

# CHEMICAL PROCESS AND BIOENGINEERING SUB-PLAN: TECHNICAL ELECTIVES

## \*\*Note - Information on this page may be out of date

\*\*Please view the current 2022-2023 Academic Calendar here: <https://calendar.engineering.queensu.ca/index.php> (<https://calendar.engineering.queensu.ca/>)

Should a course on the list below already be a core course for a sub-plan, then that course is excluded as an elective for that sub-plan. For example ...

- CHEE 340 Biomedical Engineering and CHEE 342 Environmental Biotechnology are core courses for the CHE2 sub-plan and thus cannot be counted as electives.
- CHEE 323 Industrial Catalysis is a core course for the CHE1 sub-plan and thus cannot be counted as an elective.
- APSC 250 Biology Through an Engineering Lens has CHEE 229 Cell Based Engineering Princip as an exclusion (a core course taken by CHE2) and thus cannot be counted as an elective.

**Please Note:** Some of these elective courses may not be available to students due to pre-requisite course requirements. The student is responsible for confirming that he/she has the necessary prerequisites or permission of the instructor.

**Please Note:** Course availability and the term in which a course is held can change from one academic year to the next. This can occur due to instructor availability or a change to departmental resources. Please refer to SOLUS to find out if the TECH course is offered this upcoming year.

## Technical Electives

Should a course on the technical elective list already be a core course for a sub-plan, then that course is excluded as an elective for that sub-plan. For example ...

- CHEE 340 Biomedical Engineering and CHEE 342 Environmental Biotechnology are core courses for the CHE2 sub-plan and thus cannot be counted as electives.
- CHEE 323 Industrial Catalysis is a core course for the CHE1 sub-plan and thus cannot be counted as an elective.
- APSC 250 Biology Through an Engineering Lens has CHEE 229 Cell Based Engineering Princip as an exclusion (a core course taken by CHE2) and thus cannot be counted as an elective.

APSC 303 Professional Internship counts as a Group A Technical Elective upon successful completion of internship.

**Please Note:** Some of these elective courses may not be available to students due to pre-requisite course requirements. The student is responsible for confirming that he/she has the necessary prerequisites or permission of the instructor.

**Please Note:** Course availability and the term in which a course is held can change from one academic year to the next. This can occur due to instructor availability or a change to departmental resources. Please refer to SOLUS to find out if the TECH course is offered this upcoming year.

## Group A Technical Electives Biomedical

Code	Title	Units
CHEE 340	Biomedical Engineering	3.50
CHEE 440	Pharmaceutical Technology	3.50
MECH 393	Biomechanical Product Developm	3.50
MECH 492	Biological Fluid Dynamics (NOT OFFERED 2020-2021)	3.50

## Energy, Energy Resources, and Petroleum Engineering

Code	Title	Units
CHEE 270	ChemEtronics	3.00
CHEE 363	Electrochemical Engineering	3.50
CHEE 414	Foundations of the Oil and Gas Industry	3.50
MECH 430	Thermal Systems Design	4.00
MECH 435	Internal Combustion Engines	3.50
MECH 437	Fuel Cell Technology	3.50
MECH 439	Turbomachinery	3.50

## Environmental

Code	Title	Units
CHEE 342	Environmental Biotechnology	3.50
CHEE 484	Bioremediation (NOT OFFERED 2020-2021)	3.50
CIVL 371	Groundwater Engineering	3.75
CIVL 372	Water and Wastewater	4.00
CIVL 451	Lake, Reservoir and Coastal	3.75
CIVL 471	Subsurface Contamination	4.00



## Materials Processing

Code	Title	Units
CHEE 323	Industrial Catalysis	3.50
CHEE 324	Organic Process Development	3.50
CHEE 460	Appl Surface & Colloid Science	3.50
CHEE 490	Polymer Forms & Proc Tech	3.50
MECH 270	Materials Science and Engineering	3.50
MECH 370	Prin Of Materials Processing	3.50
MECH 371	Fracture Mech & Dislocation	3.50
MECH 476	Eng Of Polymers And Composite	3.50

## Minerals Processing

Code	Title	Units
MINE 267	Applied Chemistry for Mining	3.50
MINE 331	Methods Of Mineral Separation	4.50
MINE 335	Mineral Processing	3.00
MINE 451	Chemical Extraction Of Metals	4.00
MNTC 306	Mineral Processing Unit Operations	3.00
MNTC 311	Ore Body Modelling and Resource Estimation	4.50
MNTC 415	Metal Extraction Processes	4.00

## Process Automation, Applied Mathematics & Molding

Code	Title	Units
CHEE 434	Process Control II (NOT OFFERED 2020-2021)	3.50
ELEC 278	Fundamentals Of Information Structures	4.00
MECH 480	Airplane Aerodynamics and Performance	3.50

## General

Code	Title	Units
APSC 303	Professional Internship	3.50
APSC 381	Advanced Design and Skills for Innovation (NOT OFFERED 2020-2021)	3.50
APSC 401	Interdisciplinary Projects	4.50

## Group B Technical Electives

### Applied Chemistry

Code	Title	Units
ENCH 213	Intro To Chemical Analysis	4.75
ENCH 222	Meth Struct Determination	3.75
ENCH 311	Mechanistic Organic Chem	3.50
ENCH 312	Transition Metal Chem	3.50
ENCH 326	Environmental&Green Chemistry	3.00
ENCH 411	Adv. Analytical Chem	3.00
ENCH 422	Synthetic Organic Chem	3.50

ENCH 424	Polymer Chemistry (Not offered 2020-2021)	3.00
----------	---	------

## Applied Mathematics & Statistics

Code	Title	Units
MTHE 339	Evolutionary Game Theory	3.00

## Biosciences

Code	Title	Units
APSC 250	Biology Through an Engineering Lens (Not offered 2020-2021)	3.50
BCHM 315	Proteins and Enzymes	3.00
BIOL 335	Limnology and Aquatic Ecology	3.00
BIOM 300	Modeling Techniques in Biology	3.00
ENCH 323	Biological Chemistry	3.00

## Energy Resources/Petroleum Engineering

Code	Title	Units
GEOE 238	Surficial Proc Sed & Strat	4.00