

# Advanced Manufacturing & IIoT

ICTC's WIL Advanced Manufacturing (IIoT) e-learning course provides an introduction to the application of the Industrial Internet of Things (IIoT) in manufacturing business systems. Students will gain a practical understanding of the scope of a simple IIoT project, from data collection to visualization and the delivery of insights for decision-makers. Students are expected to have prior knowledge in Engineering or Computer science.

| Modules  |   | Lessons  | Learning Objectives  |                      |
|----------|---|--|--|----------------------|
| Module 1 | <b>IIoT and IIoT: concepts and components</b>                 | <ul style="list-style-type: none"> <li>History of IoT and IIoT</li> <li>IIoT structure and technologies used</li> <li>Benefits of IIoT</li> <li>Main uses of IIoT</li> <li>IIoT Challenges</li> </ul>                                      | <ul style="list-style-type: none"> <li>Define the concepts of IoT and IIoT</li> <li>Explain the structure of high-level IIoT</li> <li>Identify the main benefits and challenges related to IIoT</li> </ul>   | Padlet<br>Discussion |
| Module 2 | <b>Industrial Data Sources</b>                                | <ul style="list-style-type: none"> <li>Introduction to data sources (sensors, machines, processes)</li> <li>Sensor technology and industrial application</li> <li>Types of sensors</li> <li>Calibration and veracity of sensors</li> </ul> | <ul style="list-style-type: none"> <li>Contextualize the use of sensors</li> <li>Identify the different types of sensors</li> <li>Distinguish the characteristics of different types of sensors</li> </ul>   | Padlet<br>Discussion |
| Module 3 | <b>IIoT Ecosystem: the transformation of industrial data</b>  | <ul style="list-style-type: none"> <li>Cloud Computing</li> <li>IIoT Ecosystem</li> <li>Gateways and other integrated systems</li> <li>IIoT Implementation</li> <li>Network security and other types of security</li> </ul>                | <ul style="list-style-type: none"> <li>Recognize the central role of cloud computing in the transformation of industrial data</li> <li>Distinguish between public and private clouds</li> <li>Identify the main functions of the Internet of Things (IoT) platforms</li> <li>Identify the challenges in securing the Industrial Internet of Things (IIoT)</li> </ul> | Quiz                 |
| Module 4 | <b>Industrial Data Life Cycle</b>                             | <ul style="list-style-type: none"> <li>Databases (data, RDBMS/NoSQL, basic data architecture)</li> <li>Data collection methods</li> <li>Data Analysis</li> </ul>   | <ul style="list-style-type: none"> <li>Identify technologies to collect, store, and transmit data</li> <li>Contextualize the use of these technologies</li> <li>Identify beneficial approaches to the maintenance, cost, and operation of sensor systems</li> <li>Discover Industry 4.0 business intelligence and artificial intelligence systems</li> </ul>         | Padlet<br>Discussion |
| Module 5 | <b>Applications and intelligence of industrial data</b>       | <ul style="list-style-type: none"> <li>Presentation of basic knowledge</li> <li>Data visualization</li> <li>Connection and reports</li> <li>Examples of IIoT usage</li> </ul>  | <ul style="list-style-type: none"> <li>Explain what is valuable information</li> <li>Explain the communication process with the experience/user interface</li> <li>Define the concept of a digital twin</li> <li>Establish the role of augmented reality in IIoT</li> </ul>  | Padlet<br>Discussion |
| Module 6 | <b>IIoT trends, career opportunities and future solutions</b> | <ul style="list-style-type: none"> <li>Future Trends in IIoT</li> <li>The Canadian labour market, jobs in demand</li> <li>Ethics, laws and IIoT</li> <li>Solutions to meet international goals and standards</li> </ul>                    | <ul style="list-style-type: none"> <li>Identify some future trends in the IIoT</li> <li>Identify the jobs in demand in the field of IIoT</li> <li>Assess the consequences and risks of using shared data and infrastructure</li> </ul>   | Padlet<br>Discussion |