipelining

9. Applications (2 weeks)

- Real-time control
- Transaction processing
- Multimedia