Course: M404(G) Biology of Archaea  Star  Number 71761

Meets: 10:00-11:50, MF   Waggoner 221

Description: An introduction to the archaea, how they are studied, what we understand about them, what we do not yet understand, how archaea are similar to and different from other organisms, use of genomic sequence information in understanding organisms; implications for biotechnology.

Prerequisites: Biol 330, Micro 200 or equivalent or consent of instructor.

Instructor: Thomas H. Alton, PhD.  Associate Professor
Waggoner Hall 252   telephone: 298-1145 fax: 298-2270
Office hours: W 10:30 to 11:50; 2:15 to 3:15; Th 10:30 to 12:00; 2:00 to 2:50;
email: th-alton@wiu.edu;  web page: http://www.wiu.edu/biology/personnel/alton-t.shtml

Textbooks and other required materials:
Access to internet; web searches and software (free) downloads will also be required.
Course material will be posted on WesternOnline.wiu.edu/ from on campus; from off campus https://www.WesternOnline.wiu.edu/ . You do need an ecom account.

Course Objectives:
1. To introduce the archaea, how they relate to, are similar to and differ from other organisms
2. To explore aspects of cell structure, metabolism, and genetic functions unique to archaea
3. To introduce methods used to investigate and exploit the archaea
4. To introduce some of the biotechnological applications of archaea

Course Requirements:
In order to pass the course you must complete all of the following:
1. Pass the exams
2. Participate in class discussions
3. Complete the Laboratory activities and write satisfactory reports of the laboratory activities, in the format appropriate to the activity as described in class at the time.
4. If a graduate student, submit a paper based on original literature that describes a newly discovered Archaeon or newly described role of previously known in nature or biotechnology (broadly defined). Undergraduates may opt to submit such a paper and thus be graded according to the graduate student grading scheme, except that the +/- system must be used.

Mandated Disability Statement: “In accordance with University policy and the Americans with Disabilities Act (ADA), academic accommodations may be made for any student
who notifies the instructor of the need for an accommodation. It is imperative that the student take the initiative to bring such needs to the instructor's attention, as he/she is not legally permitted to inquire about such particular needs of students. Students who may require special assistance in emergency evacuations (i.e. fire, tornado, etc) should contact the instructor as to the most appropriate procedures to follow in such an emergency. Contact Disability Support Services at 298-2512 for additional services.”

Without the legaleze what I want it to mean: “It is the policy and practice of our university to create inclusive learning environments. If there are aspects of the instruction or design of this course that result in barriers to your inclusion or to accurate assessment of achievement please notify the instructor as soon as possible. Students are also welcome to contact the disability service office.” (with great thanks to Prof. R. Smith of RPTA)

Grade Determination: If you complete the course requirements, your grade will be determined based on your performance on the lecture exams, required papers and lab and discussions reports. Exams scores will be curved with the curve announced after each exam such that the top grade will be 100 pts or average of top 10% = 95 pts whichever is more favorable for all students. Required papers and lab and discussions reports will be graded on the University Standard scale. By University regulation, graduates students must complete additional requirements to receive G credit. Final grades will be individually computed according to whichever method gives the higher grade for the individual student:

For Undergraduate Students:

<table>
<thead>
<tr>
<th>Item</th>
<th>points</th>
<th>or</th>
<th>Grade Scaled to</th>
<th>Final Grade</th>
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</thead>
<tbody>
<tr>
<td>hour exams 100 each</td>
<td>200</td>
<td>0</td>
<td>≥90.5</td>
<td>≥452 A</td>
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<tr>
<td>Final exam</td>
<td>200</td>
<td>400</td>
<td>89.5-90.4</td>
<td>447-451 A–</td>
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<tr>
<td>Lab reports, problem sets</td>
<td>100</td>
<td>100</td>
<td>87.0-89.5</td>
<td>435-446 B+</td>
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<tr>
<td>Total</td>
<td>500</td>
<td>500</td>
<td>80.5-86.9</td>
<td>402-434 B</td>
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<td>79.5-80.4</td>
<td>397-401 B–</td>
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<td>77.0-79.4</td>
<td>385-396 C+</td>
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<td>70.5-76.9</td>
<td>353-384 C</td>
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<td>69.5-70.4</td>
<td>347-352 C–</td>
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<td>67.0-69.4</td>
<td>335-346 D+</td>
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<td>61.5-66.9</td>
<td>375-334 D</td>
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<td>59.5-61.4</td>
<td>357-374 D–</td>
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<td>≤59.4</td>
<td>≤356 F</td>
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For Graduate Students:

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<th>Item</th>
<th>points</th>
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<th>Grade Scaled to</th>
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<tr>
<td>Hour exams 100 each</td>
<td>200</td>
<td>0</td>
<td>≥89.5</td>
<td>≥626 A</td>
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<tr>
<td>Final exam</td>
<td>200</td>
<td>400</td>
<td>79.5-89.4</td>
<td>556-625 B</td>
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<tr>
<td>Lab reports, problem sets</td>
<td>100</td>
<td>100</td>
<td>69.5-79.4</td>
<td>487-555 C</td>
</tr>
<tr>
<td>Required Paper:</td>
<td>200</td>
<td>200</td>
<td>59.5-69.4</td>
<td>416-486 D</td>
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<tr>
<td>Total</td>
<td>700</td>
<td>700</td>
<td>≤59.4</td>
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Undergraduate students may choose to submit a paper with the same requirements as required of the graduate students. In such case the total points for the undergraduate will be 700 and the grade scale adjusted accordingly. For more details please see Dr. Alton.

Exams: Exams will contain any of essay, problem solving, experimental design, hypothesis development multiple choice, matching, fill-in-the blank, drawing structures questions.

**INSTRUCTOR HAS THE LAST WORD:** While other instructors teach similar courses, and there are students who have taken this course in the past or other courses with this instructor, and academic advisors talk to these students and to you, it is important to recognize that with respect to course policies, detailed content, logistics, grading policies, the instructor of this course has the Last Word. If there are any questions or disagreements with expectations or advice from students, other faculty, advisors or others, please see the instructor for clarification.

**Student Help Resources**

1. The course instructor during office hours or other times by arrangement or drop in
2. The Writing Center: “The mission of the University Writing Center, which serves the Macomb and Quad Cities campuses, is to offer students at any academic level collaborative, one-on-one consultation on writing projects from any discipline at any point in the writing process.”
3. The University Counseling Center “The University Counseling Center (UCC) provides free personal, academic, and career counseling services to currently enrolled Western Illinois University undergraduate and graduate students.” In Olson Hall until late Nov.
4. [http://counseling.uchicago.edu/related/virtualpamphlets/study_skills.shtml](http://counseling.uchicago.edu/related/virtualpamphlets/study_skills.shtml)

**Department Statement on Plagiarism**

DEPARTMENT OF BIOLOGICAL SCIENCES
Western Illinois University

Definition of Plagiarism

The faculty of the Department of Biological Sciences ascribes to a definition of plagiarism as expressed by V. E. McMillan in Writing Papers in the Biological Sciences (Bedford/St.Martin's Press, New York, pg 16)

“Plagiarism is the theft of someone else's words, work, or ideas. It includes such acts as (1) turning in a friend's paper and saying it is yours; (2) using another person's data or ideas without acknowledgement; (3) copying an author's exact words and putting them in your paper without quotation marks; and (4) using wording that is very similar to that of the original source but passing it off as entirely your own even while acknowledging the source.”

“This includes information in textbooks or laboratory manuals, honors and masters theses, all writing assignments, and images. The faculty of the Department attempt to monitor student writing assignments (essay exams, papers, laboratory reports, and other writing assignments or exercises) for incidence of plagiarism. If plagiarism is found, the faculty will discuss
the situation with the student and indicate to the student the penalty for this academic dishonesty. Potential penalties include those cited in the academic dishonesty section of the WIU web page, http://www.wiu.edu/policies/ugdishst.shtm/”

**Student Responsibilities:**
1. Understand the Syllabus; Know the course requirements, due dates, exam dates and grading procedures.
2. Immediately inform Dr. Alton if he is “talking over your head”
3. Obtain all materials for the course
4. Carry out assigned readings and other preparations for lecture and lab.
5. Attend and participate in all required laboratory activities except for excused absences.
6. Attend lectures and seek further explanation if needed.
7. Complete and submit all assignments by the due dates.
8. Have access to University computer network, the course WesternOnline site.
9. Inform Dr. Alton of all absences known in advance.
10. Make known to Dr. Alton needs for further assistance.
11. Bring to Dr. Alton’s attention any difficulties or concerns you have with the course.
12. Keep track of your grades; ask Dr. Alton if unsure
13. Be familiar with the information (including required forms, definitions, and time lines) contained in the following university web sites. Each student should access these web sites and carefully read the information they contain, your instructors will hold you responsible for knowing this information. If you have questions about any of the information contained in the web sites, ask your instructor:
   
   **Web address for student rights and responsibilities (http://www.wiu.edu/provost/students.php)**
   **Web address for Academic Integrity Policy (http://www.wiu.edu/policies/acintegrity.php)**

**Attendance:** Strongly recommended since you be held responsible for lecture material. By Departmental policy, more than 2 absences from labs results in grade of F.

**Required Mandated Put it in the syllabus or Lose Accreditation Teacher Ed Statement:**
“STATE ACCREDITATION POLICY INFORMATION:
“In accordance with Illinois State Board of Education certification rules, all candidates seeking teacher certification are required by Western Illinois University to obtain a grade of “C” or better in all directed general education course, all core courses, and all courses in the option. Note: A “C-” is below a “C.” Please note: any secondary science teacher certification student wanting to see how this course is aligned with the State and National Standards should see their advisor and/or examine the Secondary Science Teacher Certification WesternOnline Advising site."

**Recommendation Letters:** In order to prevent recurrence of past abuses, recommendation letters will gladly be sent only after completion of the course unless you have had this instructor in another course. A meaningful recommendation letter requires understanding of one’s
performance in all aspects of the course, and that is possible only after all requirements of the course are completed and evaluated.

**Important Dates:**
- Aug. 20  First day of classes
- Sept. 3  Labor Day No Classes
- Oct. 8,  First Exam Due
- Oct. 12 Fall Break No Class
- Oct. 16  Early Warning grades emailed to students
- Nov 19-23 Thanksgiving Break No classes
- Nov. 30 Second Exam Due
- Dec. 10 10:00 AM Final Exam
- Dec. 18 Grades emailed to students

**Course Topics: where appropriate from perpsective of genome sequence information**
- Introduction to the Archaea
- Where Archaea are found and how they are found
- Sequence alignment, phylogenetic tree construction; Archaeal Phylogenies
- Membrane Lipids
- Archaeal Cell Walls
- Methanogens
- Methanogenesis
- Nitrogen Fixation
- ANME
- Halophiles
- Euryarchaeota heterotrophic thermophiles
- Nanoarchaea
- Crenarchaea
- Sulfur metabolism
- Thaumarchaea
- Ammonia Oxidation
- Stress responses
- Central metabolism
- DNA topology and topoisomerases
- Archaeal chromatin and DNA binding proteins
- DNA replication
- DNA repair and mutagenesis
- DNA recombination
- Archaeal viruses
- Genetic Exchange
- Transcription
- RNA processing
- Translation
- inteins
- CRISPR