

COURSE DETAIL

ALGEBRA AND LOGIC

Country

Australia

Host Institution

University of Sydney

Program(s)

University of Sydney

UCEAP Course Level

Upper Division

UCEAP Subject Area(s)

Mathematics

UCEAP Course Number

123

UCEAP Course Suffix**UCEAP Official Title**

ALGEBRA AND LOGIC

UCEAP Transcript Title

ALGEBRA AND LOGIC

UCEAP Quarter Units

6.00

UCEAP Semester Units

4.00

Course Description

This course unifies and extends mathematical ideas and techniques that most participants will have met in their first and second years, and will be of general interest to all students of pure and applied mathematics. It combines algebra and logic to present and answer a number of related questions of fundamental importance in the development of mathematics, from ancient to modern times. The Propositional and Predicate Calculi are studied as model axiomatic systems in their own right, including proofs of consistency and completeness. The final part of the course introduces precise notions of computability and decidability, through abstract Turing machines, culminating in the unsolvability of the Halting Problem the undecidability of First Order Logic, and a discussion of Godel's Incompleteness Theorem. Classical and novel arithmetics are introduced, unified and described abstractly using field and ring axioms and the language of field extensions. Quotient rings are introduced, which are used to construct different finite and infinite fields. A construction of the real numbers, by factoring out rings of Cauchy sequences of rationals by the ideal of null sequences, is presented. Axiomatics are placed in the context of reasoning within first order logic and set theory.

Language(s) of Instruction

English

Host Institution Course Number

MATH3066

Host Institution Course Title

ALGEBRA AND LOGIC

Host Institution Course Details

Host Institution Campus

Host Institution Faculty

Host Institution Degree

Host Institution Department

Mathematics

Course Last Reviewed

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