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| <b>Course Number &amp; Name</b>      | MIME 4450 – Automation Design - CRN 45503                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |
| <b>Credits &amp; Contact hours</b>   | 3 Credits – 3 lec, 0 lab                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |
| <b>Course Number &amp; Name</b>      | EET 4550 – Mechatronics II                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |             |
| <b>Credits &amp; Contact hours</b>   | 4 Credits – 3 lec, 1 lab                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |
| <b>Course Number &amp; Name</b>      | EET 4600 – Industrial Robotics                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |             |
| <b>Credits &amp; Contact hours</b>   | 4 Credits – 3 lec, 1 lab                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |             |
| <b>Coordinator</b>                   | Wm Ted Evans, PhD, PE<br>NI 2061, ph. 419-343-3681, <a href="mailto:william.evans@utoledo.edu">william.evans@utoledo.edu</a>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |             |
| <b>Textbook</b>                      | Hybrid Text, Hybrid Lab Text both at <a href="http://hybridplc.org">hybridplc.org</a><br>youtube videos, other texts, books, manuals as needed (see link)                                                                                                                                                                                                                                                                                                                                                                                                                                                           |             |
| <b>Schedule Lecture</b>              | 9:35-10:55 T, R North Engineering 2108                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |             |
| <b>Lab (EET 4550 &amp; EET 4600)</b> | 11:05-12:45 T, North Engineering 1100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |             |
| <b>Office Hours</b>                  | 9:30-12:00 M, W, NI 2061 or NE 2330                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |             |
| <b>Course Information</b>            | This course continues with automation topics following MIME 4440. The PLC was the main tool in this first course. In MIME 4450, integration of various control elements is emphasized. The course begins with a study of robotics. Later robots are linked to PLCs. Then vision systems are added. Also included are advanced topics such as speed and position control of single axes servo and stepper motors as well as coordination of multiple axes. Comparison of various methods of configuring these systems are discussed. Also, the safety of the system is emphasized. AI is used throughout the course. |             |
| <b>Topics</b>                        | <ol style="list-style-type: none"> <li>1. Boolean math and number representation</li> <li>2. Robotic Programming</li> <li>3. Ladder Logic structure in PLC</li> <li>4. HMI Programming Organization</li> <li>5. Vision Systems</li> <li>6. Motion Control of single axis motion systems</li> <li>7. Communications between Robots, PLCs and other devices</li> <li>8. Discussion of ROS and open source devices</li> </ol>                                                                                                                                                                                          |             |
| <b>Class will be graded:</b>         | <b>14 Assignments (one per week – keep 10)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | <b>50 %</b> |
|                                      | <b>Project w/Report</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             | <b>50 %</b> |
|                                      | <b>(A &gt;= 90, B &gt;= 80, C &gt;= 70, D &gt;= 60)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |             |

There are no make-up assignments for this course. If you have a problem or conflict and cannot attend a specific class, let me know beforehand and we will try to work something out. Cell phone use will not be allowed.

Cheating is not allowed and will be punished by rules of U of Toledo Student Handbook.

Credit for Project consists of presentation or video of a finished (signed) Project Report.

## Lectures

|         | Date        | Lecture/Lab Schedule | Assignment/Lab Due Date |
|---------|-------------|----------------------|-------------------------|
| Week 1  | 9/1/26      | Introduction         |                         |
|         | 9/3/26      | Digital Logic I      | Week 1 Assn – 9/3/26    |
| Week 2  | 9/8/26      | Digital Logic II     |                         |
|         | 9/10/26     |                      |                         |
| Week 3  | 9/15/26     |                      |                         |
|         | 9/17/26     |                      |                         |
| Week 4  | 9/22/26     |                      |                         |
|         | 9/24/26     |                      |                         |
| Week 5  | 9/29/26     |                      |                         |
|         | 10/1/26     |                      |                         |
| Week 6  | 10/6/26     |                      |                         |
|         | 10/8/26     |                      |                         |
| Week 7  | 10/13/26    |                      |                         |
|         | 10/15/26    |                      |                         |
| Week 8  | 10/20/26    | Fall Break           |                         |
|         | 10/22/26    |                      |                         |
| Week 9  | 10/27/26    |                      |                         |
|         | 10/29/26    |                      |                         |
| Week 10 | 11/3/26     |                      |                         |
|         | 11/5/26     |                      |                         |
| Week 11 | 11/10/26    |                      |                         |
|         | 11/12/26    |                      |                         |
| Week 12 | 11/17/26    |                      |                         |
|         | 11/19/26    |                      |                         |
| Week 13 | 11/24/26    |                      |                         |
|         | 11/26/26    | Thanksgiving         |                         |
| Week 14 | 12/1/26     |                      |                         |
|         | 12/3/26     |                      |                         |
| Week 15 | 12/8/26     |                      |                         |
|         | 12/10/26    |                      |                         |
| Week 16 | 12/14-18/26 | Finals               |                         |