

<b>FALL SCHEDULE (2011)</b>		
<b>WEEK</b>	<b>LECTURE</b>	<b>LABORATORY</b>
<b>1</b> Sept 5- Sept 11	Introduction to COE 538 Scope and objectives Management <b>INTRODUCTION TO THE HCS12 MICRO-CONTROLLER</b> <ul style="list-style-type: none"> <li>- 1.3 Computer Hardware Organization</li> <li>- 1.5 Memory system Operation</li> <li>- 1.6 Program Execution</li> <li>- 1.8 The HCS12 CPU Registers</li> <li>- 1.9 HCS12 Addressing Modes</li> <li>- 1.11 A Sample of HCS12 Instructions</li> </ul> <b>(Labor Day, Monday, Sept. 5)</b>	
<b>2</b> Sept 12- Sept 18	<b>HCS12 ASSEMBLY PROGRAMMING</b> <ul style="list-style-type: none"> <li>- 2.2 Assembly Language Program Structure</li> <li>- 2.3 Assembly Directives</li> <li>- 2.5 Writing Programs to Do Arithmetic</li> <li>- 2.6 Program Loops</li> <li>- 2.7 Shift and Rotate Instructions</li> <li>- 2.8 Boolean Logic Instructions</li> <li>- 2.9 Bit Test and Manipulate Instruction</li> <li>- 2.10 Program Execution Time</li> </ul> <b>HW/SW DEVELOPMENT TOOLS FOR HCS12</b> <ul style="list-style-type: none"> <li>- 3.2 Development Tools for the HCS12</li> <li>- 3.8 Using CodeWarrior</li> </ul>	<i>Lab 1: Using the Serial Monitor Program &amp; Introduction to Assembly Language Programming.</i>
<b>3</b> Sept 19- Sept 25	<b>ADVANCED ASSEMBLY PROGRAMMING</b> <ul style="list-style-type: none"> <li>- 4.3 Stack</li> <li>- 4.4 What Is a Subroutine?</li> <li>- 4.6 The Stack Frame</li> <li>- 4.7 Mathematical Subroutines</li> <li>- 4.9 Subroutines for Creating Time Delay</li> <li>- 4.10 Introduction to Parallel I/O Port and Simple I/O Devices</li> <li>- 4.11 Simple I/O Devices</li> </ul> <b>ADVANCED PARALLEL I/O</b> <ul style="list-style-type: none"> <li>- 7.5 The HCS12 Parallel Ports</li> <li>- 7.7 Liquid Crystal Displays (LCDs)</li> <li>- 7.8 The HD4478U LCD Controller</li> <li>- 7.9 Interfacing Parallel Ports to a Keypad</li> </ul>	<i>Lab 2: Programming the Liquid Crystal Display.</i>

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<b>4</b> Sept 26- Oct 2	<b>ANALOG-TO-DIGITAL CONVERTER</b> <ul style="list-style-type: none"> <li>- 12.2 Basics of A/D Conversion</li> <li>- 12.3 The HCS12 A/D converter</li> <li>- 12.4 The Functioning of the ATD Module</li> <li>- 12.5 Procedure for Performing A/D Conversion</li> </ul> <b>QUIZ /Covers material up to end of week 3</b>	<i>Lab 3: Battery and Bumper Displays.</i>
<b>5</b> Oct 3- Oct 9	<b>C LANGUAGE PROGRAMMING</b> <ul style="list-style-type: none"> <li>- 5.3 Types, Operators, and Expressions</li> <li>- 5.4 Control Flow</li> <li>- 5.5 Input and Output</li> <li>- 5.6 Functions and Program Structure</li> <li>- 5.7 Pointers, Arrays, Structures, and Unions</li> <li>- 5.8 Writing C Programs to Perform Simple I/O</li> <li>- 5.11 Using the CodeWarrior IDE to Develop C Programs</li> </ul>	<i>Lab 4: Motor Control &amp; Using the Hardware Timer.</i>
<b>6</b> Oct 10- Oct 16	<b>INTERRUPTS, CLOCK GENERATION, AND OPERATION MODES</b> <ul style="list-style-type: none"> <li>- 6.2 Fundamental Concepts of Interrupts</li> <li>- 6.3 Resets</li> <li>- 6.4 HCS12 Exceptions</li> <li>- 6.6 Clock and Reset Generation Block</li> <li>- 6.7 Real-Time Interrupt</li> <li>- 6.11 HCS12 Operation Modes</li> </ul> <b>(Thanksgiving, Monday, Oct. 10)</b>	<i>Lab 5: Robot Roaming Program.</i>
<b>7</b> Oct 17- Oct 23	<b>TIMER FUNCTIONS</b> <ul style="list-style-type: none"> <li>- 8.3 Standard Timer Module</li> <li>- 8.4 Timer Counter Register</li> <li>- 8.5 Input-Capture Function</li> <li>- 8.6 Output-Compare Function</li> <li>- 8.7 Pulse Accumulator</li> </ul>	<i>Lab 6: Wheel Counter Interrupt.</i>
<b>8</b> Oct 24- Oct 30	<b>TIMER FUNCTIONS</b> <ul style="list-style-type: none"> <li>- 8.8 Modulus Down counter</li> <li>- 8.10 Pulse-Width Modulation Function</li> <li>- 8.11 DC Motor Control</li> </ul> <b>MIDTERM /Covers material up to end of week 6</b>	<i>Lab 7: The eebot Guide.</i>

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<b>9</b> Oct 31- Nov 6	<b>SERIAL COMMUNICATION INTERFACE</b> <ul style="list-style-type: none"> <li>- 9.3 The RS-232 Standard</li> <li>- 9.4 The HCS12 SCI</li> <li>- 9.6 The SCI Operation</li> <li>- 9.8 Flow Control of USART in Asynchronous Mode</li> <li>- 9.9 Interfacing SCI with TIA-232</li> </ul>	<i>Lab Project: Robot Guidance Challenge 1.</i>
<b>10</b> Nov 7- Nov 13	<b>THE SPI FUNCTION</b> <ul style="list-style-type: none"> <li>- 10.2 Introduction to the SPI Function</li> <li>- 10.3 Registers Related to the SPI Subsystem</li> <li>- 10.4 SPI Operation</li> <li>- 10.5 SPI circuit connection</li> <li>- 10.6 Configuration / Data Transfer in SPI</li> <li>- 10.8 The 74HC595 Shift Register</li> </ul>	<i>Lab Project: Robot Guidance Challenge 2.</i>
<b>11</b> Nov 14- Nov 20	<b>INTER-INTEGRATED CIRCUIT (I<sup>2</sup>C) INTERFACE</b> <ul style="list-style-type: none"> <li>- 11.2 The I<sup>2</sup>C Protocol</li> <li>- 11.3 An Overview of the HCS12 I<sup>2</sup>C Module</li> <li>- 11.4 Registers for I<sup>2</sup>C Operation</li> <li>- 11.5 Programming the I<sup>2</sup>C Module</li> <li>- 11.6 The Serial Real-Time Clock DS1307</li> </ul> <b>Faculty/Course Evaluation</b>	<i>Lab Project: Robot Guidance Challenge 3.</i>
<b>12</b> Nov 21- Nov 27	<b>INTERNAL MEMORY CONFIGURATION AND EXTERNAL EXPANSION</b> <ul style="list-style-type: none"> <li>- 14.3 Internal Resource Remapping</li> <li>- 14.4 Expanded Memory Mapping</li> <li>- 14.5 On-Chip Flash Memory</li> <li>- 14.6 The On-Chip EEPROM Memory</li> <li>- 14.7 HCS12 External Memory Interface</li> <li>- 14.9 Memory Devices</li> <li>- 14.10 Example of External Memory Expansion for the HCS12</li> </ul>	<i>Demonstration week 1</i>
<b>13</b> Nov 28- Dec 4	<b>REVIEW AND CATCH-UP</b>	<i>Demonstration week 2</i>
<b>FINAL EXAMINATION</b>		