1. **Course number and name:**
   COE 251 – Introduction to Computer Systems

2. **Credits hours**
   3-3-4

3. **Prerequisites or co-requisites**
   Prerequisites: CMP 120 (Programming I) or MCE226L (Computer Applications in Mechanical Engineering) and COE 221 (Digital Systems)

4. **Instructor's or course coordinator's name:**
   Dr. T. Ozkul, Professor of Computer Engineering,
   Office: EB2-212, Extension: 2455,
   Email: tozkul@aus.edu
   Office Hours: Posted on ilearn and office door

5. **Course Description (Catalog Description):**
   Examines hardware and software model of microprocessors, programming of microprocessors, memory systems, memory interface and memory access (DMA), input/output programming and interface, and design of microprocessors-based systems.

6. **Textbook, title, author, and year**
   Textbook:

   Barry B. Brey, The Intel Microprocessors: 8086/8088, 80186, 80286, 80386, 80486, Pentium, Pentium Pro, Pentium II, Pentium III, Pentium 4, Eight Edition, 2009, Prentice-Hall.

   Other supplemental material: None

7. **Learning Outcome**
   Upon completion of the course, students will be able to:
   1. Explain the operation of a microprocessor Bus Interface Unit (BIU) and Execution Unit (EU).
   2. Utilize the memory and input/output addressing modes.
   3. Use the instructions set.
   4. Write a register-level program according to the design specifications.
   5. Include subroutines within a program.
   6. Understand the multiplexing concepts of address, data and control buses.
   7. Analyze the timing sequence of events on the address, data and control bus.
   8. Design an interface module for peripheral such as printer, fax, keyboard and others.
   9. Acquire process and display real-time parameters.

8. **Teaching and Learning Methodologies:**
   Methods include lectures, labs, home works, quizzes and exams and class discussions.

9. Course Topics and Schedule:

Topic	Weeks
Architecture & software model of 8088/8086 microprocessor	1
Memory, address space, data organizations & data types	1
Registers and memory addresses	1
Introduction to the instruction set and addressing modes	2
Data transfer and arithmetic instructions, Logic, Shift and Rotate instructions	2
Flag-control instructions and compare instructions	1
Control, Flow and the Jump Instructions	1
Subroutine and Subroutine- Handling Instructions	1
Microprocessors -memory and I/O interfaces	3
Address, data and control signals timing, Clock and bus cycles	1
Input /Output interface and programmable peripheral interface	1
Two Midterm Exams	1
Total:	**16**

10. Schedule of Laboratory and other Non-Lecture Sessions:

Lab	Due Date Week:
Introduction to DRAGON12- Plus Board, AsmIDE ,D-Bug 12 and Arrays	2
Data Transfer and Arithmetic Instructions	3
Assembler Directives, BCD arithmetic, Multiplication & Division instructions	4
Compare & Clear instructions ,Boolean Logic, Shift, Rotate, Push and Pull instructions	5
I/O Ports Assembly Language Programming	6
Midterm Exam	7
C Programming - (Interfacing DIP Switches with 7- Segment Displays)	8
C Programming - (Interfacing with LCD Display)	9
Analog to Digital Converter (ATD) Subsystem – Part I	10
Analog to Digital Converter (ATD) Subsystem – Part II	11
Timer Polling – Input Capture and PWM generation	12
Introduction to Serial communication programming and interfacing	13
Review	14
Final Exam	15

11. Out-of-Class Assignments with Due Dates:

Assignment	Due Date (tentative)

Homework 1 & 2 – Assembly language programming	Week 3
Homework 3 – High level language programming (I/O interfacing)	Week 7
Homework 4- Interfacing LCD using C	Week 8
Homework 5- Analog to Digital Conversion Programming & Interface	Week 11
Homework 6 – Timers and Interrupts – Programming & Interfacing	Week 13

12. Student Evaluation:

Assessment	**Weight**	**Due Date (tentative)**
Homework & Quizzes	15%	TBA
Midterm I	18 %	March 16, 2016
Midterm II	18 %	May 2, 2016
Lab	20%	TBA
Final Exam	25 %	TBA
Attendance	4%	
Total	100%	

13. Contribution of Course to Program Outcomes

CMP Program outcome	**Emphasis in this course**
a) an ability to apply knowledge of computing and mathematics	○
b) an ability to analyze a problem, identify and define the computing requirements	○
c) an ability to design, implement and evaluate a computer-based system, process, component, or program	●
d) an ability to function effectively on teams to accomplish a common goal	
e) an understanding of professional, ethical, legal, security and social issues and responsibilities	
f) an ability to communicate effectively with a range of audiences	
g) an ability to analyze the local and global impact of computing on individuals, organizations, and society	
h) recognition of the need for and an ability to engage in continuing professional development	○
i) an ability to use current techniques, skills, and tools necessary for computing practice	○
(J): An ability to apply mathematical foundations, algorithmic principles, and computer science	
(k): An ability to apply design and development principles in the construction of software	

Emphasis: ● High; ◑ Medium; ○ Low; Blank – Nothing Specific Expected

LETTER GRADE POLICY

The letter grade will be assigned according to the following policy:

A:	93 and above
A-:	90 to 92.9
B+:	85 to 89.8
B:	80 to 84.9
B-:	75 to 74.9
C+:	70 to 74.9
C:	65 to 69.9
C-:	60 to 64.9
D:	55 to 59.9
F:	below 55