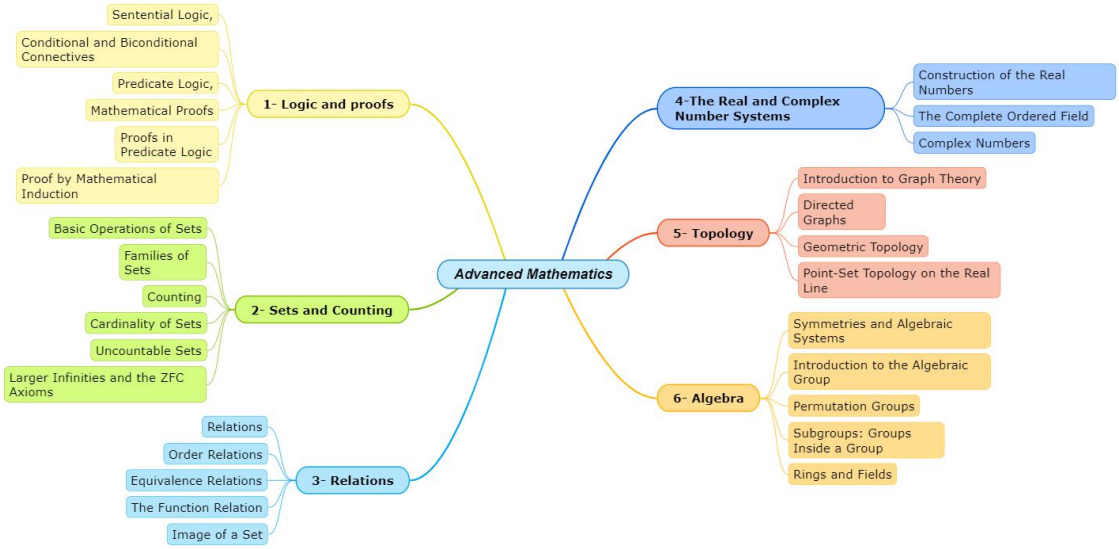
MATH 3215: Introduction to Higher Mathematics

2022 Fall Session	
Total Class Sessions: 25 **Class Sessions Per Week: 5** **Total Weeks: 5** **Class Session Length (Minutes): 145** **Credit Hours: 4**	**Instructor: Staff** **Classroom: TBA** **Office Hours: TBA** **Language: English**

Course Description:

This course is an induction to proofs and designed for students to prepare for the study of advanced mathematics. After practices of problem solving and calculations through previous Math courses, students will learn the language and philosophy of higher mathematics in this course. Topics include logic and proofs, sets and counting, relations, the real and complex number systems, topology, and algebra. The next figure shows the topics in details.



Course Materials:

Textbook:

A Transition to Advanced Mathematics, 8th Edition

Author(s): Douglas Smith, Maurice Eggen, Richard St. Andre

Publisher: Brooks Cole (August 6, 2014)

Language: English

ISBN-10: 1285463269

ISBN-13: 978-1285463261

Recommended:

How to Prove It: A Structured Approach, 3rd Edition
Author: Daniel J. Velleman
Publisher: Cambridge University Press; 3rd edition (August 29, 2019)
Language: English
ISBN-10: 1108439535
ISBN-13: 978-1108439534

Course Format and Requirements:

This course has 25 class sessions in total. Each class session is 145 minutes in length. Pre-reading the relevant chapter and attempting the assigned homework problems prior to each class is strongly recommended. Familiarizing with the course material before class, you will gain a better understanding of the information presented during the class. Students are strongly encouraged to ask questions on things they do not understand. Main learning points will be highlighted from the relevant textbook chapters.

Course Assignments:

Homework:

You are encouraged to work together on problem sets, but each of you must hand in your own work.

Quizzes:

There will be six 10-20 minute quizzes in total. The quizzes will cover material from in-class handouts and homework.

Exams:

The exams will be closed book and closed notes. Formula sheets will be provided by the Instructor. No make-up exams will be given. Upon prior notification of the Instructor, allowances will be made under extreme circumstances. There will be two midterms and one cumulated final exam.

Course Assessment:

Homework and Quizzes	20%
Midterm Exams 1	20%
Midterm Exams 2	20%
Final Exam	40%
Total	**100%**

Grading Scale (percentage):

A+	A	A-	B+	B	B-	C+	C	C-	D+	D	D-	F
98-100	93-97	90-92	88-89	83-87	80-82	78-79	73-77	70-72	68-69	63-67	60-62	<60

Academic Integrity:

Students are encouraged to study together, and to discuss lecture topics with one another, but all other work should be completed independently.
Students are expected to adhere to the standards of academic honesty and integrity that are described in the Chengdu University of Technology's *Academic Conduct Code.* Any work suspected of violating the standards of the *Academic Conduct Code* will be reported to the Dean's Office. Penalties for violating the *Academic Conduct Code* may include dismissal from the program. All students have an individual responsibility to know and understand the provisions of the *Academic Conduct Code*.

Special Needs or Assistance:

Please contact the Administrative Office immediately if you have a learning disability, a medical issue, or any other type of problem that prevents professors from seeing you have learned the course material. Our goal is to help you learn, not to penalize you for issues which mask your learning.

Course Schedule:

Week	Topics	Homework	Quiz	Exam
1	**Logic and proofs** Sentential Logic Conditional and Biconditional Connectives Predicate Logic Mathematical Proofs Proofs in Predicate Logic Proof by Mathematical Induction	√	Quiz 1	
2	**Sets and Counting** Basic Operations of Sets Families of Sets Counting Cardinality of Sets Uncountable Sets	√	Quiz 2	First Midterm

	Larger Infinities and the ZFC Axioms **Review for the first Midterm**			Exam
3	**Relations** Relations Order Relations Equivalence Relations The Function Relation Image of a Set **The Real and Complex Number Systems** Construction of the Real Numbers The Complete Ordered Field	√	Quiz 3	
4	**The Real and Complex Number Systems** Complex Numbers **Review for Second Midterm** **Topology** Introduction to Graph Theory Directed Graphs Geometric Topology Point-Set Topology on the Real Line	√	Quiz 4	Second Midterm Exam
5	**Algebra** Symmetries and Algebraic Systems Introduction to the Algebraic Group Permutation Groups Subgroups: Groups Inside a Group Rings and Fields **Course Summary and Review for Final Exam**	√	Quiz 5 Quiz 6	Final Exam (Cumulative)