Ders Bilgi Formu (İngilizce)

Course Name: Real-Time Systems			**Program** Information Systems Engineering		
Credit: 6	**Year- Semester:** 4/7	**Course Code:** BSM 4509	**Level of Course:** Undergraduate	**Required/Elective:** Elective	**Language:** Turkish
Hours/Credit: **T** 2 **U** 2 **L** 0 **C** 6	**Instructor(s):** bilisimsistem@mu.edu.tr				

Teaching Methods: Teaching, Question - Answer, Demonstration

Course Objectives: The objective of this course is to provide information about development of operating systems for real-time systems or appropriate applications for existing operating systems.

Course Content: General structure of real-time operating systems, real-time kernel, interrupt, memory and resource management, programming I/O elements and programming algorithms, open source RTOS' and their usage, designing real-time application program

I. Week	General Structure of Real-Time Operating Systems: Used Processors, Memory Structure and Input Output Units
II. Week	General Structure and Units of Real-Time Operaing Systems
III. Week	Kernel Structure, Tasks, Scheduling
IV. Week	Scheduling Algorithms, Priority-Based Scheduling
V. Week	Queue Management, Queue Specifications, Creating Queues, Data Storage, Access to Multiple Tasks
VI. Week	Interrupt Management, Events, Semaphores
VII. Week	Interrupt Processing, Counting Semaphores, the Use of Queues in Interrupt Servide Routine
VIII. Week	Midterm
IX. Week	MPU Hardware Restriction in Determining Memory Areas
X. Week	Open Source Real-Time Operating Systems: freeRTOS, OPENRTOS, TinyOS, Specifications and Usage
XI. Week	The Use of Input/Output Elements: The Use of Device Driver with RTOS
XII. Week	Polling or Interrupt Stimulated I/O Programming Algorithms
XIII. Week	Network Protocols used in Real-Time Operating Systems: TCP/IP, CAN, GSM, GPRS, IRDA, IEEE 802.11
XIV. Week	Data Transmission Techniques, Networking and Protocols

Anticipated Learning Outcomes: At the end of this course, the student;

- Understans desing methods and restrictions of real-time systems.
- Explains some necessary concepts such as scheduling, interrupt usage, kernel priority for real-time operating systems.
- Designs real-time kernel with C and Assembly languages by establishing hardware/software relationship.
- Designs multiprocess applications by generating server-client software architecture which provides synchronization and transmission of necessary interprocess.
- Explanes necessary network protocols for real-time applications.
- Develops real-time application software by using real-time operating systems.

Assessment Method(s): Midterm Exam (30%), Final Exam (40%), Assignments (30%)

Textbook: Real-Time Systems: Scheduling, Analysis and Verification, Albert M. K. Cheng, John Wiley High Education, 2002.

Recommended Reading: Real-Time Systems, Jane W. S. Liu, Prentice Hall, 2000.

Pre/Co-requisites: None