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| **Addis Ababa University**  **College of Natural Sciences**  **Department of Computer Science** | |
| **Course Title** | **Computer Organization & Architecture** |
| **Course Code** | **CoSc2031** |
| **Credits** | **5 ECTS** |
| Module Title | Computer Architecture and operating systems |
| Module Code | CoSc-M2031 |
| Prerequisite(s) | CoSc-M1011 (CoSc1012) |
| Teaching & Learning Methods | Lectures , Individual and group Assignments |
| Assessment/Evaluation & Grading System | * Continuous Assessment --------------------------50% * Final Exam ----------------------------------------------50% |
| Attendance Requirements | 75% |
| Course Description | This course presents about Register transfer languages; Computer basic instructions; Assembler Programming; Micro Programmed Control Unit; Central Processing Unit: General Register Organization; Stack Organization; Instruction Format; Addressing Modes; Reduced Instruction Set Computer (RISC); Pipeline and vector Processing; Computer arithmetic: multiplication and division algorithms; floating point arithmetic operations; Input & Output Organization; Memory Organization: Memory Hierarchy: Main Memory; Auxiliary Memory; Associative Memory; Cache Memory; Virtual Memory; |
| Course Outline | |  |  | | --- | --- | | **Week/Date** | **TOPIC TO BE DISCUSSED** | | **Week 1** | **Introduction**  Logic gates  Boolean Algebra  Combinational circuit  Flip Flops  Sequential circuits | | **Week 2** | **Number Systems and Codes**  Data types  Complements  Fixed point representation  Floating point representation  Codes | | **Week 3** | **Common Digital Components**  Integrated Circuits  Decoders, multiplexers and registers  Binary counters  Memory units | | **Week 4** | **Register Transfer Language and Micro Operations**  Register Transfer Language  Bus and Memory Transfer | | **Week 5** | **Register Transfer Language and Micro Operations**  Arithmetic and Logic Operations  Shift Micro operations | | **Week 6** | **Basic Computer Organization and Design**  Instructional Code  Computer Registers  Computer Instructions  Timing and Control | | **Week 7** | **Basic Computer Organization and Design**  Memory Reference Instructions  Design of Basic Computer  Design of accumulator Logic | | **Week 8** | **Central Processing Unit**  General Register Organization  Stack Organization  Instruction Formats | | **Week 9** | **Central Processing Unit**  Addressing modes  Data Transfer and Manipulation  Program Control  Characteristics of RISC and CISC | | **Week 10** | **Memory Organization**  Memory Hierarchy  Main Memory  Cache memory  Mapping Functions  Direct Mapping  Associative Mapping  Set Associative Mapping | | **Week 11** | **Memory Organization**  External Memory  Magnetic Disks  RAID Technology  Optical disks  Magnetic Tape | | **Week 12** | **Input-Output Organization**  Peripheral Devices  Input-Output Interface  Asynchronous Data Transfer  Mode of Transfers | | **Week 13** | **Input-Output Organization**  Priority Interrupts  Direct Memory Access(DMA)  Input-Output Processor(IOC)  Serial Communication | | **Week 14** | **Pipeline and Vector Processing**  Parallel Processing  Pipelining | | **Week 15** | **Pipeline and Vector Processing**  Vector Processing  Multiprocessors | | **Week 16** | FINAL EXAM | |
| **Text books & References:** | * 1. Morris M. Mano, “Computer System Architecture”   2. W. Stallings , “Computer Organization and Architecture”   3. Linda Null and Julia Lobur, “Essential of Computer Organization & Architecture” ,2003 |