POSGRADOS

ITESO
Universidad Jesuita de Guadalajara

Contenido Curso Propedéutico 2015
Especialidad en Sistemas Embebidos

I. **C- Programming Concepts**
   a. Data Structures (1 hr)
      i. Data-types definition and declaration in C for embedded.
         1. Char
         2. Integers (architecture dependent)
         3. Float (single precision and double precision)
      ii. Variables in RAM
         1. Initialized
         2. Non-initialized
         3. Static
         4. Volatile
         5. Temporal
      iii. Constants
   b. Conditional structures, Decision structures and Loops (1 hr)
      i. IF –then-else
      ii. For-loop
      iii. While-loop (usage recommendations)
      iv. Switch (usage recommendations)
   c. Complex Data Types – Pointers, Arrays, etc. (2 hr)
      i. Memory allocation
      ii. Pointer to variables
      iii. Pointer to structures
      iv. Pointer to functions
      v. Casting rules
      vi. Direct and indirect structure member referencing
   d. Bit Fields with padding (1 hr)
      i. Logical vs Binary operations
      ii. Basic logical operations
      iii. Basic binary operations
   e. Casts (1 hr)
      i. Little-endian vs Big-endian
      ii. MISRA recommendations

II. **Data Representation**
   a. Integer numbers (1 hr)
      i. Signed and unsigned
      ii. Range and resolution
   b. Fixed-point numbers (optional) (1 hr)
      i. Range and resolution

        ii. Addition, Subtraction, Multiplication, Division.
    c. Floating point numbers (optional) (1 hr)
        i. Single precision
        ii. Double precision

III. Peripherals

a. I/O (3 hr)
    i. Input vs output. Electrical behavior
    ii. Open-drain vs Push-pull
    iii. Pull-up and Pull down
b. Timers (3 hr)
    i. System timers
    ii. Input capture / Output compare
    iii. PWM
c. Serial (3 hr)
    i. SCI format.
    ii. Transmission – Reception
    iii. Transceiver (electrical debugging)
d. ADC (optional)

IV. Microprocessor/Microcontroller Architectures

a. Computer Structures (2 hr)
    i. Buses
    ii. CPU
    iii. ALU
    iv. Memory Models
    v. Stack
    vi. Interrupt controller
b. Instruction Set (1 hr)
    i. CPU register
    ii. Assembly
c. Addressing Modes (1 hr)
    i. Small vs Paged
d. Arithmetic Operations (2 hr)
    i. Native arithmetic operations (integer / other)
    ii. Emulated arithmetic operations

NOTAS:

- ✓ Énfasis en las razones del porqué se puede soportar C en un micro
- ✓ Qué pasa con el código antes del “main(){…}”
- ✓ Estructuración de código en “capas” o “módulos”
- ✓ Creación de proyectos desde cero
- ✓ Configuración avanzada de IDE’s
- ✓ Conceptos de Compiladores+Enlazadores+Optimizadores

Kits Base para el Curso:

DEMOS12XEP100 de Freescale

DEMO9S12XEP100_PB.pdf

Lectura recomendada:

http://www.phaedsys.com/principals/bytecraft/bytecraftdata/bcfirststeps.pdf