Appendix A – Course Syllabi

1. **Course number and name:** ECE 4510: Microcontroller Applications

2. **Credits and contact hours:** 4 credits and 6 hours

3. **Course coordinator:** Janos Grantner, PhD, Professor

4. **Textbooks and other course materials:**
   - HCS12/9S12 An Introduction to Software & Hardware Interfacing (2nd Edition), Huang, 2010, Delmar (Cengage Learning)
   - Books

   a. ECE 4510 Parts Kit
   b. Adapt 9S12DP512 Evaluation Board by Technological Arts
   c. ICC12 IDE software by ImageCraft
   d. NoICE Debugger by NoICE.com
   e. MC9S12DP512B Device User Guide by Motorola
   f. CPU12 Reference Manual by Motorola
   g. Instructor's Lecture Notes

5. **Course Information**
   a. Hardware and software design of real-time embedded microcontroller systems
   b. Prerequisites: ECE 2210 and ECE 2510
   c. Required

6. **Specific goals for the course:**
   a. **specific outcomes of instruction:**
   
   [1] The student will develop an ability to design and conduct experiments, as well as to analyze and interpret data. (b)

   [2] The student will develop an ability to function on multi-disciplinary teams. (d)

   [3] The student will develop an ability to use the techniques, skills and modern engineering tools necessary for engineering practice and/or further graduate study. (k)

   b. **ABET student outcome:** This course contributes to the attainment of the following student learning outcomes a, b, c, d, e, g and k. ABET learning outcomes b, d and k are directly assessed in this outcome.

7. **Brief list of topics to be covered**
   [1] Introduction to the Motorola HC12/HS12 Microcontroller Families
[2] MC9S12DP512 architecture and memory map
[4] Development of C programs for the MC9S12DP512
[5] Interfacing to the Parallel I/O Ports, MC9S12DP512 Interrupts
[6] Programming the Main Timer, Input Capture and Output Compare
[7] Programming the PWM Module
[8] Analog Input and Output Interface
[9] Serial Communications Interface Design
[10] SPI Interface
[12] Interfacing Static Memory to the MC9S12DP512 External Bus
[13] Design of 8 or 16-Bit Memory Modules, Critical Timing Analysis