The Spectrum

The News Letter of the Buffalo Astronomical Association

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In this Issue...

From the Editors desk...

Mike Benz

Have you ever wanted to learn more about what you are looking at in the night sky? There is a wealth of information available on the Internet and a lot of it is free. After doing some research I came across a site that listed a bunch of free online astronomy courses. Under 'Free Online Astonomy Course List' below is a sampling of what they had on their list.

In looking at these links I found MIT has an extensive list of free online courses under their MIT Open Courseware site located at http://ocw.mit.edu/index.htm. This site houses over 2000 courses online and with the exception of buying the book for the course, which they provide a handy link to Amazon for, the courses are free! They do say if you use the link they provide to Amazon, OCW will get 10% of the purchase price for the book. I think that is a small price to pay to keep this resource available.

Unlocking Knowledge, Empowering Minds.

Free lecture notes, exams, and videos from MIT. No registration required.

MIT OpenCourseWare (OCW) is a web-based publication of virtually all MIT course content. OCW is open and available to the world and is a permanent MIT activity.

What is MIT OpenCourseWare?

MIT OpenCourseWare is a free publication of MIT course materials that reflects almost all the undergraduate and graduate subjects taught at MIT.

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What's Up???

Mike Benz

September 16 - Final Space Shuttle Flight. IF all goes according to plan, this day will see the final flight of the Space Shuttle. The orbiter Discovery will depart on mission STS-133 and bring to a close the 30+ year era of space shuttles as the work horses of the United States space program. After this flight, the remaining shuttle orbiters will find their final resting places in museums across the country.

September 21 - Jupiter at Opposition. The Solar System's largest planet will be at its closest approach to Earth. This is the best time to view and photograph Jupiter and its moons. The giant planet will be a big and bright as it gets in the night sky. A medium-sized telescope should be able to show you some of the details in Jupiter's cloud bands.

September 22 - Uranus at Opposition. The blue-green planet will be at its closest approach to Earth. This is the best time to view Uranus, although it will only appear as a tiny blue-green dot in all but the most powerful telescopes.

September 23 - The Autumnal Equinox occurs in the northern hemisphere at 03:09 UT. There will be equal amounts of day and night. This is also the first day of fall.

September 23 - Full Moon

October 7 - New Moon

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Learning Continued...

- OCW is not an MIT education.
- OCW does not grant degrees or certificates.
- OCW does not provide access to MIT faculty.
- Materials may not reflect entire content of the course.

How do I register to use MIT OpenCourseWare?

There is no registration or enrollment process because OCW is not a credit-bearing or degree-granting initiative.

Can I get a certificate?

No. MIT OpenCourseWare is a publication of the course materials that support the dynamic classroom interactions of an MIT education; it is not a degree-granting or credit-bearing initiative. However, you should work through the materials at your own pace, and in whatever manner you desire.

How do I find what courses are available? How do I search your site?

A site overview is available for MIT OpenCourseWare. You can also browse courses by department or use the advanced search to locate a specific course or topic. High school students and educators should check out Highlights for High School.

What it takes to support this work

Each course we publish requires an investment of $10,000 to $15,000 to compile course materials from faculty, ensure proper licensing for open sharing, and format materials for global distribution. Courses with video content cost about twice as much, but your feedback about the significant value of these video materials helps to justify the cost.

Free Online Astronomy Course List

Introduction to Astronomy at MIT

http://ocw.mit.edu/courses/physics/8-282j-introduction-to-astronomy-spring-2006/

This introductory course quantitatively examines the

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Learning Continued...

elements of the solar system, galaxy and universe, including planets, stars, cosmic rays, magnetic fields, cosmic background radiation and the history of the universe. Assignments, exams, study materials and other related resources are provided; course textbooks may need to be purchased.

Hands-On Astronomy: Observing Stars and Planets at MIT

http://ocw.mit.edu/courses/earth-atmospheric-and-planetary-sciences/12-409-hands-on-astronomy-observing-stars-and-planets-spring-2002/index.htm

Students in this class examine celestial objects through visual observation using the naked eye, telescopes, electronic imaging and spectroscopy. They learn how to work with astronomical data and maintain a written log of their observations. Lecture notes are provided, but OCW learners may need to purchase the textbook and obtain instruments used in the course.

Exploring Black Holes: General Relativity & Astrophysics at MIT

http://ocw.mit.edu/courses/physics/8-224-exploring-black-holes-general-relativity-astrophysics-spring-2003/index.htm

The study of black holes is the primary focus of this course, particularly in relation to general relativity, astrophysics and cosmology. Spacetime, energy, cosmic models, particles and light are also investigated. Lectures can be accessed on video or by download, and course assignments, exams and projects are also provided.

Astrodynamics at MIT

http://ocw.mit.edu/courses/aeronautics-and-astronautics/16-346-astrodynamics-fall-2008/

The basics of astrodynamics with applications to space vehicle navigation in human space missions are the main topics in this graduate level course. Students also study Kepler, Lambert, mission planning and celestial mechanics, as well as space exploration programs. The course includes lecture notes, assignments and a video lecture.

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What's up continues...

October 16 - Astronomy Day Part 2. Astronomy day is a grass roots movement to share the joys of astronomy with the general public. Two days this year have been designated as Astronomy Day. On these days astronomy and stargazing clubs and other organizations around the world will plan special events. You can find out more about October's events by checking the Web sites for AstronomyDay.org and the Astronomical League.

October 20 - Comet Hartley 2 will make its closest approach to Earth, coming within 11.2 million miles. For a few days around October 20, the comet should be bright enough to view with the naked eye in the early morning sky. You will, however, need to be far away from the glow of city lights. Look to the east just before sunrise. In early November, NASA's Deep Impact spacecraft will observe comet Hartley 2 from a distance of about 600 miles.

October 21, 22 - Orionids Meteor Shower. The Orionids is an average shower producing about 20 meteors per hour at their peak. This shower usually peaks on the 21st, but it is highly irregular. A good show could be experienced on any morning from October 20 - 24, and some meteors may be seen any time from October 17 - 25. Best viewing will be to the east after midnight.

October 23 - Full Moon

Learning Continued...

The Solar System at MIT

http://ocw.mit.edu/courses/earth-atmospheric-and-planetary-sciences/12-400-the-solar-system-spring-2006/

Using current knowledge and recent findings, students learn the basic principles of the solar system, including planetary formation and orbits, meteorites, asteroids, comets and planetary atmospheres. OCW students have access to problem sets and handouts; however, textbooks may need to be purchased.

The Early Universe at MIT

http://ocw.mit.edu/courses/physics/8-286-the-early-universe-spring-2004/

As an introduction to modern cosmology, this course discusses the development of the big bang theory during the 20th century and the more recent impacts of particle theory. Topics include special relativity, Newtonian cosmology, non-Euclidean spaces, black body radiation and the magnetic monopole problem. Assignments, exams and quizzes with solutions are available to OCW learners.

Essential Radio Astronomy at the National Radio Astronomy Observatory

http://www.cv.nrao.edu/course/astr534/ERA.shtml

The National Radio Astronomy Observatory, a facility of the National Science Foundation, offers this graduate level or advanced undergraduate course on radio astronomy. The course consists of lectures, study materials and problem sets with solutions that can be downloaded, as well as a list of additional resources relevant to the course.

Frontiers and Controversies in Astrophysics at Yale University

http://oyc.yale.edu/astronomy/frontiers-and-controversies-in-astrophysics/

This course focuses on three growing areas of astronomy, which are extra-solar planets, black holes and dark energy. Students investigate current trends in astronomic research and exploration that are being used to increase knowledge and resolve uncertainties. Course lectures are available in print, video and audio formats, as well as class notes, problems sets and reading assignments.

Introduction to General Astronomy at UC Berkeley

http://webcast.berkeley.edu/course_details.php?seriesid=1906978237

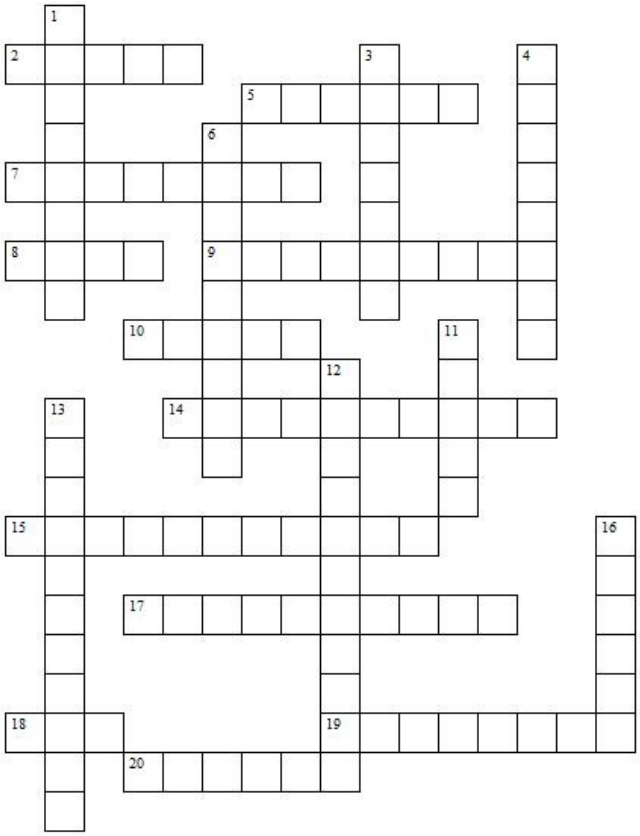
This webcast course, available as a series of video lectures, offers a comprehensive introduction to astronomy. Emphasis is placed on the structure and evolution of stars, galaxies and the universe, with additional topics on blackbody radiation, lunar phases, black holes, dark matter and quasars.

Comparing Stars at The Open University

http://openlearn.open.ac.uk/course/view.php?id=2796

The properties of stars, such as size, mass and luminosity, are examined using the Hertzsprung-Russell diagram. Stellar evolution, classification and interstellar materials are also discussed. The course is available as a series of lectures with questions and answers by The Open University, a distance learning higher education institution in the United Kingdom.

BAA Puzzle Corner



ACROSS

2 _____(meaning "barker" in Russian) was the first dog launched into Earth orbit (other dogs were launched earlier on sub-obital flights).

5 _____ motion is motion towards or away from the observer.

7 _____ is a Northern Hemisphere constellation that is the fifth largest in the sky.

8 A _____ is a luminous ring that is sometimes seen surrounding the sun or the moon.

9 _____ is a measure of brightness of celestial objects.

10 _____ is the closest of Jupiter's 16 moons .

14 John Hadley (1682-1744) was an English mathematician and inventor who built the first _____ telescope and invented an improved quadrant (known as Hadley's quadrant).

15 The _____ are a meteor shower that occur eacl year from Dec. 8-Jan. 7, with a maximum on Jan. 3

17 A _____ (Mpc) is a unit of distance that is equa to one million parsecs, 3.26 x 106 light-years or 3.085678 x1019 kilometers.

18 _____(which means "peace" in Russian) was a Russian space station, the first semi-permanent human habitat in orbit around the Earth.

19 The _____ are a meteor shower that occur each year from Oct. 15-29, with a maximum on Oct. 21-22.

20 _____ is one of the larger of the 18 moons of Uranus.

DOWN

1 A _____ is a highly magnetic star.

3 _____ is Jupiter's tenth moon.

4 _____ Law is a linear relationship between the distance to a galaxy (R) and the velocity at which that galaxy is moving from us (v) because to the expansion of the universe.

6 In each constellation, every star is given a _____ number accordng to the system devided by John Flamsteed in early eighteenth century.

11 _____, also known as "The Hunter," is a constellation.

12 _____ is a celestial coordinate that is used to measure the degrees of latitude above or below the celestial equator on the celestial sphere.

13 _____ is when a smaller astronomical body passes behind a larger astronomical body (wholly obscuring its view).

16 University of Chicago's _____ Observatory is an astronomical observatory located at Williams Bay, Wisconsin, USA

Harvard University International Interdisciplinary Conference: BAA Member Presents Talk on Hubble Telescope

Dr. August Cenkner Jr

From May 31 to June 3, 2010, an international interdisciplinary conference was held at Harvard University in Cambridge, Mass.

The main objective of the conference is best described in their own words: "There is an increasing realization that each academic discipline cannot thrive on its own without capitalizing on the rapidly developing research and findings across disciplines." This is exactly what I did with my Hubble Telescope research.

In my slide show talk, I detailed how I transferred experimental and theoretical high speed gas flow research, from the Aerospace industry to the astronomical area, to develop insight to help interpret gas dynamic data acquired from the Hubble Space Telescope. This lead to an identification of dark energy and a realization that dark energy is responsible for the occurrence of other currently unexplained astronomical phenomenal – not just the acceleration of galaxies.

The details of the talk are given in:

Cenkner A. A. Jr., Hubble Space Telescope Identifies Dark Energy, 8/3/2009, ISBN: 978-1-4490-1134-5 (Sc), Barnes & Nobel, Amazon.com.

BAA ANNALS

Rowland A. Rupp

5 YEARS AGO - Our notices of forthcoming meetings were notably terse five years ago: "September - 'What I Did On My Summer Vacation' - Various BAA members; October - 'High-resolution Planetary Imaging' - Alan Friedman." Featured in this Spectrum were details by Bill Aquino of the robotic telescope project he headed, complete with photographs of the construction of the observatory intended to house the scope. We were gearing up for public nights at BMO and Remmick Observatory in Lockport. A brief article by Rowland Rupp dealt with refurbishing the Clark 26 1/4 inch refractor at the University of Virginia campus in Charlottesville.

10 YEARS AGO - I searched the September/October Spectrum of ten years ago, but failed to find what topics were being presented at our coming monthly meetings. It seems to me that announcing future meetings is, perhaps, the most important function of any newsletter. Is it that we don't know what is scheduled, or is it too difficult to tell about it? There were some neat articles though. Joe Orzechowski continued his report on "Observing Our Nearest Neighbors." Bill Smith compiled an entertaining list of about twenty-five quotes pertaining to astronomy. Some were pretty sardonic. He also contributed a bunch of miscellaneous "Astronomical Facts." Carl Klingenschmitt and Rowland Rupp reported on an article written by University of Illinois eminent professor George Swenson in Scientific American that supported their pessimistic expectations expressed in recent Spectrums about contacting extraterrestrials via radio signals. (We beat him to it!) Mark Swiderski wrote about his July trip to Mount Wilson Observatory where the famous 100 inch Hooker telescope is located.

15 YEARS AGO - BAA President Terry Farrell presented "An Evening With the Stars" at our September meeting. In October, Rodney Pratt spoke on NASA's ECHO I communication satellite, a project he headed up in the early days of the space program. Terry expressed disappointment with the response to the survey he created. Only 15 out of a total membership of 105 returned the filled out form.. That's the perennial problem with surveys. As an aside, we currently have about

150 members. Bob Hughes, Steve Kramer and Gene Witkowski were inducted into the College of Fellows. A couple of Gene's excellent lunar photos taken with his video camera were included in this Spectrum. Bill Smith had just taken over as editor from Darwin Christy, who served in that capacity for a record sixteen years.

Carl Milazzo noted that "The Best Season for Observing" was winter when skies are dry, transparent and bug-free. Too often, he commented, observers avoid the cold, letting their telescopes collect "dust instead of photons." The BAA had a permit to observe at Beaver Island State Park, according to Joe Orzechowski, who reported on his successful observing session there. Gunther C. Wang wrote a tongue-in-cheek spoof in which he proposed that miniature black holes are responsible for the disappearance of socks in washing machines

25 YEARS AGO - We heard from Geneseo's Dr. David Meisel at our opening meeting for 1985. His timely topic was Halley's Comet. We were uncertain about the topic for October. Observatory Director Carl Milazzo reported that public turnout for Sunday public nights was around 35 and more members were needed at BMO to help out. Six new members were inducted into the College of Fellows. They were: Ken Biggie, Larry Carlino, Darwin Christy, Ken Kimble, Jack Mack and Rowland Rupp. Ed Lindberg wrote about the cause of dinosaur extinction, briefly commenting on several hypotheses currently being considered. The new idea of a meteor impact, now generally accepted, was mentioned, but was not given special emphasis. Observation reports were made by Michael Idem and Darwin Christy.

35 YEARS AGO - The topic for Ray Manners's September 1975 talk was to be announced at the meeting. Ray worked at Bell Aerospace and had spoken to us before. In October, Dr. Lyle Borst, Professor of Physics and Astronomy at UB, lectured on "Problems with the Expanding Universe." (I wonder what he had to say.) Two astronomical events were noted. Nova Cygni 1975 attained 2nd magnitude in late August. It was thought to be a possible supernova in our galaxy, according to The Spectrum, but was later demoted from that prestigious designation. Comet Kobayashi-Berger-Milon reached perihelion September 5th. Buffalo State's Dr. Fred West sent in an article, "The Asteroids: Sizes; Masses, and Composition."

Five Things About Kepler

Here are some quick facts about the Kepler mission, scheduled to launch March 6, 2009:

-- Kepler is the world's first mission with the ability to find true Earth analogs -- planets that orbit stars like our sun in the "habitable zone." The habitable zone is the region around a star where the temperature is just right for water -- an essential ingredient for life as we know it -- to pool on a planet's surface.

-- By the end of Kepler's three-and-one-half-year mission, it will give us a good idea of how common or rare other Earths are in our Milky Way galaxy. This will be an important step in answering the age-old question: Are we alone?

-- Kepler detects planets by looking for periodic dips in the brightness of stars. Some planets pass in front of their stars as seen from our point of view on Earth; when they do, they cause their stars to dim slightly, an event Kepler can see.

-- Kepler has the largest camera ever launched into space, a 95-megapixel array of charge-coupled devices, or CCDs, like those in everyday digital cameras.

-- Kepler's telescope is so powerful that, from its view up in space, it could detect one person in a small town turning off a porch light at night.

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Location/Time of Meetings:
BAA meetings are held on the 2nd Friday of the month from September to June starting at 7:30 P.M. Due to construction, our normal meeting room in the Science Building at Buffalo State College will not be available during the fall semester. Beginning September 2009, our meetings will be held in Classroom Building C122 located just to the north of the Science Building. Follow directions (#35) on the Buffalo State College map.