

## Chemical Engineering and AI (Option G)

September 2024 (students who entered *first year* in September 2023 or later)

<p><b>Year 2</b></p> <p><b>Term A</b></p> <p>NMM 2270A Applied Mathematics for Engineering II          AISE 2205A Algorithms and Data Structures          CBE 2290A Fundamentals of Biochemical and Environmental Eng.          CBE 2206A Industrial Organic Chemistry I          CBE 2214A Engineering Thermodynamics          CBE 2220A Chemical Process Calculations</p> <p><b>Term B</b></p> <p>NMM 2277B Applied Mathematics for Chem &amp; Civil Eng. III          AISE 2251B Software Design for Systems Engineering          SS 2143B Applied Statistics and Data Analysis for Engineers          CBE 2207B Industrial Organic Chemistry II          CBE 2221B Fluid Flow          CBE 2224B Chemical Engineering Thermodynamics</p> <p><b>Year 3</b></p> <p><b>Term A</b></p> <p>DS 3000A Intro to Machine Learning          AISE 3309A Database Systems          AISE 3350A Cyber-Physical Systems Theory          CBE 3315A Reaction Engineering          CBE 3322A Heat Transfer Operations          One 0.5-credit non-technical elective</p> <p><b>Term B</b></p> <p>AISE 3010B Data Engineering and Machine Learning          AISE 3351B Digital Systems and Signal Processing          CBE 2291B Computational Methods in Chemical Engineering          CBE 3323B Staged Operations          CBE 3324B Mass Transfer Operations          Writing Building Better (Communication) Bridges: Rhetoric and          2130F/G Professional Communications for Engineers</p> <p><b>Year 4</b></p> <p><b>Term A</b></p> <p>AISE 4010A Deep Learning for Time Series Data          AISE 4430A Introduction to Computer Networking, Security &amp; IOT Systems            CBE 3307A Energy and Environment          CBE 3318A Introduction to Chemical Process Simulation          CBE 3395Y Chemical Engineering Lab          One 0.5-credit non-technical elective* (can be in term A or B)</p> <p><b>Term B</b></p> <p>AISE 4020B Artificial Intelligence Systems Engineering Design I          CBE 3310B Process Dynamics and Control          CBE 3316B Sustainable Chemical Eng and Life Cycle Analysis          CBE 3319B Introduction to Plant Design and Safety          CBE 3395Y Chemical Engineering Lab          0.5 credit from AISE technical electives (can be in term A or B)**</p>	<p><b>NOTES:</b></p> <p><b>Important:</b>          Students are responsible for ensuring they have the correct courses required for their degree. If you are unsure which courses you still need or if you see courses listed on the progression sheet that are no longer offered or are not offered in the term you see listed here, please contact your Academic Counsellor.</p> <p><b>*Non-technical Electives:</b>          Please choose a maximum of 1.0 credits (one 1.0 credit course or two 0.5 credit courses) from the 1000 level and a minimum of one 0.5 credit from the 2000 (or higher) level.</p> <p><a href="http://www.eng.uwo.ca/undergraduate/upper_year/electives.html">http://www.eng.uwo.ca/undergraduate/upper_year/electives.html</a></p> <p><b>Technical Electives:</b>          ** AISE technical electives          - refer to a list of AI-based technical courses approved by the AISE program committee. The list consists of AI-based courses offered by the Faculty of Engineering and Faculty of Science at Western. The list will be updated every year.</p> <p>Some technical electives may not be offered in a given academic year. Consult the Department for accurate listing</p> <p><b>CBE Technical Electives</b></p> <table border="1"> <tr><td>CBE 4404A/B</td><td>Downstream Processing in Pharmaceutical Manufacturing</td></tr> <tr><td>CBE 4405A/B</td><td>Air Pollution</td></tr> <tr><td>CBE 4407A/B</td><td>Solid Waste Treatment</td></tr> <tr><td>CBE 4409A/B</td><td>Wastewater Treatment</td></tr> <tr><td>CBE 4411A/B</td><td>Engineering Coffee</td></tr> <tr><td>CBE 4413A/B</td><td>Selected Topic in Chemical Engineering</td></tr> <tr><td>CBE 4415</td><td>Chemical Engineering Project</td></tr> <tr><td>CBE 4416A/B</td><td>Carbon Footprint &amp; Management</td></tr> <tr><td>CBE 4417A/B</td><td>Catalytic Processes</td></tr> <tr><td>CBE 4418A/B</td><td>Industrial Multiphase Reactor Design</td></tr> <tr><td>CBE 4420A/B</td><td>Computer Process Control</td></tr> <tr><td>CBE 4421A/B</td><td>Introduction to Biomaterials Engineering</td></tr> <tr><td>CBE 4422A/B</td><td>Nanobiotechnology</td></tr> <tr><td>CBE 4423A/B</td><td>Tissue Engineering</td></tr> <tr><td>CBE 4424A/B</td><td>Biosensor Principles and Applications</td></tr> <tr><td>CBE 4428A/B</td><td>Introduction to Nanoengineering</td></tr> <tr><td>CBE 4432A/B</td><td>Energy and Fuels Production Systems</td></tr> <tr><td>CBE 4463A/B</td><td>Water Pollution Design</td></tr> <tr><td>CBE 4485A/B</td><td>Energy &amp; Society</td></tr> <tr><td>CBE 4493A/B</td><td>Polymer Engineering</td></tr> <tr><td>CEE 3362A/B</td><td>Drinking Water Quality and Treatment</td></tr> <tr><td>GPE 4484A/B</td><td>Green Fuels and Chemicals</td></tr> <tr><td>MME 4429A/B</td><td>Nuclear Engineering</td></tr> </table> <p><b>AISE Technical Electives</b></p> <table border="1"> <tr><td>ECE4445A/B</td><td>Introduction to Digital Image Processing</td></tr> <tr><td>ECE 4438A/B</td><td>Advanced Image Processing and Analysis</td></tr> <tr><td>SE 4455A/B</td><td>Cloud Computing</td></tr> <tr><td>CS3340A/B</td><td>Analysis Of Algorithms I</td></tr> <tr><td>CS 4417A/B</td><td>Unstructured Data</td></tr> <tr><td>SS 4861A/B</td><td>Time Series</td></tr> </table>	CBE 4404A/B	Downstream Processing in Pharmaceutical Manufacturing	CBE 4405A/B	Air Pollution	CBE 4407A/B	Solid Waste Treatment	CBE 4409A/B	Wastewater Treatment	CBE 4411A/B	Engineering Coffee	CBE 4413A/B	Selected Topic in Chemical Engineering	CBE 4415	Chemical Engineering Project	CBE 4416A/B	Carbon Footprint & Management	CBE 4417A/B	Catalytic Processes	CBE 4418A/B	Industrial Multiphase Reactor Design	CBE 4420A/B	Computer Process Control	CBE 4421A/B	Introduction to Biomaterials Engineering	CBE 4422A/B	Nanobiotechnology	CBE 4423A/B	Tissue Engineering	CBE 4424A/B	Biosensor Principles and Applications	CBE 4428A/B	Introduction to Nanoengineering	CBE 4432A/B	Energy and Fuels Production Systems	CBE 4463A/B	Water Pollution Design	CBE 4485A/B	Energy & Society	CBE 4493A/B	Polymer Engineering	CEE 3362A/B	Drinking Water Quality and Treatment	GPE 4484A/B	Green Fuels and Chemicals	MME 4429A/B	Nuclear Engineering	ECE4445A/B	Introduction to Digital Image Processing	ECE 4438A/B	Advanced Image Processing and Analysis	SE 4455A/B	Cloud Computing	CS3340A/B	Analysis Of Algorithms I	CS 4417A/B	Unstructured Data	SS 4861A/B	Time Series
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**Year 5**

**Term A**

AISE 4050      Artificial Intelligence Systems Engineering Design II  
AISE 4450A      Data Driven Control of Cyber-Physical Systems  
AISE 3020A      AI: Ethics, Bias and Privacy  
ELI 4110F      Engineering Ethics, Sustainability Development and the  
Law

One 0.5 credit non-technical elective (can be in term A or B)\*\*

**Term B**

AISE 4050      Artificial Intelligence Systems Engineering Design II  
One 0.5 credit from AISE technical elective (can be in term A or B)\*\*  
Two 0.5 credits CBE Technical Elective