University of Manitoba | Price Faculty of Engineering
Department of Mechanical Engineering

2023

DEPARTMENT OF MECHANICAL ENGINEERING — 5 YEAR MODEL A PROGRAM

For students starting second year fall 2023

Students are expected to follow either the 4 year or the 5 year model program as closely as possible. This will ensure prerequisite and timetable requirements are met.

Note: c = corequisite

Offered in all 3 terms (Fall/Winter/Summer)

Offered fall & winter terms

* common to all engineering programs

FALL TERM				WINTER TERM			
FIRST YEAR	**(2022)**	hr	**Prerequisites (16.5 hrs)**	**(2023)**		hr	**Prerequisites (15 hrs)**
CHEM 1100 *	**Intro Chem 1**	**3**	(formerly CHEM 1300)	ENG 1430 *	Eng Design	3	
CHEM 1122 *	**Chem Techs for Eng 1**	**1.5**		ENG 1450 *	Intro Elec Eng	3	
COMP 1012 *	Comp Prog Eng	3	p or c MATH 1510	ENG 1460 *	Thermal Sci	3	
PHYS 1050 *	Physics	3	p or c MATH 1510	MATH 1210 *	C/L Algebra	3	
ENG 1440*	Eng Statics	3		MATH 1710 *	App Calc 2	3	1500/1510, p or c PHYS 1050
MATH 1510 *	App Calc 1	3					
SECOND YEAR	**(2023)**		**(18.5 hrs)**	**(2024)**			**(20 hrs)**
CHEM 1110 *	**Intro Chem 2**	**3**	CHEM 1100 (formerly CHEM 1310)	MATH 2132 *	Math Analysis 2	3	MATH 1700/1710, MATH 1210
CHEM 1126 *	**Chem Techs for Eng 2**	**1.5**	p or c CHEM 1122	MECH 2150	Numerical Methods	4	COMP 1012, p or c MATH 2132
MATH 2130 *	Math Analysis 1	3	MATH 1700/1710,1210	MECH 2112	C.A.D.	5	ENG 1430
MECH 2202	Thermodynamics	4	ENG 1460, MATH 1500/10/1700/10	MECH 2262	Fluid Mechanics	4	PHYS 1050, ENG 1440, ENG 1460 MATH 2130, p or c MATH 2132
MECH 2222	Mechanics of Materials	4	PHYS1050 ENG1440 COMP1012 MATH1710				
Written English Requirement *	Choose course from approved List	3		MECH 2272	Materials 1	4	CHEM 1110/1126 or 1310, MECH 2222
THIRD YEAR	**(2024)**		**(15 hrs)**	**(2025)**			**(15 hrs)**
MATH 3132*	Math Analysis 3	3	MATH 2130, MATH 2132	MECH 3430	Meas. & Control	4	MATH 3132, ENG 1450
MECH 3482	Kin.& Dynamics	4	PHYS 1050, COMP 1012, Yr Cl 3	MECH 3420	Vibes	4	MECH 3482, MATH 3132
MECH 3492	Fluids 2	4	MECH 2262, p or c MECH 2150	ENG 2030 or*	Eng Communication	3	Written English Course, ENG 1430
MECH 3502	Stress Analysis	4	MECH 2112, MECH 2222, MATH 2130	ENG 2040*	Eng Communication		
				Technical Elective #1		4	(5 technical electives required in total)
FOURTH YEAR	**(2025)**		**(19 hrs)**	**(2026)**			**(17 hrs)**
ECE 3010	Digital Systems	4	ENG 1450, MATH 2132, Yr Cl 3	ENG 3000*	Eng Economics	3	Yr Cl 3, (formerly CIVL 4050)
MECH 3542	Materials 2	4	MECH 2272	MECH 3460	Heat Transfer	4	MECH 2150, MATH 3132, ENG 1460, P or C MECH 3492
MECH 3170	Project Management	4	MECH 2112 (formerly MECH 2012)				
Comp. Elective* (PHIL 1290 or Choice)		3	CE choice = 1000 level or better from Faculty of Arts or Management	MECH 3652	Machine Design	4	MECH 3482, MECH 3502
Technical Elective #2		4	(5 technical electives required in total)	MECH 3992	ME Labs Thermofluids	2	ENG 2030/40, MECH 2202, MECH 2262, P or C 3460, **Winter Only**
				Technical Elective #3		4	(5 technical electives required in total)
FIFTH YEAR	**(2026)**		**(14 hrs)**	**(2027)**			**(13 hrs)**
MECH 3982	ME Labs Solid Mech	2	ENG 2030/40, MECH 2222, P or C MECH 3420, **Fall Only**	ENG 3020	Tech Soc	3	Written English (formerly CIVL 4460)
				PHYS 1070	Physics 2	3	Phys 1050, MATH 1500/10, P or C Math 1700/10
STAT 2220 *	Eng Statistics	3	MATH 1700/1710				
MECH 4860	Eng. Design **Fall Only**	5	ENG 2030/40, MECH 3170, MECH 3652	Technical Elective #5		4	(5 technical electives required in total)
Technical Elective #4		4	(5 technical electives required in total)	**Indigenous Knowledge Course**	**Choose course from approved list. See last page**	**3**	**MECH Program**
				(NEW Indigenous Knowledge Course can be taken any term as scheduling allows)			

Technical electives (TE) offered vary from year to year. See final page for complete TE course list or on the Mechanical website

9 hours of Comp. Electives Required = (Written Requirement, PHIL 1290 or Choice, Indigenous Knowledge Course)

Total credit hrs: 163

University of Manitoba | Price Faculty of Engineering
Department of Mechanical Engineering

DEPARTMENT OF MECHANICAL ENGINEERING — **2023 5 YEAR MODEL B PROGRAM**

For students starting second year fall 2023

Students are expected to follow either the 4 year or the 5 year model program as closely as possible. This will ensure prerequisite and timetable requirements are met.

Note: c = corequisite

Offered in all 3 terms (Fall/Winter/Summer)

Offered fall & winter terms

* common to all engineering programs

	FALL TERM				WINTER TERM			
FIRST YEAR	**(2022)**	hr	**Prerequisites**	**(16.5 hrs)**	**(2023)**		hr	**Prerequisites (15 hrs)**
CHEM 1100 *	**Intro Chem 1**	**3**	(formerly CHEM 1300)		ENG 1430 *	Eng Design	3	
CHEM 1122 *	**Chem Techs for Eng 1**	**1.5**			ENG 1450 *	Intro Elec Eng	3	
COMP 1012 *	Comp Prog Eng	3	p or c MATH 1510		ENG 1460 *	Thermal Sci	3	
PHYS 1050 *	Physics	3	p or c MATH 1510		MATH 1210 *	C/L Algebra	3	
ENG 1440*	Eng Statics	3			MATH 1710 *	App Calc 2	3	1500/1510, p or c PHYS 1050
MATH 1510 *	App Calc 1	3						
SECOND YEAR	**(2023)**			**(15.5 hrs)**	**(2024)**			**(17 hrs)**
CHEM 1110 *	**Intro Chem 2**	**3**	CHEM 1100 (formerly CHEM 1310)		MATH 2132 *	Math Analysis 2	3	MATH 1700/1710, MATH 1210
CHEM 1126 *	**Chem Techs for Eng 2**	**1.5**	p or c CHEM 1122		MECH 2202	Thermodynamics	4	ENG 1460, MATH 1500/10/1700/10
MATH 2130 *	Math Analysis 1	3	MATH 1700/1710,1210		MECH 2222	Mechanics of Materials	4	PHYS1050 ENG1440 COMP1012 MATH1710
MECH 2112	C.A.D.	5	ENG 1430		Comp. Elective* (PHIL 1290 or Choice)		3	CE choice = 1000 level or better from Faculty of Arts or Management
Written English Requirement *	Choose course from approved List	3			**Indigenous Knowledge Course**	**Choose course from approved list. See last page**	**3**	**MECH Program**
					(NEW Indigenous Knowledge Course can be taken any term as scheduling allows)			
THIRD YEAR	**(2024)**			**(18 hrs)**	**(2025)**			**(16 hrs)**
MATH 3132*	Math Analysis 3	3	MATH 2130, MATH 2132		MECH 3482	Kin. & Dynamics	4	PHYS 1050, COMP 1012, Yr Cl 3
MECH 2150	Numerical Methods	4	COMP 1012, p or c MATH 2132		MECH 3492	Fluids 2	4	MECH 2262, p or c MECH 2150
MECH 2262	Fluid Mechanics	4	PHYS 1050, ENG 1440, ENG 1460 MATH 2130, p or c MATH 2132		MECH 3502	Stress Analysis	4	MECH 2112, MECH 2222, MATH 2130
MECH 2272	Materials 1	4	CHEM 1110/1126 or 1310, MECH 2222		MECH 3542	Materials 2	4	MECH 2272
ENG 2030 or*	Eng Communication	3	Written English Course, ENG 1430					
ENG 2040*	Eng Communication							
FOURTH YEAR	**(2025)**			**(18 hrs)**	**(2026)**			**(17 hrs)**
ECE 3010	Digital Systems	4	ENG 1450, MATH 2132, Yr Cl 3		**STAT 2220 ***	Eng Statistics	3	MATH 1700/1710
MECH 3420	Vibes	4	MECH 3482, MATH 3132		MECH 3170	Project Management	4	MECH 2112 (formerly MECH 2012)
MECH 3460	Heat Transfer	4	MECH 2150, MATH 3132, ENG 1460, P or C MECH 3492		MECH 3992	ME Labs Thermofluids	2	ENG 2030/40, MECH 2202, MECH 2262, P or C 3460, **Winter Only**
MECH 3652	Machine Design	4	MECH 3482, MECH 3502		Technical Elective #1		4	(5 technical electives required in total)
MECH 3982	ME Labs Solid Mech	2	ENG 2030/40, MECH 2222, P or C MECH 3420, **Fall Only**		Technical Elective #2		4	(5 technical electives required in total)
FIFTH YEAR	**(2026)**			**(17 hrs)**	**(2027)**			**(13 hrs)**
MECH 3430	Meas. & Control	4	MATH 3132, ENG 1450		ENG 3000*	Eng Economics	3	(formerly CIVL 4050)
MECH 4860	Eng. Design **Fall Only**	5	ENG 2030/40, MECH 3170, MECH 3652		ENG 3020	Tech Soc	3	Written English (formerly CIVL 4460)
Technical Elective #3		4	(5 technical electives required in total)		PHYS 1070	Physics 2	3	Phys 1050, MATH 1500/10, P or C Math 1700/10
Technical Elective #4		4	(5 technical electives required in total)		Technical Elective #5		4	(5 technical electives required in total)

Technical electives (TE) offered vary from year to year. See final page for complete TE course list or on the Mechanical website

9 hours of Comp. Electives Required = (Written Requirement, PHIL 1290 or Choice, Indigenous Knowledge Course)

Total credit hrs: 163

University of Manitoba | Price Faculty of Engineering
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DEPARTMENT OF MECHANICAL ENGINEERING — **2023**

For students starting second year fall 2023 — **4 4 YEAR MODEL PROGRAM**

Students are expected to follow either the 4 year or the 5 year model program.
This will ensure prerequisite and timetable requirements are met.

Note: c = corequisite
Offered in all 3 terms (Fall/Winter/Summer)
Offered fall & winter terms
* common to all engineering programs

FALL TERM				WINTER TERM			
FIRST YEAR	**(2022)**	hr	**Prerequisites (19.5 hrs)**	**(2023)**		hr	**Prerequisites (18 hrs)**
CHEM 1100 *	**Intro Chem 1**	**3**	(formerly CHEM 1300)	ENG 1430 *	Eng Design	3	
CHEM 1122 *	**Chem Techs for Eng 1**	**1.5**		ENG 1450 *	Intro Elec Eng	3	
COMP 1012	Comp Prog Eng	3		ENG 1460 *	Thermal Sci	3	
PHYS 1050 *	Physics	3	p or c MATH 1510	MATH 1210 *	C/L Algebra	3	
ENG 1440*	Eng Statics	3		MATH 1710 *	App Calc 2	3	1500/1510, p or c PHYS 1050
MATH 1510 *	App Calc 1	3		Comp. Elective* (PHIL 1290 or Choice)		3	CE choice = 1000 level or better from Faculty of Arts or Management
Written English Requirement *	Choose course from approved List	3					
SECOND YEAR	**(2023)**		**(21.5 hrs)**	**(2024)**			**(23 hrs)**
CHEM 1110 *	**Intro Chem 2**	**3**	CHEM 1100 (formerly CHEM 1310)	MATH 2132 *	Math Analysis 2	3	MATH 1700/1710, MATH 1210
CHEM 1126 *	**Chem Techs for Eng 2**	**1.5**	p or c CHEM 1122	MECH 2112	C.A.D.	5	ENG 1430
MATH 2130 *	Math Analysis 1	3	MATH 1700/1710,1210	MECH 2150	Numerical Methods	4	COMP 1012, p or c MATH 2132
STAT 2220 *	Eng Statistics	3	MATH 1700/1710	MECH 2262	Fluid Mechanics	4	PHYS 1050, ENG 1440, ENG 1460 MATH 2130, p or c MATH 2132
MECH 2202	Thermodynamics	4	ENG 1460, MATH 1500/10/1700/10	MECH 2272	Materials 1	4	CHEM 1110/1126 or 1310, MECH 2222
MECH 2222	Mechanics of Materials	4	PHYS1050 ENG1440 COMP1012 MATH1710	ENG 2030 or*	Eng Communication	3	Written English Course, ENG 1430
Indigenous Knowledge Course	**Choose course from approved list. See last page**	**3**	**MECH Program**	ENG 2040*	Eng Communication		
THIRD YEAR	**(2024)**		**(23 hrs)**	**(2025)**			**(22 hrs)**
MATH 3132*	Math Analysis 3	3	MATH 2130, MATH 2132	MECH 3420	Vibes	4	MECH 3482, MATH 3132
MECH 3170	Project Management	4	MECH 2112 (formerly MECH 2012)	MECH 3430	Meas. & Control	4	MATH 3132, ENG 1450
MECH 3482	Kin. & Dynamics	4	PHYS 1050, COMP 1012, Yr Cl 3	MECH 3460	Heat Transfer	4	MECH 2150, MATH 3132, ENG 1460, P or C MECH 3492
MECH 3492	Fluids 2	4	MECH 2262, p or c MECH 2150	MECH 3652	Machine Design	4	MECH 3482, MECH 3502
MECH 3502	Stress Analysis	4	MECH 2112, MECH 2222, MATH 2130	MECH 3992	ME Labs Thermofluids	2	ENG 2030/40, MECH 2202, MECH 2262, P or C 3460, **Winter Only**
MECH 3542	Materials 2	4	MECH 2272	Technical Elective #1		4	(5 technical electives required in total)
FOURTH YEAR	**(2025)**		**(19 hrs)**	**(2026)**			**(17 hrs)**
ECE 3010	Digital Systems	4	ENG 1450, MATH 2132, Yr Cl 3	ENG 3000*	Eng Economics	3	(formerly CIVL 4050)
MECH 3982	ME Labs Solid Mech	2	ENG 2030/40, MECH 2222, P or C MECH 3420, **Fall Only**	ENG 3020	Tech Soc	3	Written English (formerly CIVL 4460)
MECH 4860	Eng. Design **Fall Only**	5	ENG 2030/40, MECH 3170, MECH 3652	PHYS 1070	Physics 2	3	Phys 1050, MATH 1500/10, P or C Math 1700/10
Technical Elective #2		4	(5 technical electives required in total)	Technical Elective #4		4	(5 technical electives required in total)
Technical Elective #3		4	(5 technical electives required in total)	Technical Elective #5		4	(5 technical electives required in total)

Technical electives (TE) offered vary from year to year. See final page for complete TE course list or on the Mechanical website

9 hours of Comp. Electives Required = (Written Requirement, PHIL 1290 or Choice, Indigenous Knowledge Course)

Total credit hrs: 163

University of Manitoba | Price Faculty of Engineering
Department of Mechanical Engineering

Technical Elective Option and Streams in Mechanical Engineering

Students are required to take has 5 Technical Elective (TE) slots to be filled with non-core courses of your choice from the list of technical electives offered each year. Students wishing to pursue a variety of Mechanical topics have the chance here to do so by choosing courses in a variety of subject/research areas.

The 5 Technical Elective spots can be filled with courses from our Aerospace Option or Streams in Aerospace, Materials, Solid Mechanics, Thermofluids and Manufacturing.

To obtain the Aerospace Option students must take all courses from List A and a choice of 2 from List B. A Stream consists of 3 courses out of 5 TE slots.

To obtain a stream on your transcript select 3 TE courses from the stream area of your choice and 2 TE courses from the same area, another area or Thesis.

Students interested in research and experimentation have the option of replacing 2 Technical Elective slots with a 6-credit-hour Thesis (MECH 4162). Work on the thesis is done under the supervision of a Faculty Advisor and begins in September with an April completion date, done in the student's graduating year.

Please note:
1) Technical Electives listed may vary from year to year and may have limited space.
2) Students are urged to consult the Mechanical Engineering office or the website for a current list of technical electives offered.
3) Students must be in their graduating year to register for MECH 4162 Thesis.
4) Students may NOT use the same technical elective to count toward multiple streams.

Aerospace Option

Complete all 3 TEs in List A. Choose the remaining 2 TEs from List B. Some courses in List B will be offered in alternating years.

List A (select 3)		hr	Prerequisites
MECH 3520	Aerodynamics	4	MECH 2150, MECH 3492
MECH 4182	Aerospace Structures: Analysis and Design	4	MECH 3502
MECH 4192	Aerospace Materials and Manufacturing Processes	4	MECH 3542

List B (select 2)			
MECH 3582	Manufacturing Planning and Quality Control	4	MECH 2112 (formerly MECH 2012)
MECH 4200	Gas Turbine Propulsion Systems	4	MECH 2202, MECH 3520
ENG 4110	Operational Excellence	4	STAT 2220 or (STAT 1000/2000)

Aerospace Stream

Choose 3 TEs from the following 5 courses. Choose the remaining 2 TEs from the same stream, other TEs, or thesis. Some courses will be offered in alternating years.

MECH 3520	Aerodynamics	4	MECH 2150, MECH 3492
MECH 4182	Aerospace Structures: Analysis and Design	4	MECH 3502
MECH 4192	Aerospace Materials and Manufacturing Processes	4	MECH 3542
MECH 4200	Gas Turbine Propulsion Systems	4	MECH 2202, MECH 3520
MECH 4452	Aircraft Performance, Dynamics and Design	4	MECH 3520

Manufacturing Stream

Choose 3 from the following 10 courses. Choose the remaining 2 TEs from the same stream, other TEs, or thesis. Some courses will be offered in alternating years.

MECH 3582	Manufacturing Planning and Quality Control	4	MECH 2112
MECH 3592	Simulation Modeling and Facility Planning	4	MECH 2112
MECH 4330	Contemporary Topics in Manufacturing Engineering	4	CIMA 1 (MECH 2112)
MECH 4342	Contemporary Topics in Manufacturing Engineering	4	CIMA 2 (MECH 2112)
MECH 4342	Contemporary Topics in Manufacturing Engineering II	4	Precision Multi-Axis Control (MECH 3430)
MECH 4900	Mechantronics System Design	4	MECH 3430

Materials Stream

Choose 3 from the following 5 courses. Choose the remaining 2 TEs from the same stream, other TEs, or thesis. Some courses will be offered in alternating years.

		hr	Prerequisites / Topic Title
MECH 4192	Aerospace Materials and Manufacturing Processes	4	MECH 3542
MECH 4350	Topics in Engineering Material 1	4	Instructor Approval
MECH 4360	Topics in Engineering Materials 2	4	Instructor Approval
MECH 4870	Fracture and Failure of Engineering Materials	4	MECH 3542

Solid Mechanics Stream

Choose 3 from the following 6 courses. Choose the remaining 2 TEs from the same stream, other TEs, or thesis. Some courses will be offered in alternating years.

MECH 4182	Aerospace Structures: Analysis and Design	4	MECH 3502
MECH 4322	Cont. Topics M.E. 2:	4	Design of Biomechanical Devices
MECH 4322	Cont. Topics M.E. 2:	4	Reliability Engineering
MECH 4322	Cont. Topics M.E. 2:	4	Vibration Based Condition Monitoring
MECH 4452	Aircraft Performance, Dynamics and Design	4	MECH 3520
MECH 4510	Fundamentals of Finite Element Analysis	4	MECH 2150, MATH 3132, MECH 2222
MECH 4812	Automotive Engineering	4	MECH 3502 Pre/Co MECH 3420

Thernofluids Stream

Choose 3 from the following 8 courses. Choose the remaining 2 TEs from the same stream, other TEs, or thesis. Some courses will be offered in alternating years.

MECH 4292	IC Engines	4	MECH 2202
MECH 4200	Gas Turbine Propulsion Systems	4	MECH 2202, MECH 3520
MECH 4412	Heating, Ventilation and Air Conditioning	4	MECH 2202
MECH 4560	Selected Topics in Fluid Mechanics 4M	4	MECH 3132, MECH 3492
MECH 4692	Renewable Energy	4	MECH 2202, MECH 2262, P or C MECH 3460
MECH 4822	Numerical Heat Transfer in Fluid Flow	4	MECH 3132, MECH 2150, MECH 3460, MECH 3492

* Confirm topics titles with your student advisor or see the Dept. website for a list of Technical Elective offerings for the current year

INDIGENOUS KNOWLEDGE COURSE

Students are required to take at least one of the courses from the list of Indigenous Knowledges courses. ENG 4100* may be used to meet this requirement when the course content satisfies the requirements for an Indigenous course. Students admitted to Civil Engineering in Fall 2021 who have completed two complementary studies elective courses (or 6 credit hours) prior to admission to the program, may use one of those courses in place of the Indigenous knowledge course. Prerequisites must be met for all courses.

Crs #	Course Title	Credit Hours
INDG 1200	Indigenous Peoples in Canada (6)	6 hrs
	NOTE: INDG 1200 is a spanned course offered both fall and	
ENG 4100*	Contemporary Topics in Eng. Practice (4) (see note above)	4 hrs
INDG 1220	Indigenous Peoples in Canada Part 1 (3)	3 hrs
INDG 1240	Indigenous Peoples in Canada Part 2 (3)	3 hrs
INDG 2012/ HIST 2010	Indigenous History in Canada (3)	3 hrs
INDG 2020/ HIST 2020	The Metis in Canada (3) (May be used as W requirement also)	3 hrs
POLS 2802	Introduction to Indigenous Politics (3)	3 hrs
POLS 3870	Politics of Indigenous-Settler Relations (3)	3 hrs

* W indicates that the course may also be used as a written English requirement. Should a student choose to do this they must also take a 1000 level or better course from the Facutly of Arts or Management. To ensure 9 hours of complimentary studies electives.

https://umanitoba.ca/engineering/mechanical/advising