SCIENCE EDUCATION
LIFE SCIENCE (BIOLOGY) CONCENTRATION

Grade Levels 5-12
REPA 3

NOT VALID WITHOUT OFFICIAL TRANSCRIPT EVALUATION

Purdue University Course Catalog 2022-2023

CONTENT			**CREDIT HOURS**
Major Courses			
BIOL	12100	Biology I: Diversity, Ecology, & Behavior	2
BIOL	13100	Biology II: Development, Structure, & Function of Organisms	3
BIOL	23100	Biology III: Cell Structure & Function	3
BIOL	23200	Laboratory in Biology III: Cell Structure and Function	2
BIOL	24100	Biology IV: Genetics and Molecular Biology	3
BIOL	24200	Laboratory in Biology IV: Genetics and Molecular Biology	2
BIOL	28600	Introduction to Ecology and Evolution	2
CHM	12901	General Chemistry with a Biological Focus	5
BIOL	13500	First Year Biology Laboratory	2
One of the following:			3
STAT	30100	Elementary Statistical Methods	
STAT	35000	Introduction To Statistics	
STAT	50300	Statistical Methods for Biology	
One of the following:			2
ABE	22600	Biotechnology Laboratory I	
BIOL	19500	Special Assignments	

Biology Selective: 10
Elect ten (10) hours of upper division biology courses
Choose one Intermediate Biology Selective, choose at least one Group A Selective, at least one Group B Selective, satisfy the Base Laboratory requirement, and at least one 50000-level course from Group A Selective or Group B Selective. Overlap (Intermediate Selective, A, B, 500, Lab) is allowed, but 10 credits must still be earned.

Research (49400 or 49900 - maximum of 2 credits), BIOL 36701 Principles of Development Lab, and BIOL 44100 Senior Seminar in Genetics, will count toward the 10-credit requirement, but will not satisfy the Group A, Group B, or laboratory requirement.

One of the following Intermediate Biology Selective:

BIOL	32800	Principles of Physiology[1, 2] (4)
BIOL	39500	Special Assignments (0-18)
BIOL	41500	Introduction to Molecular Biology[3] (3)
BIOL	41600	Viruses & Viral Disease[3] (3)
BIOL	42000	Eukaryotic Cell Biology[3] (3)
BIOL	43600	Neurobiology[3] (3)
BIOL	43800	General Microbiology[2, 3] (3)
BIOL	36700	Principles of Development[2, 3] (2)

At least one of the following Group A Selective (continued on page 2):

BCHM	56100	General Biochemistry I (3)
BCHM	56200	General Biochemistry II (3)
BCHM	43400	Medical Topics Biochemistry (3)

BIOL	39500	Special Assignments (0-18)
BIOL	41500	Introduction to Molecular Biology[3] (3)
BIOL	41600	Viruses & Viral Disease[3] (3)
BIOL	42000	Eukaryotic Cell Biology[3] (3)
BIOL	43600	Neurobiology[3] (3)
BIOL	43800	General Microbiology[2, 3] (3)
BIOL	43900	Laboratory in General Microbiology[2, 4] (2)
BIOL	44400	Human Genetics[2] (3)
BIOL	44600	Molecular Bacterial Pathogenesis (3)
BIOL	47800	Introduction to Bioinformatics[5] (3)
BIOL	48100	Eukaryotic Genetics (3)
BIOL	51100	Introduction to X-Ray Crystallography (3)
BIOL	51600	Molecular Biology of Cancer (3)
BIOL	51700	Molecular Biology: Proteins (2)
BIOL	52900	Bacterial Physiology (3)
BIOL	53300	Medical Microbiology (3)
BIOL	53601	Biological and Structural Aspects of Drug Design and Action (3)
BIOL	53800	Molecular, Cellular, and Developmental Neurobiology (3)
BIOL	54100	Molecular Genetics of Bacteria (3)
BIOL	54900	Microbial Ecology (2)
BIOL	55001	Eukaryotic Molecular Biology (3)
BIOL	56200	Neural Systems[5] (3)
BIOL	56310	Protein Bioinformatics (3)
BIOL	59500	Cellular Biology of Plants (3)
BIOL	59500	Epigenetics in Human Disease (3)
BIOL	59500	Genetics & Omics of Host-Microbe Interaction (3)
BIOL	59500	Methods and Measurements in Physical Biochemistry (3)
BIOL	59500	Neural Mechanisms in Health & Disease (3)
BIOL	59500	Neurobiology of Learning and Memory (3)
BIOL	59500	Practical Biocomputing (3)
BIOL	59500	Theory of Molecular Methods[4] (3)
CHM	33900	Biochemistry: A Molecular Approach (3)
CHM	53300	Introductory Biochemistry (3)

At least one of the following Group B Selective:

BIOL	32800	Principles of Physiology[1, 2] (4)
BIOL	36700	Principles of Development[1, 2] (2)
BIOL	43200	Reproductive Physiology (3)
BIOL	48300	Great Issues – Environmental & Conservation Biology (3)
BIOL	53700	Immunobiology (3)
BIOL	55900	Endocrinology (3)
BIOL	58000	Evolution (3)
BIOL	58210	Ecological Statistics (3)
BIOL	58705	Animal Communication (3)
BIOL	59100	Field Ecology (3)
BIOL	59200	The Evolution of Behavior (3)
BIOL	59500	Special Assignments (0-18)
HORT	30100	Plant Physiology[2] (4)

Lab Requirement:

Each student will select an option from the Required Course list. Students must also satisfy Objectives A and B below, which can be met by courses, research, or a combination of the two. BIOL research (49400 or 49900) can be used to satisfy Objectives A and/or B below. The Research Mentor must approve research to meet one or both objectives. Consult with your academic advisor for the forms used to obtain Research Mentor approval for each objective. A minimum of four credits of BIOL 49400 or 49900 must be

earned in addition to research director approval. Students who complete a Biology Honors Thesis automatically meet Objectives A and B.

Objective A – Research planning, literature review, and writing
Objective B – Analysis, simulation, and presentation

Objectives may be met by taking courses according to the following chart:

Courses	Title	Required Course	Objective A	Objective B
BIOL 39500	Special Assignments		X	X
BIOL 43900	Laboratory in General Microbiology[4]	X	X	X
BIOL 44202	Animal Physiology	X		X
BIOL 44205	Introduction to LabVIEW	X		X
BIOL 44207	Exploration of Protein Structure	X		
BIOL 44211	Laboratory in Anatomy & Physiology	X		
BIOL 44212	Microscopy and Cell Biology	X		X
BIOL 48300	Great Issues: Environmental And Conservation Biology		X	X
BIOL 49500	Special Assignments		X	X
BIOL 54200	Modular Upper-Division Laboratory Course			X
BIOL 58210	Ecological Statistics		X	X
BIOL 59100	Field Ecology[7]	X	X	X
BIOL 59500	Special Assignments	X	X	X

If undergraduate research is used to meet the lab requirement, only three credits may count toward the 10-credit requirement.

Students who successfully complete a Biology Honors Research Thesis have successfully met all three objectives.

Undergraduate Research may be used to meet these objectives. Student must get Research Mentor approval for each objective after that objective is completed. Student must also earn at least four credits of BIOL 49400 or 49900 research.

Consult with your academic advisor for the forms used to obtain Research Mentor for each objective.

A combination of courses and research may be used to meet this requirement.

[1] This may count for the Intermediate Biology Selective and as a Group B course and as the Cos Teambuilding & Collaboration requirement.
[2] These courses are recommended for teaching majors.
[3] Courses chosen for the Intermediate Requirement may satisfy part of the 10-credit requirement.
[4] This course may count for a Group A course and for the Base Lab requirement. You must still complete 10 total credits of biology selective.
[5] This course may count for a Group A course and as the College of Science Multidisciplinary requirement.
[6] This course may count for a Group B course and as the College of Science Great Issues requirement.
[7] This course may count for a Group B course and toward the Biology Lab Selective. However, you must still complete 10 total credits of biology selective.

One of the following: 4

CHM 25500 Organic Chemistry (3) **AND**
CHM 25501 Organic Chemistry Laboratory (1)
OR
CHM 26505 Organic Chemistry (3) **AND**
CHM 26300 Organic Chemistry Laboratory (1)

One of the following:			4
CHM	25600	Organic Chemistry (3) **AND**	
CHM	25601	Organic Chemistry Laboratory (1)	
		OR	
CHM	26605	Organic Chemistry (3) **AND**	
CHM	26400	Organic Chemistry Laboratory (1)	
One of the following:			3-4
CS	15900	C Programming (3)	
		OR	
CS	17700	Programming with Multimedia Objects (4)	
		OR	
CS	18000	Problem Solving and Object-Oriented Programming (4)	
One of the following:			3-5
MA	16010	Applied Calculus I (3)	
MA	16100	Plane Analytic Geometry and Calculus I (5)	
MA	16500	Analytic Geometry and Calculus I (4)	
One of the following:			3-5
MA	16020	Applied Calculus II (3)	
MA	16200	Plane Analytic Geometry and Calculus II (5)	
MA	16600	Analytic Geometry and Calculus II (4)	
One of the following:			
PHYS	17200	Modern Mechanics (4)	4
PHYS	23300	Physics for Life Sciences I (4)	
One of the following:			
PHYS	23400	Physics for Life Sciences II (4) **OR**	4
PHYS	27200	Electric and Magnetic Interactions (4)	
		OR	
PHYS	24100	Electricity and Optics (3) **AND**	
PHYS	25200	Electricity and Optics Laboratory (1)	
			Total Content 74-79

PROFESSIONAL EDUCATION

Educational Program Course Requirements

EDCI	20500	Exploring Teaching as a Career ****required for TEP admission***	2
EDCI	27000	Introduction to Education Technology and Computing	1
EDCI	28500	Multiculturalism and Education ****required for TEP admission***	2
EDPS	23500	Learning and Motivation	2-3
EDPS	26501	The Inclusive Classroom	2
EDST	20010	Educational Policies and Laws ****required for TEP admission***	1
EDPS	32700	Classroom Assessment	1-3
EDPS	43010	Secondary Creating and Managing Learning Environments	1
EDCI	20001	Special Populations Seminar: Focus on Students with Disabilities and Differentiation Approaches	1
EDCI	20002	Special Populations Seminar: English Language Learners and Students with Gifts and Talents	1
EDCI	30900	Reading in Middle and Secondary Schools: Methods and Problems	3
EDCI	35000	Community Issues & Applications for Educators	1
EDCI	37001	Teaching and Learning English as a New Language	2-3
EDPS	24000	Children with Gifts, Creativity, and Talents	1

EDPS	24800	Differentiating Curriculum and Instruction	1
EDPS	36201	Positive Behavioral Supports	2
EDCI	49800	Supervised Teaching (16 weeks)	12

Methods Courses

EDCI	42100	The Teaching of Biology in Secondary Schools	3
Choose one of the following courses:			2-3
EDCI	42800	Teaching Science in the Middle and Junior High School (2)	
EDCI	55800	Integrated Science, Technology, Engineering and Mathematics (STEM) Education Methods-Secondary (3)	

Learner Pathway Selective 3

Pick **ONE** course from the selective below in a pathway of your choice (required). ABA courses are included if allowed by the plan of study. Students can take two additional courses in the same pathway to complete requirements for an add-on teaching license in ELL or HA or take one additional course in the SPED pathway for a certificate in SPED.

English Language Learners Licensure Pathway

EDCI	51900	Teaching English Language Learners (3)
EDCI	52600	Language Study for Educators (3)
EDCI	55900	Academic Language and Content Area Learning (3)

High Ability Licensure Pathway

EDPS	54200	Curriculum and Program Development in Gifted Education (3)
EDPS	54500	Social and Affective Development of Gifted Students (3)

Special Education Non-Licensure Pathway

EDPS	21100	Special Education Law, Policy, and Ethical Guidelines (3)

Applied Behavior Analysis Non-Licensure Pathway

EDPS	34100	Introduction to Philosophical Underpinnings and Concepts of Applied Behavior Analysis (3)
EDPS	34200	Applied Behavior Analysis – Assessment and Intervention (3)
EDPS	44100	Introduction to Ethics and Practice of Applied Behavior Analysis (3)
EDPS	44200	Advanced Intervention in Applied Behavior Analysis (3)

Total Professional Education 44-49

Licensure Information

All Purdue University Program and Indiana Department of Education requirements must be met for recommendation for Indiana licensure.

After all requirements are met, Purdue graduates will be considered eligible to apply to the Indiana Department of Education for licensure under REPA 3 in:

Life Sciences (5-12)
Addition in Blended and Online Teaching (5-12)
Optional: Addition in High Ability (P-12) or ELL (P-12) if chosen pathway requirements are complete

Visit the Indiana Department of Education website for more information about what courses can be taught once licensed in this area.

Please reference the 2022-2023 Biology Education Guidelines and Requirements and the 2022-2023 Biology Education Checklist for more information.