Content

Course Code	Course Name	Semester	Theory	Practice	Lab	Credit	ECTS
INF 543	Advanced Embedded Systems	2	3	0	0	3	6

Prerequisites	
Admission Requirements	

Language of Instruction	English
Course Type	Elective
Course Level	Masters Degree
Objective	This course which builds on top of graduate-level knowledge of processor and systems architecture, aims to provide the current designs and trends in the field. Objectives of this course can be summarized as follows: • Puts forward the differences between current trends and traditional designs aproaches in the field of Computer architecture. •Presents the design choices behind various commercial architectures. • Puts forward the techniques used for designs at the level of computer architecture. • Presents the effect of the computer architecture on the low level software. • Enables the students to complete realistic designs on certain subcomponents of a modern computer architecture. • Enables students with opportunities for assimilating the concepts and experimental methods presented in the class through multi-stage projects and assignments.
Content	Week 1: Overall discussion of the course content, a brief summary of the subjects for the whole semester. Week 2: Processor architectures. Instruction set architecture (ISA) and microcomputer arcitecture. Define the components in the internals of a processor system. Week 3: Memory: Introduction of the semi-conductor technology related to the memory. Classification of the memory.Memory hierarchy. Error detection and correction techniques for memory Week 4: Cache memory. Taxonomy of Cache memory. Multi-level cache memory design. Week 5: RISC Architecture: General design principles behind RISC. Historical perspective. Introduction to Pipelining. Contaracting RISC with CISC architecture. Week 6: Pipeline Architecture - I Week 7: Pipeline Architecture - II Week 8: Midterm Week 9: Instruction Level Parallelism (ILP):Dependency types, ILP design approaches, challenges and solutions. Week 10: Instruction Level Parallelism (ILP): Performance Evaluation Week 11: Advanced Topics: Parallel Computers Hafta 12: Advanced Topics: ARM Architecture Hafta 13: Advanced Topics: GPU design and architecture Hafta 14: Advanced Topics: Performance evaluation of advanced microprocessor systems.
References	- Course notes - Hennesy, L., Patterson, D. “Computer Architecture A Quantitative Approach” 5/e, Morgan Kaufmann, 2011

Theory Topics

Week	Weekly Contents
1	Overall discussion of the course content, a brief summary of the subjects for the whole semester.

Week	Weekly Contents
2	Processor architectures. Instruction set architecture (ISA) and microcomputer arcitecture. Define the components in the internals of a processor system.
3	Memory: Introduction of the semi-conductor technology related to the memory. Classification of the memory.Memory hierarchy. Error detection and correction techniques for memory
4	Cache memory. Taxonomy of Cache memory. Multi-level cache memory design.
5	RISC Architecture: General design principles behind RISC. Historical perspective. Introduction to Pipelining. Contaracting RISC with CISC architecture.
6	Pipeline Architecture - I
7	Pipeline Architecture - II
8	Midterm
9	Instruction Level Parallelism (ILP):Dependency types, ILP design approaches, challenges and solutions.
10	Instruction Level Parallelism (ILP): Performance Evaluation
11	Advanced Topics: Parallel Computers
12	Advanced Topics: ARM Architecture
13	Advanced Topics: GPU design and architecture
14	Advanced Topics: Performance evaluation of advanced microprocessor systems.