


AMOU UNIVERSITY
“A Vehicle for Peace and Development”
fAMOU UNIVERSITY



FACULTY OF COMPUTING AND ICT

BACHELOR OF SCIENCE IN INFORMATION TECHNOLOGY PROGRAMME

ACADEMIC YEAR 2015/ 2016

COURSE DESCRIPTION

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| BIT 212 | Computer Architecture & Organization |
| Contact Hours | 52 |
| Pre-requisite | N/A |
| Purpose/Aim | <ul style="list-style-type: none"> • A student should grasp the basic concepts of computer architecture and organization, and understand the key skills of constructing cost-effective computer systems. A student should learn how to quantitatively evaluate different designs and organizations, and provide quantitative arguments in evaluating different designs. A student should be able to articulate design issues in the development of processor or other components that satisfy design requirements and objectives. In addition, a student should experience use of design tools to model various alternatives in computer design. A student should understand the basics of technical writing, and is able to construct a detailed tutorial paper on a selected topic related to computer engineering. This course introduces the principles of computer organization and the basic architecture concepts. The course emphasizes performance and cost analysis, instruction set design, pipelining, memory technology, memory hierarchy, virtual memory management, and I/O systems. |
| Course Objective (Indicative Learning Outcomes) | <ul style="list-style-type: none"> • Understand the merits and pitfalls in computer performance measurements. • Understand the impact of instruction set architecture on cost-performance of computer design. • Design a pipeline for consistent execution of instructions with minimum hazards. • Understand ways to incorporate long latency operations in pipeline design. • Understand ways to take advantage of instruction level parallelism for high performance processor design. • Understand dynamic scheduling methods and their adaptation to contemporary microprocessor design. • Understand the impact of branch scheduling techniques and their impact on processor performance. • Understand alternatives in cache design and their impacts on cost/performance • Understand contemporary microprocessor designs and identify various design techniques employed. |



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| | <ul style="list-style-type: none"> • Design an interconnection networks and multiprocessors. • Understand the design process of a computer and critical elements in each step. • Understand memory hierarchy and its impact on computer cost/performance. • Use a set of hardware simulators to model a complex processor at the behavioral level. • Use tools for modeling various microprocessor design alternatives. • Discuss current events in the microprocessor R&D and industry • Work as a team on a processor design and simulation project. • Verbally demonstrate and communicate findings on processor simulation. | | |
| Course Content | <ul style="list-style-type: none"> • Computer performance measurement methods, criteria and pitfalls. • Principles of instruction set design, the role of compiler and optimizations, historical perspective on instruction set design. • Principle of pipeline processor, hazards and design considerations. • Exception handling and long latency operations in pipeline design. • Role of compiler and speculative execution on performance. • Instruction level parallelism and processor design. • Memory technology. • Cache design and its impact on performance. • Memory hierarchy, virtual memory and their cost/performance. • I/O systems. • Interconnection networks and fault tolerance. | | |
| Learning & Teaching Methodologies | Lectures, tutorials and computer laboratory exercises | | |
| Instructional Materials/Equipment | Supplemental readings on latest technology advances and industry news. | | |
| Course Assessment | Type | Weighting (%) | |
| | Final Examination | 60 | |
| | Mid Term Examination | 20 | |
| | Assignment | 10 | |
| | Attendance | 10 | |
| | Total | 100 | |
| Recommended Reading | Title | Author | Publisher |
| | Performing with Computer Applications: Word Processing, Desktop Publishing, Spreadsheets, Database, Presentations, and Web Design (Performing) | Iris Blanc | |
| Additional Reading | Computer Applications | Srinivasan, T M | Aavishkar Publisher (2004) |
| | Computer Organization and Architecture | William Stallings | Pearson Education (2000) |
| Other Support Material | A variety of multimedia systems and electronic information resources as prescribed by the lecturer. Various application manuals, URL search and journals. | | |