



COURSE SYLLABUS

Course Title	Control Technique with Microcontrollers		
Course Code	CT	No. of Credits	3
Department		School	MUST
Pre-requisites Course Code	none	Co-requisites Course Code	
Course coordinator	Ts. Tengis	Room number	
Email	tengis@must.edu.mn	Telephone No	99095618
Other Instructor(s)			
Learning Hours	Total: . . . Learning hours (2:0:2:5) Lecture (. . hr), Seminar (. . hr), Field trip (. . hr), (. . hr)		
Course Type	<input checked="" type="checkbox"/> Compulsory <input type="checkbox"/> Elective <input type="checkbox"/> Selected elective <input type="checkbox"/> Other		
Offer in Academic Year	<input type="checkbox"/> 1 st Semester <input checked="" type="checkbox"/> 2 nd Semester <input type="checkbox"/> Summer <input type="checkbox"/> Year Long		
Introduction language	Mongolian or English		
AIMS AND OBJECTIVES:			
<ul style="list-style-type: none"> • To introduce students with the architecture and operation of typical microcontrollers. • To familiarize the students with the programming and interfacing of microcontrollers. • To provide strong foundation for designing real world applications using microcontrollers • Knowledge of basic methods, tools and elements necessary for control-system 			
ESSENTIAL READINGS: (Journals, textbooks, website addresses etc.)			
BIBLIOGRAPHY:			
<ul style="list-style-type: none"> • Muhammad Ali Mazidi. THE AVR MICROCONTROLLER AND EMBEDDED SYSTEM USING ASSEMBLY AND C. • Norman S. Nice CONTROL SYSTEMS ENGINEERING 6th edition 			
COURSE DESCRIPTION:			
<p>This course covers the development, structure, programming, and interfacing of microprocessors, and microcontrollers. Microcontroller's structure, commands, interfaces, and operations will be learnt through practical C programming on the trainers.</p> <p>Control technique with microcontroller enable students to develop control algorithms and programs to realize the actual control functions for control targets or plants. The course has 16 laboratories, and laboratories will use microcontroller's trainer board.</p>			
TEACHING METHODS: Flipped classroom and laboratory-based learning (Blended learning)			
COURSE CONTENT			
Course topics for lecture and seminar:		Lecture hours	Seminar hours

Building wolf scaring device (Parallel port)	4		
Traffic light control (Parallel port)	4		
Road automatic speed bump (Parallel port)	4		
Locker with keypad (Parallel port)	4		
DC motor control	4		
Stepper motor control	4		
Seven segment display	4		
LCD control	4		
Human counting device (Timer and Counters)	4		
Second Meter (Timer and Counters)	4		
Elevator emergency system (Interrupt)	4		
Temperature control (ADC)	4		
White line follower (PID)	4		
Stabilization of rotational speed of DC motor (PID)	4		
Pendulum stabilization (PID)	4		
Serial communication (USART)	4		
COURSE LEARNING OUTCOMES (CLOs)		Aligned PLOs	
By the end of the main course, the students should be able to:			
1	Explain the general construction of microcontroller system.		
2	Using the LCD, keyboard, switch, relay, LED other peripherals able to build control system monitoring		
3	Design and implement programs on microcontrollers		
4	To design and assemble custom microcontroller's system		
COURSE TEACHING AND LEARNING ACTIVITIES			
Weekly contact hours: (.....)-..... hour lecture, 1x1 hour seminar, Field triphour laboratory. Traditional and active learning methods will be used within lecture, seminar and field trip classes.			
Learning methods /Pedagogy/	Modes of Delivery	Aligned CLOs	
Case based learning	<ul style="list-style-type: none"> • Lecture • Seminar and discussion • Laboratory work 		
Flipped classroom			
Experiential learning			
COURSE ASSESSMENT METHODS			
Assessment tools	Assessment frequency	Weight	Aligned CLOs
Attendance/Participation in class	Weekly	10%	
Homework/assignment	6, 7,8,9,10,11,12,13 th weeks	20%	
Case processing/ Course work/project	13 th weeks	20%	
Midterm exam	7, 14	20%	
Final exam	17 or 18 th week	30%	
REVISED BY:			
Course coordinator:	Ts. Tengis	Date:	15/12/2019
APPROVED BY:			
Head of Department:		Date:	