Tentative Syllabus for ASTR 330/FC30 – Spectroscopy of the Planets
Spring Semester 2006

Course Instructors: Catrina M. Hamilton  Office: 223 Kendade Hall, MHC
                  Office: 517D LGRT B, UMass
Phone: 538-2263 (MHC Office), 413/297-1510 (Cell)
Email: chamilto@mtholyoke.edu

Office Hours:     M,W: MHC 1-3 PM
                 Th: UMass 3-4 PM, starting 2/2/2006
                 Or by appointment.

Class Meetings: Tuesdays, 4-7 PM, Kendade 223, MHC, unless notified otherwise.
                 Attendance is mandatory. This course meets once a week. We will be
                 covering a great deal of information during that time. Each class period
                 will consist of a lecture and an activity and/or a quiz over the required
                 reading. Students who miss class should obtain permission from the
                 instructor at least 1 day in advance, or have a note from the Dean.

Course Philosophy: The goal of this course is to teach students the science of spectroscopy,
                   and what one can learn through that process. We will focus, in particular,
                   on the planets and Solar System bodies, but the techniques and skills
                   learned here can be applied to all fields of astronomy. The course will
                   consist of four modules described below.

Exams:            There are no exams per se in this class. There will be quizzes in alternate
                   weeks, beginning February 7, and they will be cumulative.

Course Materials: This course has no required textbook. Instead, we will use a large number
                   of on-line readings from the popular and scholarly journals; links for these
                   will be available on a week-by-week basis, so you will need to check the
                   course web site frequently. I expect you to read the assigned articles
                   BEFORE the class for which they are assigned. It is essential that you
                   come to class prepared. Be sure to bring a calculator to class.

Evaluation Policies: Your grade for this course will be based on a sum total number of points
                     acquired throughout the semester. Opportunities to earn points come from
                     HW assignments, quizzes, in-class exercises, project summaries, and in-
                     class presentations.

Daily Activities: Question/Answer Period – You will have time at the beginning of each
class to ask questions about the reading material due that day or problems
you may be quizzed on.
Reading/HW Quiz – There will be short quizzes covering the topics from the required weekly readings and/or assigned homework. These quizzes will be given every other week.
Lecture – Introduction to the material that was covered in the reading for that week. These lectures will vary in length. Rest assured, however, that breaks will be given throughout the 3 hour period.
Class Exercises/Discussions – When appropriate, exercises and/or discussions will follow the lecture. Guides to each exercise will be posted on the course website.

TENTATIVE SCHEDULE OF EVENTS
(To be expanded upon weekly on the course website.)

Module 1: Introduction to the theory of planetary spectroscopy. (*The role of light...*)

We will review thermal radiation and reflection principles, as well as the spectroscopy of hydrogen and other relevant gases. A brief overview of spectrographs and their inner workings will be explored. The difference between elemental and molecular spectroscopy will be discussed and its application to studying planetary atmospheres will be explored.

Module 2: Reduction and analysis of long-slit cometary spectra. (*Techniques – Your bag of tricks...*)

The goal of this module is to introduce you to the IRAF (Image Reduction and Analysis Facility) package, which is commonly used to reduce astronomical data. Here, you will reduce, and then analyze, a spectrum of a comet that was obtained with the 2.3-m Steward Observatory telescope. You will learn how to recognize and interpret features in the spectrum of a comet.

Module 3: Compare and contrast the spectra of solar system bodies. (*Getting to know our neighbors...*)

The planets and moons will be explored by physical body type, and the various missions sent to each body will be discussed. We will compare and contrast the spectra obtained and talk about their physical interpretation.

Module 4: The search for exo-solar planets. (*Finding our distant cousins...*)

We will take our study outside the solar system and discuss techniques that are currently employed to search for planets orbiting other stars. We will use the theory of planet formation to help us determine the expected observable signatures of exo-solar planets.