CSE 2414 REAL TIME PROGRAMMING
Prerequisite; CCS 2124 Operating Systems II

Purpose;
To enable the student understand fundamental concepts and development of real time systems.

Learning outcomes;
By the end of this course unit the student should be able to:
1. Explain essential concepts in real-time computing.
2. Explain real-time schedule approaches and real-time software architectures.
3. Apply architecture patterns for real-time system programming.

Course Description;
Introduction to real-time systems; Uniprocessor scheduling and resource management; Multiprocessor scheduling and load sharing; Time-constrained communications; Real-Time Computing, Threads and Processes, Scheduling, Intertask Communication Methods, Real-Time Operating Systems; Distributed Computing for Controls, Network Communication Protocols Suitable for Controls, Interprocess Communication Models, Networked Control Systems; Concurrent programming languages: design issues and examples, POSIX threads and semaphores.

Teaching Methodologies;
Lectures, practical sessions and tutorials.

Instructional Materials/Equipment;
1. LCD Projector
2. Whiteboard
3. Computers and Internet.

Course Assessment;

Continuous Assessment Tests	30%
End of Semester Examination	70%

Course Textbooks;
1. Kopetz, H. (1997). *Real-Time Systems: Design Principles for Distributed Embedded Applications.* Kluwer Academic Publishers.
2. Wolf, W. (2006). *High-Performance Embedded Computing: Architectures, Algorithms, and Applications.* Morgan-Kauffman Publishers.
3. Burns, A & Wellings, A. (2001). *Real-Time Systems and Programming Languages* (3rd ed.). Addison-Wesley.

Course Journals;
1. International Journal of Embedded and Real-Time Communication Systems
2. Journal Real Time Systems
3. International Journal of Critical Computer-Based Systems

Reference Textbooks;

1. Hristu-Varsakelis,L. & Henzinger, A.(2005). *Handbook of Networked and Embedded Control Systems* (2nd edition). Birkhauser.
2. C. M. Krishna & K. G. Shin, (1997). *Real-time systems*. McGraw-Hill, 1997.
3. Stankovic, J. A & Ramamritham, K.(1988). *Hard real-time systems*. IEEE Computer Society Press, 1988.

Reference Journals;

1. Embedded Multimedia Electronic Journals
2. Knowledge and Information Systems
3. Advances in Wireless and Mobile Communications (AWMC)