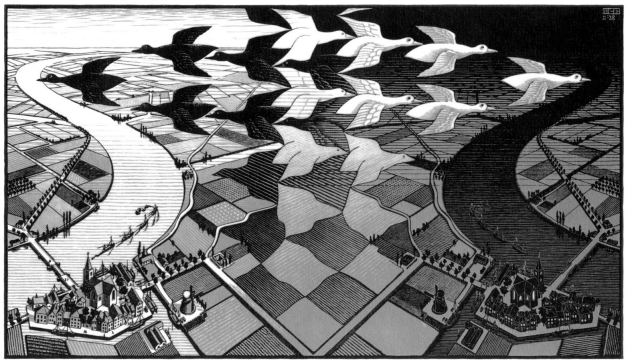
CS 491/691: Foundations of Autonomous Systems

Offered: Fall Semester 2016 and Meeting in SEM 234: Monday & Wednesday 5:30-6:45pm
Prerequisite: CS 365 or MATH 301 (prerequisites can be waived upon instructor approval)



Day and Night by *M.C. Escher* 1938 Woodcut in black and grey, printed from 2 blocks. 677mm x 391mm.

Course Topics: Are you interested in artificial intelligence? Have you ever wondered if there are truths which can't be proven? Can science produce all and only true statements? What's the connection between Zen Buddhism and machine learning? How can the humanities be treated in a rigorous manner? Are there truly random processes? What's the relationship between computation, epistemology, and the human mind-brain?

Please feel invited to join in a weekly exploration of foundational mathematics, logic, theoretical computer science, philosophy of mind, music theory, and aesthetics.

Instructor: **Dr. Richard Kelley** will be the main instructor. After finishing his doctorate in human-robot interaction from UNR, Dr. Kelley signed on to NAASIC as their Chief Engineer. His time is currently spent overseeing autonomous systems research, instructing, and interfacing with both government officials and the private sector in order to establish Reno as source of cutting edge research in the field of autonomous systems.

Dr. Kelley's instruction will be complemented via the work of the lead teaching assistant Banafsheh Rekabdar and the head teaching fellow Duncan Wilson.

Primary Textbooks: (there will be additional selected readings as well)

1. **Gödel, Escher, Bach: an Eternal Golden Braid** by Douglas Hofstadter
2. **META-MATH!** by Gregory Chaitin

Student Expectations and Learning Outcomes: Students enrolled in CS 491 will be expected to complete the weekly reading, actively participate in weekly discussion, and attempt all assignments to the best of their ability. Students who complete CS 491 will: understand concrete examples of incompleteness in formal systems, write programs in one of Chaitin's LISP dialects, understand connections between mathematics and music theory, have written about the relationship between language, consciousness, incompleteness, complexity and artificial intelligence, and have learned about foundational mathematics and theoretical computer science and most importantly their connections to music, art, physics, and life.

Questions: Contact Dr. Kelley at rkelley@unr.edu or Duncan at duncanw@nevada.unr.edu