1. **Course Number and Course Title**
   COE425 – Modern Computer Organization

2. **Credit Hours**
   3-0-3

3. **Prerequisites and/or Co-Requisites:**
   Prerequisite/Concurrent: Prerequisite: COE341 (Computer Architecture and Organization)

4. **Name and Contact Information of Instructor:**
   Dr. Assim Sagahyroon

5. **Course Description (Catalog Description):**
   Covers Performance measures, RISC processors, datapath and control units design, memory hierarchy, pipelining, I/O systems and multiprocessors.

6. **Textbook and other Supplemental Material:**
   Textbook: J. Hennesy and D. Patterson, *Computer Organization & Design: the hardware/software interface*. 5th Edition, Morgan Kaufmann, 2014
   Other supplemental material: None

7. **Learning Outcomes:**
   Upon completion of the course, students will be able to:
   1. Evaluate computer performance
   2. Design instruction sets for modern processors
   3. Demonstrate a high level understanding of computer arithmetic and be able to design digital arithmetic circuits
   4. Design processor data paths and control unit
   5. Describe the principles of caching and assess the performance of cache memories under various replacement policies
   6. Describe and analyze virtual memory systems
   7. Design and analyze pipelined processors
   8. Demonstrate an understanding of multicores and multiprocessors

8. **Teaching and Learning Methodologies:**
   Methods include lectures; problem and project based learning methods (homework, simulation-based projects) and class discussions.

9. **Course Topics and Schedule:**

Topic	**Weeks**
Computer Performance Measurement	1
Instructions Design (RISC Processors)	2
Computer Arithmetic	2

Processor Datapath and Control Design (including pipelining, data hazards, etc)	3
Memory hierarchy (including cache performance, virtual memory, TLBs, etc)	3
Storage and input/output	1
Multiprocessors	2
Review & Evaluation	2
Total:	16