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 Campus

Host Institution Faculty

Host Institution Degree

Host Institution Department
Mathematics

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