Programme	**Master of Technology in VLSI and Embedded Systems**					Year of Regulation		**2018-19**
Department	**Electronics and Communication Engineering**					Semester		**I**

Course Code	Course Name	Credit Structure				Marks Distribution		
		L	T	P	C	Continuous Evaluation	VIVA	Total
EC 555	**Programming Lab**	**0**	**0**	**2**	**1**	**70**	**30**	**100**

Course Objectives	Develop capability to handle Xilinx Vivado, ARM Kile and Mbed tools	Course Outcomes	CO1	Able to learn the Xilinx VIVADO and ARM Kile Tools
	Understand basic FPGA implementation and executing the code on STMF4 controller Board		CO2	Able to implement Digitals circuits on FPGA
	Design embedded C programmes for Embedded applications		CO3	Able to realize embedded applications using STMF4 and mbed

No.	COs	Mapping with Program Outcomes (POs)												Mapping with PSOs		
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
1	CO1	3	3	0	1	0	0	0	0	2	0	0	0	3	3	0
2	CO2	3	3	3	1	0	0	0	0	2	0	0	0	2	2	0
3	CO3	2	3	3	1	2	0	0	0	0	0	0	0	2	2	0

SYLLABUS			

No.	Content	Hours	COs
I	1) Perform Verilog simulation and implementation of Generalized Digital Combinational & Sequential Circuits 2) Design complex Finite state machine and implement the same in FPGA. 3) Perform basic software on Embedded C programming on Kile software. 4) Interfacing GPIOs inputs and outputs on STM F4 board. 5) Interface GPIO with LCD for display messages. 6) Learn to use Timer delays using Systick Timers. 7) Learn To used interrupts and delays in STM F4. 8) Interface Temperature, Smoke, LDR sensors with LCD display. 9) Interface RTC Timer and 10) Learn Mbed platform for STMF4.	24	CO1 CO2 CO3
	Total Hours	24	

Essential Readings

1. Yifeng Zhu Embedded Systems with ARM Cortex-M Microcontrollers in Assembly Language and C ,Third Edition, E-Man Press LLC, 2017

2. Ramachandran, S A Design Manual for Implementation of Projects on FPGAs and ASICs Using Verilog , First Edition Springer , 2007

Supplementary Readings

1. D.Ibrahim ARM-based Microcontroller Projects Using mbed 1st Edition, Newnes , 2019
2. Carmine Noviello Mastering STM32 Lean pub 2nd Edition 2016