UNIVERSITY OF GUYANA
FACULTY OF NATURAL SCIENCES
DEPARTMENT OF COMPUTER SCIENCE

Course Number: CSE 3201
Course Name: Computer Architecture and Organisation
Course Credit: 4

Description: This course is a third year second semester course intended for students pursuing the two year full time degree program. This course seeks to take the student on a journey beginning with elementary Boolean logic and culminating with the design and implementation of a simple digital computer system. The course will emphasize handling complexity by embracing abstraction, designing clean interfaces and the "keep it as simple as possible" approach to systems design.

Exemption(s): There are no exemptions for this course.

Pre-requisites: Discrete Mathematics

Follow-On Courses: Operating Systems

Learning Outcomes:

The student will:

- Be able to convert from a Boolean equation to a digital circuit vise-versa.
- Be able to design simple digital circuits, given a specification, based on the AND, OR and NOT gate abstractions.
- Be able to use simple digital circuits to construct complex digital systems, utilizing concepts of abstraction and clean interface design.
- Be able to construct an entire computing system by combining digital sub-systems.
- Be able to program a digital computing system using its native machine language.
- Be able to perform the translation of an assembly language to machine code.

Course Topics:

1. Boolean Logic and Arithmetic
2. Combinational Logic Design
3. Sequential Logic Design
4. Hardware description languages

5. Digital Building Blocks
6. Number Systems
7. Sequential Building Blocks
8. MIPS assembly language
9. MIPS machine language
10. Assemblers
11. MIPS assembly language programming
12. MIPS Single cycle Processor
13. MIPS Multi cycle Processor
14. MIPS Pipelined Processor
15. Memory Systems

Course Content:

WEEK	TOPICS	HOURS	HOURS
1	- Review Boolean Logic and Arithmetic - Combinational Logic Design o Introduction of Gates o Sum of products o Product of Sums		
2	- Combinational Logic Design o Karnaugh Maps o Combinational Building Blocks o Timing		
3	- Sequential Logic Design o D Flip-Flops o Finite State Machines o Timing in Sequential Logic Systems		
4	- Hardware description languages o Combinatorial Logic o Structural Modeling o Sequential Logic		
5	- Digital Building Blocks o Addition o Subtraction o Comparators o ALU		
6	- Digital Building Blocks		

	o Shifters and Rotators o Multiplication o Division		
7	- Number Systems o Fixed point number systems o Floating point number systems - Sequential Building Blocks o Counters o Shift Registers o Memory Arrays		
8	- MIPS assembly language - MIPS machine language o Translating assembly language to machine language - Assmeblers		
9	- MIPS assembly language programming		
10	- MIPS Single cycle Processor - MIPS Multi cycle Processor		
11	- MIPS Pipelined Processor		
12	- Memory Systems		
13			
15	Course Review. Semester Exams.		

Method of Teaching:

Lectures	2 x 15	=	30 hrs.
Laboratories/ Tutorials	2 x 15	=	30 hrs.

Method of Assessment:

Coursework (40%)

2 Tests at 30 marks each	=	60
4 Lab assignments: 4@ 10 marks	=	40
		100

Final Examination (60%)

5 Questions at 20 marks each answer any 3 questions

Students are reminded that a failure in any of the above sections may result in his/her repeating the entire course

Required Reading(s)

Recommended Reading(s)