BLST: Bachelor of Science -Life Science Major
Winona State University

About the BLST Major:
The Life Science Major (BILS) is offered through the Biology Department at Winona State University. This option is intended for career-minded students interested in teaching middle school science and secondary school life science teaching in the State of Minnesota. The Life Science Major provides students with a broad, general exposure to biology, as well as the professional education sequence required of everyone preparing for entry-level licensure as a teacher. Licensure requirements are very specific. Thus, students should carefully plan their individual program of electives in close consultation with the Life Science Advisor and the Education Department.

Who to contact?
Students interested in the BILS major should contact **Dr. Bruno Borsari, Biology Department, Winona State University - Winona, MN 55987-5838**. Dr. Borsari can also be reached at tel: **(507) 457-2822**, or by email: BBorsari@winona.edu Information about WSU and the Biology Department is also available on the WWW at **http://bio.winona.edu/** and **http://www.winona.edu/**

Preparation for the BLST Major:
Freshman entering the Life Science Major are normally expected to have completed a rigorous, college preparatory high school curriculum including 4 years of English, 3 years of Math and 3 years of science (biology, chemistry and physics). Admission into the Education Department has other requirements, including that the student have: (A) 30 semester hours of course credit, (B) a minimum 2.75 GPA overall and minimum GPA of 2.5 within the BILS major, (C) grades of B or better in English and Speech, and (D) a suitable score on a pre-professional skills test.

Course selection and scheduling:
The BILS major requires a number of course sequences and many prerequisite courses. Many of the required courses are only taught once per year. Therefore, it is very important to work very closely with your faculty advisor in planning your schedule. Further, because the biology department enforces the prerequisites established for its offerings, students should make every effort to complete the first-year/second-year sequence of courses according to the recommended schedule. Note that enrollment in the elective courses in biology requires completion of the first-year/second-year course sequence.

Typical Class schedule:
There are many ways to progress through the BLST major and it is not possible to detail each of them. However, the idealized schedule detailed below, or one very similar to it, can allow a student to graduate in **four-years**. Careful attention should be given to the selection of University Studies courses that will satisfy each of the various categories listed in the WSU catalog. A checklist is provided which can be used to track progress in the BLST major.

(Last Modified December 15, 2005)

Biology Course Prerequisites

Course	Co-requisite	Prerequisite
Basics of Life 241 or Organismal Diversity 242	Chemistry 212 & Math 150, or Chemistry 213 & Math 155	High School Biology and Chemistry
Ecology 312	Organic Chemistry 340 or 350	Principles of Biology 241, 242
Ecology Laboratory 313	Ecology 312	
Cell Biology 308		Ecology 312
Cell Biology Laboratory 307	Cell Biology 308	
Genetics 310	Cell Biology 308	Ecology 312
Biology Electives		Completion of Biology sequence: 241, 242, 312, 308, 310

BLST Checklist:

	Course or Condition:		
-	BLST Major Declared		
-	Life Science Advisor as major Advisor		
-	241 Basics of Life (4 sh)	-	311 Genetics Laboratory (1 sh)
-	242 Organismal Diversity (4 sh)	-	313 General Ecology Laboratory (1 sh)
-	312 General Ecology (3 sh)	-	315 Environmental Biology (3 sh)
-	308 Cell Biology (3 sh)	-	499 Student Research (3 sh) (This course also satisfies the biology capstone requirement.)
-	310 Genetics (3 sh)		
-	307 Cell Laboratory (1 sh)	-	Life Science Electives (9 approved semester hours, broadly distributed)
-	MATH 150 Modeling/Precalc & Stat (3 sh)		
-	MATH 155 Mathematics for the Earth and Life Sciences II (3 sh)		
-	CHEM 212 Principles of Chemistry (4 sh)		
-	CHEM 213 Principles of Chemistry (4 sh)		
-	CHEM 340 Organic Chemistry (4 sh) **or** CHEM 350 & 351 (substitution for CHEM 340)		
-	GEOS 120 Dynamic Earth (4 sh)		
-	GEOS 130 Earth and Life Through Time (4 sh)		
-	PHYS 201 General Physics (4 sh) {or PHYS 221 substitution for PHYS 201}		
-	PHYS 202 General Physics (4 sh) {or PHYS 222 substitution for PHYS 202}		
-	PHYS 311 Science Teaching Methods (4 sh)		
-	EDUC 305 Human Development & Learning (4 sh)		
-	EDUC 312 (Secondary) Instructional Planning & Assessment (3 sh)		
-	EDUC 308 Human Relations (3 sh)		
-	EDUC 429 Reading & Teaching Strategies for Middle and High School (4 sh)		
-	EDUC 449 Middle School Philosophy, Interdisciplinary Organization and Planning (3 sh)		
-	EDUC 459 The Professional Educator (3 sh)		
-	EDUC 465 Student Teaching (12 sh)		
-	SPED 400 Special Education of Exceptional Children and Youth (3 sh)		
-	HERS 204 Personal and Community Health (3 sh)		
-	ENG 111 English (4 sh)		
-	CMST 191 Speech (3 sh)		
-	Physical Education Activities (2 sh)		
-	Humanities (3 sh)		
-	Social Science (3 sh)		
-	Different Culture (3 sh)		
-	Total University Credits = 128 semester hours (or more)		

Fall: First Year	Spring: First Year
Basics of Life 241 (4 sh)	Organismal Diversity 242 (4 sh)
Principles of Chemistry 212 (4 sh)	Principles of Chemistry 213 (4 sh)
Mathematics 150 (3 sh) or Math 120 (4 sh)	Mathematics 155 (3 sh) or Math 160 (4 sh)
English 111 (4 sh)	Speech 191 (3 sh)
Physical Education Elective (1 sh)	Physical Education Elective (1 sh)
17 sh Total	16 sh Total

Fall: Second Year	Spring: Second Year
Ecology 312 (3 sh)	Cell Biology 308 (3 sh) & Cell Biology Lab 307 (1 sh)
Ecology Laboratory 313 (1 sh)	Genetics 310 (3 sh) & Genetics Lab 311 (1 sh)
GEOS 120 Dynamic Earth (4 sh)	
Organic Chemistry 340 (4 sh)	HHP 204 Personal and Community Health (3 sh)
EDUC 305 Human Development and Learning (4 sh)	EDUC 308 Human Relations (3 sh)
EDUC 312 Instructional Planning & Assessment (3 sh)	SPED 200 Special Education... (3 sh)
19 sh Total	17 sh Total

Fall: Third Year	Spring: Third Year
BLST Elective (3 sh)	Environmental Biology 315 (3 sh)
Physics 201 (4 sh)	Physics 202 (4 sh)
BLST Elective (4 sh)	GEOS 130 Earth and Life Through Time (4 sh)
University Studies Elective (3 sh)	BLST Elective (2 sh)
University Studies Elective (3 sh)	EDUC 449 Middle School Philosophy... (3 sh)
17 sh Total	16 sh Total

Fall: Fourth Year	Spring: Fourth Year
499 Student Research (3 sh)	EDUC 465 Student Teaching (12 sh)
PHYS 311 Science Teaching Methods (4 sh)	
EDUC 459 The Professional Educator (3 sh)	
EDUC 429 Reading and Teaching Strategies... (4 sh)	
University Studies Elective (3 sh)	
17 sh Total	12 sh Total

Recommended Electives for BILS Major:

The formal requirement is for at least 9sh credits of approved elective courses (see WSU undergraduate catalog). To meet licensure requirements, the electives must be broadly distributed across the spectrum of biology topics. Further, the Life Science Advisor recommends that students take more biology electives than the minimum, since 9sh of elective credit is grossly inadequate.

WSU HONORS IN BIOLOGY PROGRAM

Philosophy:

Any science can be described as having two major aspects: 1) an organized body of knowledge and 2) a formal way of adding new information to the existing body of knowledge. Thus, science is related to method and process, and it is not merely a collection of factual information. The Biology Department at WSU believes that students who desire advanced careers in biology need significant experiences which involve them directly in an intimate and meaningful process of biological inquiry. The Honors in Biology Program is designed to provide this enhanced opportunity to eligible biology majors.

Eligibility:

To be eligible for the Honors in Biology Program, a student must:

1) Be a Biology (any option) or a Life Science Major,
2) Have completed the biology core sequence (Basics of Life, Organismal Diversity, Ecology, Cell Biology and Genetics) or it's equivalent,
3) Have a 3.25 GPA, both overall and within the major,
4) Identify a WSU faculty member who is willing to serve as a research advisor to the student, and
5) Apply for and be granted admission into the Honors in Biology Program by the Biology Department Honors Committee.

Completion:

A student will be recognized as having successfully completed the Honors in Biology Program after satisfying the following requirements:

1) Completion of the Honors in Biology seminar offered in the spring. Honors students graduating at the end of fall semester may satisfy this requirement by giving a seminar describing their honors research to the department in another venue approved by the Honors Committee.
2) Presentation of her/his honors research project at the Annual Biology Research Symposium; and
3) Submission of a written approvable Honors Thesis in an appropriate format and style. Approval by both the research advisor and the Honors Committee is required.

FACULTY MEMBER	HONORS RESEARCH INTERESTS
Kimberly M. Bates, Associate Professor; 1997 - B.S., University of Massachusetts-Amherst M.S., Ph.D., University of Missouri-Columbia	Immunoparasitology; Serology; Zoonotic diseases; Design and implementation of serological assays; Epidemiology of lungworm in cattle and deer; Lyme disease.
Steven Berg, Professor; 1986 - B.S., Pacific Lutheran University Ph.D., Purdue University	Membrane studies; Bioenergetics; Photosynthesis; Use of computers in teaching biology.
Bruno Borsari, Assistant Professor; 2005 - D. Ag. Sc., University of Bologna, Italy Ph.D., University of New Orleans	Curriculum assessment of biology and applied life sciences. Instrument design. Agroecology, Apiculture, Prairie restoration, soil biology and reclamation.
Emmanuel Brako, Professor; 1989 - B.S., Tuskegee University M.S., Ph.D., Louisiana State University and A & M College B.V.M., University of Nairobi	Effects of viruses, phytochemicals (garlic), and UV irradiation on cell structure and function; Light and electron microscopy.
Michael D. Delong, Professor; 1992 - B.S., University of Southern Mississippi M.S., Memphis State University (TN) Ph.D., University of Idaho, Moscow	Ecology of large rivers; Invertebrate ecology; Food web dynamics.
David W. Essar, Professor; 1992 - B.S., Ferris State College (MI) M.S., Ph.D., University of Iowa	Microbial molecular genetics and physiology; Molecular evolution; The use of genetic fingerprinting in species identification.
Kimberly J. Evenson, Professor; 1995 - B.S., M.S., North Dakota State University, Fargo Ph.D. University of Minnesota-Twin Cities	Molecular biology and tissue culture of oilseed plants; Isolation of medicinal plant compounds.
Neal D. Mundahl, Professor; 1989 - B.A., Winona State University M.S., Michigan Technological University Ph.D., Miami University (Ohio)	Fish ecology; Bio-monitoring of coldwater streams; Avian ecology.
Frances R. Ragsdale, Professor; 1993 - B.S., Eastern Oregon State M.S., Southeastern Louisiana University Ph.D., University of Idaho	Comparative vertebrate physiology, blood chemistry, and exercise physiology of reptiles.
Lawrence A. Reuter, Professor; 1979 - B.A., Saint Mary's College of Minnesota Ph.D., Princeton University	Regulation of growth and development in early *Drosophila* embryos; Steroid hormone effects in mammals.
Robin K. Richardson, Professor; 1992 - B.S., Michigan State University M.S., Central Michigan University, Mt. Pleasant Ph.D., University of Oklahoma, Norman	Parent investment in lizards and spiders; Behavioral ecology of spiders.
Scott Segal, Assistant Professor; 2006 - B.S. University of Wisconsin, Madison Ph.D. Northwestern University, Chicago IL	Regulation of gene expression Control of mRNA translation and degradation
Edward Thompson, Professor; 1992 - B.A., Macalester College, St. Paul Ph.D., Medical College of Wisconsin, Milwaukee	Diabetes; Heart Disease; Muscle Physiology.
Edward Wilson, Assistant Professor; 2004- B.A., Luther College, Decorah IA; M.S., Ph.D., Iowa State University	Phytochemicals and nutritional physiology of fruit juices; Physiology of nitric oxide and smooth muscle; Comparative physiology of earthworms