



## AST 102 – Stellar Astronomy

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### Science Department

**Semester: Spring 2009**

**Catalog Course Description:** This course is a descriptive survey of the universe with emphasis on basic physical concepts and galactic and extra-galactic objects. Related topics of current interest are included in the course.

**Prerequisite(s):** None

**Credit Hours:** 4

**Departmental Web Site:** <http://www.midlandstech.edu/science>

**Course Web Site:** <http://marioklaric.com/ast/> User Name and Password provided in class

**Orientation Page:** <http://marioklaric.com/hybrid.html>

**Instructor:** Dr. Mario Klarić

**Office:** Beltline Campus, Lindau Engineering Technology (LET) 412D

**Telephone:** 803-738-7713

**Departmental Assistant:** Jan Oliver ([oliverj@midlandstech.edu](mailto:oliverj@midlandstech.edu))

**Department Chair:** Dr. GERALYNE LOPEZ-DE-VICTORIA ([lopezg@midlandstech.edu](mailto:lopezg@midlandstech.edu))

**FAX:** 803-790-7530

**E-mail Address:** [klaricm@midlandstech.edu](mailto:klaricm@midlandstech.edu) (Subject of your message must include AST102B51.)

**Campus Mailbox:** LET 421

**Class Schedule:** LET 402, MW 18:00-19:25, Lab: W 19:25-22:25

**Office Hours:** TR 10:00-11:00, TWR 17:00-18:00

**Textbook(s):** Lecture: *Foundations of Astronomy*, Michael A. Seeds, 10<sup>th</sup> Ed.  
Lab: *AST 102 Bundle*, LSW, 2008

**Additional Materials:** Scientific calculator, protractor, metric ruler, a personal e-mail account, and computer access.

**General Education Core Competency Statement:** This course is designed to meet the college's general education core competency for Scientific Reasoning.

**Course Objectives:** Upon completion of this course the student will be able to have a working knowledge of basic principles of stellar astronomy.

### **Course Outcomes and Competencies:**

**Intended Course Outcome:** Students will understand and be able to use scientific reasoning and principles through the study of basic stellar astronomy. To promote an interest in astronomy and physics. To enable the student to more thoroughly understand the concepts of astronomy in general. To enable the student to apply knowledge to a specific problem in a systematic manner.

**Course Competency (Performance Measure):** Students will demonstrate their knowledge of basic stellar astronomy by:

1. describing a characteristic of astronomical instruments
2. describing a stellar property
3. describing an aspect of stellar formation and evolution
4. describing an aspect of galaxies and the Universe as a whole

Topics covered in the course include:

T Tauri stars	absorption spectra	giant stars	emission spectra
Hubble law	triple alpha process	light spectrum	white dwarfs
Zeeman effect	black holes	brown dwarfs	atomic structure
binary stars	spectral classes	cosmic rays	degenerate matter
Doppler effect	star clusters	parsec	Schwarzschild radius
RR Lyrae variable	angular size	galaxies	sunspots
protostars	planetary nebulae	Maunder minimum	butterfly diagram
H II regions	solar wind	proton-proton chain	Olber's paradox
helioseismology	Bok globules	luminosity	novae
supernovae	Roche limit	prominences	Milky Way
primordial radiation	Lagrangian point	flares	look back time
stellar parallax	big bang theory	pulsar	proper motion
visual magnitude	CNO cycle	gravitational wave	Chandrasekhar limit
dark matter	supergiant stars	grand unified theories	Magellanic Clouds
neutron stars	nebulae	cosmology	variable stars
spectroscopic parallax	fusion	mass function	gravitational lens
fission	21-cm radiation	black dwarfs	red dwarfs

**Measurement Instrument:** Students will complete a set embedded examination questions prepared by faculty based on the course learning objectives.

**Course Attendance:** Students will be allowed to miss twice the number of times a lecture section meets per week. The lecture meets 2 times per week; therefore, 4 absences are allowed.

The student missing more than 10 minutes of class by either arriving late or leaving early will be counted as absent. Missing fewer than 10 minutes is a tardy. Three tardies count as one absence. One tardy is 1/3 of an absence.

Students adding courses after classes begin are responsible for work covered from the first day of class. All classes missed count as absences.

Students are responsible for all material and announcements presented, whether present or absent.

**Withdrawal:** Students may withdraw from a course anytime before the last week of classes. See the current semester college calendar, available on the MTC Web site, for official dates. Students who wish to withdraw from a course must submit a withdrawal form to records. The date of withdrawal may affect a number of things, including financial aid/tuition reimbursement, tuition refunds, and course grades. The effective date of withdrawal depends upon the date the withdrawal form is submitted to records. It is the student's responsibility to be aware of relevant dates, to make an informed decision, and if necessary, to submit withdrawal forms in a timely fashion.

For questions regarding the effect of withdrawal on financial aid or tuition reimbursement students should contact Student Financial Services. Deadlines for tuition refunds may be found on the current semester college calendar, available on the MTC Web site, or by calling the cashier's office.

Students who withdraw before midterm will receive a grade of W. Students who withdraw after midterm and have an overall class average of 60% or greater will receive a grade of W. Students who withdraw after midterm and have an overall class average below 60% will receive a grade of WF, which is calculated as an F.

Grades of W or WF are also assigned when a student exceeds the maximum number of absences allowed in the course. These grades are entered on the final grade roster along with the last date of attendance (LDA). Students should understand that the LDA does not constitute an effective date of withdrawal and should not consider a decision to stop attending class to be equivalent to withdrawal.

**Course Grading Scale:** The final grade for this course will be determined as follows:

Lecture: 75% for four tests and final exam

Lab: 25%

A (90-100)

B (80-89)

C (70-79)

D (60-69) F (<60)

Total of lecture exams divided by the number of exams equals lecture average. Lecture average times 0.75 equals lecture points.

Total of lab reports divided by the number of reports equals lab average. Lab average times 0.25 equals lab points.

Lecture points plus lab points equals course average.

A grade of zero will be recorded for any missed announced test or lab. The cumulative final exam will count twice in place of the missed test. There will be one make-up lab.

**Please Note:** Should change become necessary, the instructor reserves the right to adjust the requirements, pace, or scheduling of this course. Any change will be announced in class before it becomes effective.

The Science Department Chair, Coordinators, and faculty are here to help you. If you are having any problems in your classes, please contact the person who can help you. If we don't know you are having problems, we can't help you. Gerry Lopez is Department Chair and can be reached at 822-3443; Greg Mancini is Beltline Science Coordinator and can be reached at 738-7660. Contact Jan Oliver at 822-3548 for information regarding the Airport Science Coordinator.

### **Laboratory Policies:**

1. The hints for all labs are available at <http://www.marioklaric.com/ast/>.
2. More than two labs not completed/submitted will result in a grade of W if the student is passing the course or WF if the student is failing after midterm. Before midterm you will get W.
3. There will be no lab quizzes. Lab reports are due on dates listed at <http://www.marioklaric.com/ast/>. **No late work will be accepted for any reason.**
4. You will be able to make up one missed lab. The make-up lab will be known toward the end of the term.
5. Labs will be discussed to some extent during lectures. You will have plenty of time to perform all the work, to have it checked before due date, and to submit it on time.

### **Tests and Final Exam:**

Class tests may be multiple choice, identification, definitions, short answers, essay and/or a mixture of these formats. I will not be any more precise at this time, because the emphasis will be on learning the concepts and nature of astronomy - not on the nature of testing.

There will be 4 class tests and a final exam. Class tests and the final exam are all take-home tests. Actually, you will access the tests from the class Web site. It will be a form-based test, which you will enter the answers on and then send it by clicking the "submit" button. I will receive your work, grade it, and return your graded work to your email account soon thereafter. You will be able to use your books and notes, but may not - under any circumstances - give aid to or receive aid from anyone other than your professor during the test. Such activity is cheating and the penalties are extremely high.

Each class test and the final exam will be given over a specific period spanning 24 hours of which you will only need to set aside a period of no more than 2 hours to take the test. The specific dates and times are listed on the Test page of the class Web site. Look now at these dates and make sure you can schedule yourself time to take the tests. Test dates and times are fixed and will not be moved or altered unless there is some natural disaster or similar event. Please do not plan on asking later to change dates or times because of a personal conflict - because these dates are fixed, and there are no make-up tests.

## AST 102 Weekly Class Outline

Week	Class Topics and Tests
1	Ch. 6 Light and Telescopes
2	Ch. 7 Atoms and Starlight
3	Ch. 8 The Sun
4	Ch. 9 The Family of Stars   <b>Test 1 (Ch. 6, 7, 8)</b>
5	Ch. 10 The Interstellar Medium
6	Ch. 11 The Formation of Stars
7	Ch. 12 Stellar Evolution   <b>Test 2 (Ch. 9, 10, 11)</b>
8	Ch. 12 Stellar Evolution
9	Ch. 13 The Deaths of Stars
10	Ch. 14 Neutron Stars and Black Holes
11	Ch. 15 The Milky Way Galaxy   <b>Test 3 (Ch. 12, 13, 14)</b>
12	Ch. 16 Galaxies
13	Ch. 18 Cosmology in the 21st Century
14	Ch. 18 Cosmology in the 21st Century
15	Review   <b>Test 4 (Ch. 15, 16, 18)</b>
16	Final Exam (Cumulative)

Test dates are on the course Web site.

## AST 102 Weekly Lab Outline

Set	Laboratory
1	<ol style="list-style-type: none"> <li>1. Light and Other Forms of Electromagnetic Radiation (No. 22)</li> <li>2. Our Star - The Sun (No. 26)</li> <li>3. Stellar Parallax - Measuring the Distance to Stars (No. 27)</li> <li>4. The Moving Stars (No. 28)</li> </ol>
2	<ol style="list-style-type: none"> <li>1. Brightness of Stars and Stellar Magnitudes (No. 29)</li> <li>2. Stellar Spectra and Classification (No. 30)</li> <li>3. H-R Diagram &amp; Stellar Life Cycles (No. 31)</li> <li>4. Variable Stars - Unique Stars (No. 32)</li> </ol>
3	<ol style="list-style-type: none"> <li>1. The Material Between Stars (No. 33)</li> <li>2. The Galaxies (No. 34)</li> <li>3. Cosmology (No. 35)</li> </ol>

Lab due dates are on the course Web site.

## College Policies

**Students are expected to read the student handbook and abide by its policies. Copies of the handbook may be obtained at various locations on campus and is located on the web: <http://www.midlandstech.edu/planner/>**

**Academic Dishonesty:** The Student Code addresses what constitutes academic dishonesty. All forms of dishonesty including, but not limited to, cheating on tests, plagiarism, collusion and falsification, will call for discipline.

**CHEATING ON TESTS** includes:

- Copying from another student's paper.
- Using materials during a test not authorized by the person giving the test.
- Collaborating with any other person during a test without permission.
- Knowingly obtaining, using, buying, selling, transporting, or soliciting in whole or part the contents of any un-administered test.
- Bribing any other person to obtain information about tests.
- Substituting for another student, or permitting another student to substitute for oneself.

**PLAGIARISM** is the appropriation of any other person's work and unacknowledged incorporation of that work in one's own work offered for credit.

**Campus Emergency Protocol:** Students and employees are asked to report safety concerns or suspicious activities to Campus Security at 7199 (on campus) or 738-7199 (cell phone or off campus). In the event of an emergency, employees and/or students should immediately call Campus Security or local 911. If an emergency occurs, the college will use a variety of methods to communicate additional information and instructions including the MTC Information Centers, campus loud speakers, MTC Alerts! ([http://www.midlandstech.edu/Phone\\_Alert.htm](http://www.midlandstech.edu/Phone_Alert.htm)), voice mail, email, college Intranet, and the MTC website homepage.

**Inclement Weather Policy:** In the event weather conditions or other emergencies cause the closing or a delayed start of Midlands Technical College, announcements will be made over local radio and TV stations, on the MTC Web site, and on the college's information line (803-738-8234). Notices will be sent to students via Campus Cruiser Mail when applicable. Separate announcements may be made for day and evening classes as weather conditions change during the day.

If the college closing or reopening means that there is at least 30 minutes of a class remaining, plan to attend that class. For example, if the college opens at 10:00 a.m. in TTH, classes that normally meet at 8:00 a.m. will not meet, but classes beginning at 9:30 a.m. will meet. If the college closes at 8:00 p.m., 6:00 p.m. classes will meet for their regular time, but 7:35 p.m. classes will not meet since there are fewer than 30 minutes remaining in class.

**Student E-Mail Accounts:** All MTC students are assigned a college e-mail account upon admission to the college. This account is called "Campus Cruiser Mail." Campus Cruiser Mail is the primary mode by which the college communicates with students. Students are responsible for checking their college e-mail on a regular basis for important information and announcements about registration, financial aid, cancelled classes, emergency announcements and other notices. Students can use their college e-mail accounts to communicate with faculty, staff, fellow students, and others, in support of their educational pursuits. In addition to e-mail, students will also have access to maintaining personal calendars and "tasks lists" through their Campus Cruiser e-mail account.

**Student Evaluation of Instruction:** Students have the opportunity to evaluate this course. The confidential evaluation process is conducted through MTC Online using the individual student's username and password. Announcements will be made during the term concerning how and when to complete the online evaluation. Students are encouraged to participate in this process.

**Students Requiring Special Accommodations:** If special accommodations are needed for a student with a disability, the student should go to Counseling Services on Beltline or Airport Campus for assistance. Documentation regarding a specific disability is required in order for special arrangements to be made. Confidentiality of information received will be maintained.

## SCIENCE DEPARTMENT CODE OF CONDUCT

Student rights and responsibilities are outlined in the Student Handbook. We are extremely proud of the quality of students in the Science Department; however, there have been occasions where disciplinary action is necessary to prevent disruptive and dishonest behavior. The following items are specific violations and consequences supported by the Science Department. Your instructor will circulate a form for your signature stating that you understand the Science Department Course Syllabus, which includes this document.

1. Any student who exhibits behavior that is disruptive to the learning process such as talking, discourtesy to faculty or fellow students to include obscene language or gestures, or uncooperative actions will be asked to leave the classroom. The student will be counted absent for this class. Depending upon the nature of the offense or if it occurs during an exam the instructor may require that the student see the Science Coordinator, Chair of the Science Department, or the Director of Campus Life before returning to class. Campus Security will be called for any threatening or violent behavior.
2. Beepers, cell phones, personal stereos, and similar devices are not permitted in class. Permission must be obtained from the Science Coordinator or Instructor for students who are emergency personnel or where there are extenuating circumstances. Campus Security can locate a student and will interrupt a class if there is a situation that needs immediate attention
3. Any student proven to have engaged in academic dishonesty will be given a grade of zero on the exam or assignment. This includes, but is not limited to, giving or receiving information during an exam, use of unauthorized materials during an exam or assignment, plagiarism, or changing answers after a grade has been assigned. An instructor must have reasonable proof that dishonesty has occurred. Until an incident is verified, the student will be assigned a grade of "I" for the work. Witnesses of cheating should report this immediately to the instructor. The grade will be discussed confidentially with the student. If the student denies that academic dishonesty occurred, the Chair of the Science Department or Science Coordinator will meet with the instructor and student. The instructor will be supported if departmental guidelines for handling cheating incidences were followed. However, the student is referred to the Student Handbook for the policy on filing a grievance. In any incident involving academic dishonesty, a report will be filed with the Director of Campus Life.
4. Students with complaints about instructors should follow the appropriate chain of command as outlined in the "Science Department Conflict Resolution" form. A form can be obtained from the Science Department. Signatures must be obtained at each level before the complaint will be validated. There may be some circumstances where the first contact is with the Science Coordinator who will discuss the problem with the instructor. All efforts possible will be made to resolve conflicts internally. However students should remember that matters can also be handled through the Academic Appeal/Grievance process detailed in the Student Handbook.