Course Code-Name	EE242 – MICROPROCESSOR SYSTEMS

Course Schedule	
Instructor's Name Phone E-mail Office Hours	Assist. Prof. Dr. Gökhan Şahin **Contact me using Email!** sahin@yeditepe.edu.tr The class is on Yeditepe coadsysexam:https://coadsysexam.yeditepe.edu.tr/
Assistants	
Textbook & Supplementary Materials	Geoffrey Brown, Discovering the STM32 Microcontroller, 2012 Carmine Noviello, Mastering stm32,2016 Yifeng Zhu, Embedded Systems with ARM Cortex-M Microcontrollers in Assembly Language and C .pdf
Recommended Prerequisites	Knowledge of digital design techniques and the C programming language is a prerequisite for this course. Although not listed as formal prerequisites, circuits/electronics courses are highly recommended. An understanding of compilers, assemblers, linkers, operating systems, analog design, diodes, transistors, and electromagnetic fields and waves will be useful.
Course Overview	- In this class, the fundamentals of embedded system hardware and firmware design will be explored - Basics of microcontroller architecture will be introduced - A well known 32-bits ARM based microcontroller; STM32F407VG (SGS-Thomson Microelectronics) will be studied. - Firmware design using 'C language', and firmware debugging will be discussed. - Cortex Microcontroller Software Interface Standard (CMSIS) will be studied. - The HW/Firmware development tools for the microcontroller will be used effectively. - A complete embedded system design cycle will be carried out.
Midterm Date	Midterm: **Will be announced later.**

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	All exams are open book/notes. All students must show their own efforts, cheating is strictly forbidden. All the answers must be clearly explained, clear explanation of the answer is the responsibility of the student.
Grading	Final Exam 30% Midterm Exams 40% Lab. Experiments 20% Quiz 10% Grading Policy <table><tr><td>85</td><td>100</td><td>AA</td></tr><tr><td>75</td><td>84</td><td>BA</td></tr><tr><td>65</td><td>74</td><td>BB</td></tr><tr><td>55</td><td>64</td><td>CB</td></tr><tr><td>45</td><td>54</td><td>CC</td></tr><tr><td>40</td><td>44</td><td>DC</td></tr><tr><td>35</td><td>39</td><td>DD</td></tr><tr><td>0</td><td>34</td><td>FF</td></tr></table>
Course Plan	1. Common Computer Organization / Microcontroller basics Lab1: Introduce the discovery board, Installation of Compiler/debugger, basic examples demonstrating the use of compiler/debugger 2. Common Computer Organization / Microcontroller basics Lab2: Introduce the discovery board, Installation of Compiler/debugger, basic examples demonstrating the use of compiler/debugger 3. Introduction to ARM cortex processors, STM32F40x HW architecture Lab3: Using C language on discovery board 4. IO interfacing, and STM32F407 interfaces Lab4: General purpose IO module and blinking LED application 5. Parallel port, GP output -> using the 7-segment module Lab5: multi-7-segment display application 6. Parallel port, GP input -> using the matrix keypad Lab6: 7-segment display with matrix keypad application 7. Midterm 8. Int. to Cortex microcontroller software interface standard (CMSIS) libraries, Reset and Clock control module->PLL and frequency settings Lab7: GP input/output experiments using CMSIS

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	9. Sampling, ADC module Lab8: Read ADC, write to 7-segment 10. Interrupts, Timer interrupt, sampling Lab9: generate a square wave with desired frequency 11. PWM applications Lab10: Generate PWM with adjustable duty cycle. Freq.: 10 KHz. Duty cycle should be adjusted using pot. Observe PWM signal using osc. 12. Serial communication: UART Lab 11: PC->HyperTerminal (realterm) ☐ STM32F407 via UART connection
Attendance	• **80 % (**If your **lecture and lab** attendance falls below 80%, you <u>FAIL</u> the class (FA) and have <u>NO</u> right to take the Final make-up exam**.)**