Department of Computer Science and Engineering
National Institute of Technology Calicut
Kozhikode - 673 601, Kerala, India
Winter Semester 2022-23

CS2093D HARDWARE LABORATORY

(The instructor reserves the right to adjust the syllabus as and when required)

COURSE PLAN

Course Details:

Code: CS2093D
Title: Hardware Laboratory
Credits:3
Slot: R1 & R2
Time: Wednesday 9 am to 11:50 am (Batch: R2) & Wednesday 2 pm to 4:50 pm (Batch: R1)
Venue: SSL & NSL

Instructors:

Sl.No.	Name	Mail id
1	Saidalavi Kalady*	said@nitc.ac.in
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6	Nirmal Kumar Boran	nirmalkboran@nitc.ac.in
7	Manisha N L	manishanl@nitc.ac.in

*For any issues regarding HW lab, you can email the corresponding email ID with CC to all the Instructors!

Syllabus:

Theory (20 Hours)

Introduction to 8086 Microprocessor; Architecture of 8086, Memory addressing, Assembly Language Programming using 8086, the Instruction set of 8086, Data movement Instructions, Arithmetic and logic instructions, Program control instructions, String handling instructions, procedures, recursions, floating point instructions, Basics of SIMD programming.

Memory and I/O interfacing, interfacing with 8255- Programmable peripheral interface, 8279 – programmable keyboard interface, 8254 timer interface - 16550 UART interface - ADC/DAC interfaces. Interrupts, hardware interrupts, Programmable interrupt controller 8259, Interrupt examples. Direct Memory Access, Basic DMA operation, 8257 DMA controller, Bus interface, ISA, VESA, PCI, USB.

Introduction to NASM assembler, Sections in NASM, variables declarations, Basic instruction set, Basic I/O operations in NASM, Linux system calls, Interrupts, Linux 0x80h interrupt, Subprograms in NSAM, Arrays, and strings Using C Library functions in NASM, executing NASM programs, Sample programs, Floating point operations, SIMD operations.

MIPS instruction sets and their programming with SPIM simulators.

Practical (25 Hours)

1) 80X86 Assembly language programming: Integer operations, Operations on arrays, Recursive subroutines, String manipulation, Floating point operations, SIMD operations.
2) Familiarization with PC hardware and troubleshooting.
3) MIPS Programming.

References:

- P. Abel, IBM PC Assembly Language, and Programming, 5/e, Prentice Hall, 2001.
- B. B. Brey, Intel Microprocessors: Architecture and Programming, Prentice Hall, 2008
- NASM Tutorial compiled by CSED NITC
- D. A Pattersonen and J. L. Hennesy, Computer Organization and Design: The Hardware/Software Interface, 4/e, Morgan Kaufman, 2009.

Weekly Schedule (Tentative)*: Evaluation:

Date	Topics Covered	Marks
25/1/2023	Introduction	00
01/2/2023	Practice Lab 1 (Quiz 1)	3+5
08/2/2023	Practice Lab 2	3
15/2/2023	Test 1 (Integers)	25
15/3/2023	Practice Lab 3 (Arrays and Strings) (Quiz 2)	3+5
22/3/2023	Practice Lab 4 (Arrays and Strings)	3
29/2/2023	Test 2 (Arrays and Strings)	20
05/4/2023	Practice Lab 5 (MIPS) (Quiz 3)	3+5
12/4/2023	Practice Lab 6 (MIPS)	3
19/4/2023	Test 3 (MIPS) (Quiz 4)	25

*if any changes to the above schedule will intimate to the students in advance!

Assessments for final grading: Relative

Sl. No:	Evaluation criteria	Total number	Total marks (100)
1	Quiz	3*5: Best (4)	15
2	Test	3: Mandatory (25+20+25)	70
3	Practice Lab	5*3: Best (6)	15

Standard of Conduct:

- Adhere to high standards of ethical conduct.
- Academic dishonesty (if found), disciplinary actions will be taken. (Refer to the link for further details: https://minerva.nitc.ac.in/?q=node/650
- Null marks for absence for any evaluation/practice sessions.
- Makeup exam is only for tests (for only one test!) and exceptional cases with valid medical reasons and substantive proof endorsed by FA and HoD of CSED.
- Assignment (if any) submission will be permitted within the stipulated schedule.
- Issues (if any) regarding exams, assignments, and evaluations must be resolved within the stipulated time.