The University of Wisconsin Milwaukee
Microbial Diversity and Physiology BioSci-540

Course instructor: Dr. Gyaneshwar Prasad                  Office: Lap Hall 440
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Office Hr: Thursday 1.00-2.00PM

Materials from recently published reviews and research papers will be used.

Course description: To provide students with broad knowledge about microbial physiology and metabolism. In-depth knowledge of microbial metabolic function is essential in order to give biochemical, physiological and ecological meaning to the ever-increasing genomic information.


Syllabus:

**Microbial Diversity:** The concept of Microbial Species. Molecular view of microbial diversity and evolutionary relationships.

**Membrane transport:** nutrient uptake and protein excretion

**Biosynthesis and microbial growth** – Bacterial growth and cell division. Biosynthesis cell surface structures, assembly of cell surface structures.

**Exam I (50 points)**

**Carbon metabolism** – Pathways and regulation of sugar metabolism; TCA Cycle, electron transport and oxidative phosphorylation; anaerobic respiration; photosynthesis, Utilization of polymers (starch, cellulose).

**Nitrogen Metabolism**- Assimilation of inorganic nitrogen (Nitrogen fixation (free living and symbiotic), Nitrate reduction, ammonia assimilation),

**Phosphorus Metabolism**

**Micronutrient assimilation** (Sulfur, Fe and their metabolic and genetic regulation).

**Responses to environmental stress** – Stringent response, Adaptation to stationary phase, Oxidative stress, heat and cold shock, osmolarity and salinity, Biofilm formation- quorum sensing, chemotaxis, adaptive mutations.

**Exam II (50 points)**

**Bacterial development:** Spore formation, Heterocyst formation

**Bio-energy:** Hydrogen production; electricity generation.

**Final Exam- (Cumulative) MAY 17th 10.00-12.00AM**
**Desire 2 Learn.** This course will have a D2L website. Course syllabus, outlines of lectures, reference materials will be posted.

**Examination Policy.** There will be two 1 hr exams and one 2 hr final examination. Exam will be a combination of objective and short answer questions. Exam questions will come from the lecture material, and reference articles. Make-up exams will be oral or written, at the discretion of the instructor. In order to qualify for a make-up exam, you must call or email Dr. Prasad (229-5298, prasadg@uwm.edu). Request for make-up exams should be supported by documentation if possible.

**Grading Policy.** Grades will be calculated on the basis of 3 exams for undergraduate students. The final exam will be cumulative and weighted higher than first two exams. In addition, the graduate students will write a brief (5 page max) summary on a topic related to Microbial Diversity and Physiology and present it in the class.

Grading

A (94-100%); A- (90-93%); B+ (87-89%); B (83-86%); B- (80-82%); C+ (77-79%); C (73-76%); C- (70-72%), D+ (67-69%), D (63-66%), F (0-59%).

**Accommodations for students with disabilities.** If you are a student with disability and require special accommodations contact the instructor early in the semester and also contact the Student Accessibility Center (Mitchell Hall room 112; 229-6287; http://www.sac.uwm.edu).

**Biological Sciences department web homepage:** http://www.uwm.edu/Dept/Biology.

Official university policies can be found at the Secretary of the University website: http://www4.uwm.edu/secu/SyllabusLinks.pdf.