

Field Theory 9020B/4120B Course Outline

1. Course Information

Course Information

Course name: Field Theory

Course Number: 9020B & 4120B

Academic Term: Winter 2024

Location: Middlesex College 107

Hours: MWF 10:30-11:30

List of Prerequisites

Mathematics 3020A/B and Math 3120A/B or equivalent.

Unless you have either the requisites for this course or written special permission from your Dean's Designate (Department/Program Counsellors and Science Academic Counselling) to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2. Instructor Information

Instructors	Email	Office	Phone	Office Hours
Dr. Taylor Brysiewicz	tbrysiew@uwo.ca	MC114	N/A	M:11:30-12:30 W:1:30-2:30

Office hours will be weekly as indicated above in Dr. Brysiewicz's office.

Alternatively, office hours may be scheduled via email and held either in-person or on zoom.

3. Course Syllabus, Schedule, Delivery Mode

Course Description: Automorphisms of fields, separable and normal extensions, splitting fields, fundamental theorem of Galois theory, primitive elements, Lagrange's theorem. Finite fields and their Galois groups, cyclotomic extensions and polynomials, applications of Galois theory to geometric constructions and solution of algebraic equations.

Learning Outcomes: By the end of the course you will be able to:

- Reproduce the basic definitions related to field theory
- Articulate the difference between an algebraic extension and a transcendental extension
- Calculate a primitive element of an algebraic extension as well as its degree
- Determine whether an extension is simple, normal, separable, or Galois
- Calculate the Galois group of a polynomial
- Work out explicit examples illustrating the Galois correspondence
- Determine if a polynomial is solvable by radicals

Lecture Schedule: We will aim to cover a section in the textbook every two class periods. The class will cover Chapters 13 and 14 of Dummit & Foote (15 sections).

Quiz Schedule: Quizzes will be given weekly on Mondays with few exceptions (see Section 5)

Homework Schedule: Homework will be due weekly on Fridays, with few exceptions (see Section 5)

Key Dates:

Jan. 8 Classes resume

Jan. 11 Default day for December SPC Exams (1st Thursday of Winter Term)

Jan. 16 Last day to add a second-term half course

Feb. 17–25 Spring Reading Week including Family Day (Saturday – following Sunday)

Mar. 4 Date by which students in a second-term half course must receive assessment for work totaling 15% of their final grade (1000- and 2000-level courses only)

Mar. 7 Last day to withdraw from a second-term half course without academic penalty

Mar. 29 & 31 Good Friday and Easter Sunday.

Apr. 8 Last day of classes in the Winter Term

Apr. 9–10 Study Days

Apr. 11–30 April examination period

May 9 Default (i.e. **TBD**) day for April SPC Exams (2nd Thursday in May)

Contingency plan: Although the intent is for this course to be delivered in person, should any university-declared emergency require some or all of the course to be delivered online, either synchronously or asynchronously, the course will adapt accordingly. The grading scheme will **not** change. Any assessments affected will be conducted online as determined by the course instructor.

4. Course Materials

Textbook: We will use Dummit & Foote – Abstract Algebra (3rd edition is preferable)

Owl Site: Students are responsible for checking the course OWL site (<http://owl.uwo.ca>) on a regular basis for news and updates. This is the primary method by which information will be disseminated to all students in the class.

All course material will be posted to OWL: <http://owl.uwo.ca>.

If students need assistance with the course OWL site, they can seek support on the OWL Help page. Alternatively, they can contact the Western Technology Services Helpdesk. They can be contacted by phone at 519-661-3800 or ext. 83800.

5. Methods of Evaluation

The overall course grade will be calculated as listed below:

Assignments (top #8 of #10)	40%
Quizzes (top #5 of #10)	10%
Midterm Test (#1)	15%
Final Exam (#1)	35%

Tentative Dates: The tentative schedule for these evaluations is given below.

The dates are guaranteed to not be early than what is listed, but may be pushed back depending on pace.

The tentative assignment due dates are: 1/12, 1/19, 1/26, 2/2, 2/9, 3/8, 3/15, 3/22, 3/29, 4/5

The tentative quiz dates are: 1/15, 1/22, 1/29, 2/5, 2/12, 3/4, 3/11, 3/18, 3/25, 4/1

The tentative midterm (in class) date is: 2/16

The final exam is: 4/24 7pm-10pm

Material Covered:

The quizzes will cover the material covered on the previous three lectures.

The assignments will cover the material given in the three lectures prior to its due date.

The Midterm will cover Chapter 13.

The Final Exam will cover Chapter 13 and 14.

Evaluation of Graduate Students: Graduate students are evaluated differently than undergraduate students in this course:

- Assignments: Graduate students will answer additional questions
- Tests/Exams (Midterm and Final): Graduate students will answer a distinct subset of questions

6. Student Absences

If you are unable to meet a course requirement due to illness or other serious circumstances, please follow the procedures below.

The top 8 assignment scores and top 5 quiz scores will comprise the grade in those categories.

Assessments worth less than 10% of the overall course grade:

Missed quizzes will not be made-up (note: only half of them count toward final grade)

Missed homework will be granted an extension

Assessments worth 10% or more of the overall course grade:

For work totalling 10% or more of the final course grade, you must provide valid medical or supporting documentation to the Academic Counselling Office of your Faculty of Registration as soon as possible.

For further information, please consult the University's medical illness policy at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/academic_consideration.pdf.

The Student Medical Certificate is available at

https://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf.

In the case of a missed midterm exam, a makeup exam will be given.

Absences from Final Examinations

If you miss the Final Exam, please contact the Academic Counselling office of your Faculty of Registration as soon as you are able to do so. They will assess your eligibility to write the Special Examination (the name given by the University to a makeup Final Exam).

You may also be eligible to write the Special Exam if you are in a “Multiple Exam Situation” (e.g., more than 2 exams in 23-hour period, more than 3 exams in a 47-hour period).

If a student fails to write a scheduled Special Examination, the date of the next Special Examination (if granted) normally will be the scheduled date for the final exam the next time this course is offered. The maximum course load for that term will be reduced by the credit of the course(s) for which the final examination has been deferred. See the Academic Calendar for details (under [Special Examinations](#)).

Note: missed work can *only* be excused through one of the mechanisms above. Being asked not to attend an in-person course requirement due to potential COVID-19 symptoms is **not** sufficient on its own.

6. Accommodation and Accessibility

Religious Accommodation

When a course requirement conflicts with a religious holiday that requires an absence from the University or prohibits certain activities, students should request accommodation for their absence in writing at least two weeks prior to the holiday to the course instructor and/or the Academic Counselling office of their Faculty of Registration. Please consult University's list of recognized religious holidays (updated annually) at

www.edi.uwo.ca

Accommodation Policies

Students with disabilities are encouraged to contact Accessible Education, which provides recommendations for accommodation based on medical documentation or psychological and cognitive testing. The policy on Academic Accommodation for Students with Disabilities can be found at:

[https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic Accommodation_disabilities.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/Academic_Accommodation_disabilities.pdf).

7. Academic Policies

The website for Registrarial Services is <http://www.registrar.uwo.ca>.

In accordance with policy,

https://www.uwo.ca/univsec/pdf/policies_procedures/section1/mapp113.pdf,

the centrally administered e-mail account provided to students will be considered the individual's official university e-mail address. It is the responsibility of the account holder to ensure that e-mail received from the University at their official university address is attended to in a timely manner.

Electronic Devices on Quizzes or Exams: No electronic device is allowed on any quiz or exam

Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:

http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf.

8. Support Services

Please visit the Science & Basic Medical Sciences Academic Counselling webpage for information on adding/dropping courses, academic considerations for absences, appeals, exam conflicts, and many other academic related matters: <https://www.uwo.ca/sci/counselling/>.

Students who are in emotional/mental distress should refer to Mental Health@Western (<https://uwo.ca/health/>) for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at

https://www.uwo.ca/health/student_support/survivor_support/get-help.html.

To connect with a case manager or set up an appointment, please contact support@uwo.ca.

Please contact the course instructor if you require lecture or printed material in an alternate format or if any other arrangements can make this course more accessible to you. You may also wish to contact Accessible Education at

http://academicsupport.uwo.ca/accessible_education/index.html

if you have any questions regarding accommodations.

Learning-skills counsellors at the Student Development Centre (<https://learning.uwo.ca>) are ready to help you improve your learning skills. They offer presentations on strategies for improving time management, multiple-choice exam preparation/writing, textbook reading, and more. Individual support is offered throughout the Fall/Winter terms in the drop-in Learning Help Centre, and year-round through individual counselling.

Additional student-run support services are offered by the USC, <https://westernusc.ca/services/>.