

Course Code	Course Title	L	T	P	C
1156EC401	MOOC - DEVELOPMENT OF EMBEDDED AND RTOS	0	0	0	2

a) Course Category

Independent Learning – Self Learning Course

b) Preamble

This course gives a complete view of the embedded system stack with a focus on processor architectures, instruction sets and the associated advanced compiler optimizations that take advantage of the same. Also this course will give the introduction about real time system and its operating system

c) Prerequisite

Nil

d) Related Courses

Embedded System Design, Real Time Operating Systems

e) Course Outcomes

Upon the successful completion of the course, students will be able to

CO Nos.	Course Outcomes	Knowledge Level (Based on Revised Bloom's Taxonomy)
CO1	Explain instruction level parallelism and embedded microarchitectures.	K2
CO2	Describe register allocation for embedded processor	K2
CO3	Describe register allocation, data layouts for embedded and network processor.	K2
CO4	Construct a real-time system with required system parameters.	K3
CO5	Program on Free RTOS and describe scheduling methods in multi-core real time systems	K3

f) Course Content

UNIT I EMBEDDED PROCESSOR ARCHITECTURES

9

Instruction-Level Parallelism, Design of Instruction Set Architectures, Embedded Micro- architectures

UNIT II	SOFTWARE OPTIMIZATIONS	9
Compiler Phases, Register Allocation Foundation, Register Allocation for Embedded Processors		
UNIT III	ADVANCED OPTIMIZATIONS	9
Data Layouts for Embedded Processors, Data and Code Compaction, Network Processors		
UNIT IV	REAL-TIME SYSTEMS	9
Basic building stones in real-time systems, the system parameters required to construct a real-time system, Real-time schedules		
UNIT V	REAL-TIME OPERATING SYSTEMS	9
Free RTOS and its kernel, Multi-core real-time systems, Scheduling methods for multi-core real-time systems		
Total		45 Hrs

g) Learning Resources

Reference Books

1. <https://www.udacity.com/course/embedded-systems--ud169?autoenroll=true> (Georgia Tech)
2. <https://www.coursera.org/learn/real-time-systems> (ÅboAkademi University)