

Kansas State University
Bachelor of Science in Integrative Physiology

Program Approval

I. General Information

A. Institution Kansas State University

B. Program Identification

Degree Level: Bachelor's
Program Title: Integrative Physiology
Degree to be Offered: Bachelor of Science in Integrative Physiology
Responsible Department or Unit: Department of Kinesiology/College of Health and Human Sciences
CIP Code: 26.0901
Modality: Face-to-Face
Proposed Implementation Date: August, 2020

Total Number of Semester Credit Hours for the Degree: 120

II. Clinical Sites (Not applicable)

III. Justification

The Kinesiology Department at Kansas State University currently offers one degree, a Bachelor of Science, in Kinesiology. Our students have diverse career aspirations, however, with the three most popular areas being Health Science Pre-Professional, Applied Exercise, and Physical Activity Health Promotion from student surveys. The majority of our students are interested in a career in a health profession (e.g., medicine, physical therapy, physician assistant, nursing, occupational therapy, etc.). While our degree has been successful in preparing students for professional schools (primarily due to the expertise and disciplines of our faculty), we believe that adding a degree that specifically prepares students for health careers would be very attractive and beneficial for students.

The intent of the B.S. in Integrative Physiology (IP) degree is to create a program specifically for students interested in health careers and to better prepare them for health professional schools. Our current B.S. in Kinesiology degree will still be offered for students who are interested in a general kinesiology curriculum, with a core focus on applied exercise and exercise behavior. The IP curriculum will add depth and breadth to prepare students for different health career paths, with a selection of upper-level courses designed to meet the requirements of their respective health discipline. The core curriculum in the IP degree will require students to take courses focused on the four major systems within the body (cardiovascular, pulmonary, neural, skeletal muscular), and on how these systems interact with each other in health and disease. Systems physiology has consistently served as the foundation for health profession preparation. The unrestricted elective options in this degree will allow students to enroll in courses outside of Kinesiology to fulfill necessary requirements, depending on their specific career aspirations, and make the program more interdisciplinary. Through the rigorous, system-based curriculum of the IP degree, students will be prepared for health professional schools, as well as careers as biomedical scientists, physiotherapists, medical sales representatives, clinical scientists, research associates and other physiologically based health professions. We currently have seven tenured/tenure track physiologists in our department who teach and conduct research in physiology (health and disease, including heart failure, cancer, asthma, diabetes, etc.) that forms the backbone of this degree. Therefore, no additional faculty would be required to initiate this degree.

IV. Program Demand: Select one or both of the following to address student demand:

A. Survey of Student Interest

Number of surveys administered:	676
Number of completed surveys returned:	462
Percentage of students interested in program: ...	85%

In December 2018 we polled all our current Kinesiology students (n=676) and asked which area of Kinesiology they were pursuing (i.e., Health Science Pre-Professional, Applied Science, Physical Activity Health Promotion). The majority of those who responded stated Health Science Pre-Professional (85%; n=394). This Integrative Physiology degree is designed specifically towards those students interested in the Health Science Pre-Professional tract.

B. Market Analysis

The bachelor's degree in Integrative Physiology at Kansas State University from the Department of Kinesiology was designed to recruit and train students specifically interested in health careers. The Integrative Physiology program incorporates the fundamentals of systems physiology as an independent major to train physiologists. This differs from common core in most Kinesiology/Exercise Science degrees, which focus on biomechanics, rehabilitative exercise, health promotion, exercise testing and prescription. Students in the IP program could take additional courses in exercise physiology which, when combined with the systems based courses of the IP degree, would make them competent as exercise physiologists. Therefore, for the IP degree, market analyses were performed for both "Physiologists" and "Exercise Physiologists" to incorporate career options for students with this standalone degree (i.e., those that do not pursue post-graduate health professions).

- 1) Careers in physiology and exercise physiology are projected to grow at around 10% on average, from 2018-2028 according to the Occupational Outlook Handbook from the US Department of Labor (Bureau of Labor Statistics). This includes health care and biomedical science related positions, for which students with the IP degree would be qualified, such as exercise physiologist (10% growth), cardiovascular/vascular specialists (14% growth), clinical laboratory technician (11% growth), and biological scientist (7% growth) (Bureau of Labor Statistics).
- 2) Demand for a Bachelor of Science in Integrative Physiology is strong. For example, at the University of Colorado-Boulder, a bachelor's degree in Integrative Physiology was first offered in 2003 and now is the largest major at that institution with over 2,000 undergraduates. (University of Colorado – Boulder).
- 3) There are no "physiology" bachelor level programs offered across Kansas Regents institutions (Kansas Board of Regents). While there are degrees in Exercise Science at University of Kansas, Pittsburg State University, and Wichita State University, these are similar to the K-State degree in Kinesiology. The core emphasis of such degrees is on biomechanics, exercise testing and prescription, personal training, strength and conditioning, fitness management, and sport, recreation and commercial promotion. The IP degree does not incorporate core areas overlapping any of these aforementioned emphases of Exercise Science/Kinesiology programs. Any overlap of exercise physiology or health promotion is at the lower level with one introductory course in these two areas. The degree in integrative physiology offers core classes focused entirely on the anatomy and physiology of specific bodily systems (cardiac, cardiovascular, pulmonary, neural, skeletal/muscular, etc.) in health. Further, upon how these systems are functionally integrated to optimize health, and how disease disrupts this integration leading to morbidity/mortality.
- 4) Our search showed no bachelor level degrees in Integrative Physiology offered at any Big 12 University. Across the United States, there are three institutions, that we are aware of, offering a bachelor level degree in "Integrative Physiology" (Univ. of Nevada at Las Vegas, Univ. Colorado-Boulder, and Alma College).
- 5) ZipRecruiter reports that a degree in physiology offers an average salary of \$52,589 (ZipRecruiter).

V. Projected Enrollment for the Initial Three Years of the Program

Year	Headcount Per Year		Sem Credit Hrs Per Year	
	Full- Time NEW	Part- Time NEW	Full- Time	Part- Time
Implementation	20		600	
Year 2	35		1,630	
Year 3	50		3,135	

VI. Employment

As noted above in the Market Analysis, the U.S. Department of Labor Bureau of Labor Statistics reported the job growth outlook for a bachelor's degree in integrative physiology is projected to be range between 7-14% for the 2018-2028 time frame (Bureau of Labor Statistics). This includes positions of physiologist, biological scientists, laboratory technicians, exercise physiologists, and other related positions. The growth of such positions is above average compared to other job categories.

VII. Admission and Curriculum

A. Admission Criteria

University Admission Requirements:

Complete the precollege curriculum with at least a 2.0 GPA (2.5 for non-residents) **AND** achieve one of the following:

- A 21 or higher composite score on the ACT assessment **OR**
- A 1060 or higher on the SAT ERW+M if taken after March 2016 **OR**
- A 980 or higher on the SAT CR + M if taken before March 2016 **OR**
- Rank in the top third of your graduating class,
- **AND**, if applicable, achieve a 2.0 GPA or higher on all college credit taken in high school.

B. Curriculum

Year 1: Fall

SCH = Semester Credit Hours

Course #	Course Name	SCH = 14
KIN 220	Biobehavioral Bases of Physical Activity	4
BIOL 198	Principles of Biology	4
PSYCH 110	General Psychology	3
ENGL 100	Expository Writing I	3

Year 1: Spring

Course #	Course Name	SCH = 16
ECON 110	Principals of Macroeconomics	3
MATH 100	College Algebra	3
SOCIO 211	Introduction to Sociology	3
ENGL 200	Expository Writing II	3
KIN 310	Measure & Research Techniques in Kinesiology	4

Year 2: Fall

Course #	Course Name	SCH = 15
COMM 106	Public Speaking I	3
KIN 360	Anatomy and Physiology (or BIOL 341 & BIOL 342)	8
STATS 325	Introduction to Statistics	3
GNHE 210	Foundations of Human Ecology	1

Year 2: Spring

Course #	Course Name	SCH = 14
KIN 335	Physiology of Exercise	4
KIN 336	Physiology of Exercise Lab	1
KIN 345	Exercise Behavioral Science	5
CHM 210	Chemistry I	4

Year 3: Fall

Course #	Course Name	SCH = 16
	*Foundations in Integrative Physiology Course	3
	Integrative Physiology Elective	3
FNDH 400	Human Nutrition	3
	**Unrestricted Elective	4
	**Unrestricted Elective	3

Year 3: Spring

Course #	Course Name	SCH = 15
	*Foundations in Integrative Physiology Course	3
	Humanities Elective	3
	Humanities Elective	3
	**Unrestricted Elective	3
	**Unrestricted Elective	3

Year 4: Fall

Course #	Course Name	SCH = 15
	*Foundations in Integrative Physiology Course	3
	Integrative Physiology Elective	3
	**Unrestricted Elective	3
	**Unrestricted Elective	3
	**Unrestricted Elective	3

Year 4: Spring

Course #	Course Name	SCH = 15
	*Foundations in Integrative Physiology Course	3
	Kinesiology Elective	3
	**Unrestricted Elective	3
	**Unrestricted Elective	3
	**Unrestricted Elective	3

*Foundations in Integrative Physiology courses (students will take four of the five):

KIN 601 – Cardiorespiratory Physiology

KIN 603 – Cardiovascular Physiology

KIN 605 – Physiology Topics

KIN 607 – Muscle Physiology

KIN 611 – Neurological Physiology

**Unrestricted Electives: The program targets students seeking health careers, such as medicine, physical therapy, occupational therapy, nursing, physician assistant, and others. The student is advised and encouraged to use the unrestricted electives to extend their learning through specific courses in Kinesiology, Biology, Chemistry, and Biochemistry, as well as courses in Sociology, Psychology, History, Philosophy, and others pertinent to health careers.

Total Number of Semester Credit Hours 120

VIII. Core Faculty

FTE: 1.0 FTE = Full-Time Equivalency Devoted to Program

Faculty Name	Rank	Highest Degree	Tenure Track Y/N	Academic Area of Specialization	FTE to Proposed Program
Carl Ade	Assist Professor	Ph.D.	Y	Cardiovascular and Translational Physiology	0.20
Tom Barstow	Professor	Ph.D.	Y	Muscle Physiology	0.20
Brad Behnke	Professor	Ph.D.	Y	Cardiovascular Physiology	0.20
Steven Copp	Assist Professor	Ph.D.	Y	Neurophysiology	0.20
Craig Harms	Professor	Ph.D.	Y	Cardiopulmonary Physiology	0.10
Tim Musch	Professor	Ph.D.	Y	Cardiovascular Physiology	0.15
David Poole	Professor	Ph.D., D.Sc.	Y	Cardiorespiratory and Comparative Physiology	0.15

Number of graduate assistants assigned to this program 5

IX. Expenditure and Funding Sources (List amounts in dollars. Provide explanations as necessary.)

A. EXPENDITURES	First FY	Second FY	Third FY
Personnel – Reassigned or Existing Positions			
Faculty	\$149,670	\$152,663	\$155,717
Administrators (other than instruction time)			
Graduate Assistants	\$75,000	\$75,000	\$75,000
Support Staff for Administration (e.g., secretarial)	\$3,284	\$3,350	\$3,417
Fringe Benefits (total for all groups)	\$68,386	\$69,713	\$71,107

Other Personnel Costs			
Total Existing Personnel Costs – Reassigned or Existing	\$296,340	\$300,726	\$305,241
Personnel – – New Positions			
Faculty			
Administrators (<i>other than instruction time</i>)			
Graduate Assistants			
Support Staff for Administration (<i>e.g., secretarial</i>)			
Fringe Benefits (<i>total for all groups</i>)			
Other Personnel Costs			
Total Existing Personnel Costs – New Positions			
Start-up Costs - - One-Time Expenses			
Library/learning resources			
Equipment/Technology			
Physical Facilities: Construction or Renovation			
Other			
Total Start-up Costs	0	0	0
Operating Costs – Recurring Expenses			
Supplies/Expenses			
Library/learning resources			
Equipment/Technology	\$5,000	\$5,500	\$6,050
Travel			
Other			
Total Operating Costs	\$5,000	\$5,500	\$6,050
GRAND TOTAL COSTS	\$301,340	\$306,226	\$311,291

B. FUNDING SOURCES <i>(projected as appropriate)</i>	Current	First FY (New)	Second FY (New)	Third FY (New)
Tuition / State Funds		\$187,800	\$510,190	\$981,255
Student Fees		\$5,600	\$22,800	\$44,250
Other Sources				
GRAND TOTAL FUNDING		\$193,400	\$532,990	\$1,025,505

Calculations

Student Credit Hours

$$\text{YR1: } 20 \text{ students} \times 30 \text{ SCH} = 600 \text{ SCH}$$

$$\begin{aligned} \text{YR2: } & 35 \text{ students} \times 30 \text{ SCH} = 1,050 \text{ SCH} \\ & 20 \text{ students} \times 29 \text{ SCH} = \underline{580 \text{ SCH}} \\ & \qquad \qquad \qquad 1,630 \text{ SCH} \end{aligned}$$

$$\begin{aligned} \text{YR 3: } & 50 \text{ students} \times 30 \text{ SCH} = 1,500 \text{ SCH} \\ & 35 \text{ students} \times 29 \text{ SCH} = 1,015 \text{ SCH} \\ & 20 \text{ students} \times 31 \text{ SCH} = \underline{620 \text{ SCH}} \\ & \qquad \qquad \qquad 3,135 \text{ SCH} \end{aligned}$$

Tuition

$$\text{YR 1: } \$313 \times 600 \text{ SCH} = \$187,800$$

$$\text{YR 2: } \$313 \times 1,630 \text{ SCH} = \$510,190$$

$$\text{YR 3: } \$313 \times 3,135 \text{ SCH} = \$981,255$$

Fees (note: \$20/SCH college fee, \$15/SCH department fee)

$$\text{YR 1: } 20 \text{ students} \times 8 \text{ SCH} \times \$35 = \$ 5,600$$

$$\begin{aligned} \text{YR 2: } & 35 \text{ students} \times 8 \text{ SCH} \times \$35 = \$ 9,800 \\ & 20 \text{ students} \times 1 \text{ SCH} \times \$20 = \$ 400 \\ & 20 \text{ students} \times 18 \text{ SCH} \times \$35 = \underline{\$12,600} \\ & \qquad \qquad \qquad \$22,800 \end{aligned}$$

$$\begin{aligned} \text{YR 3: } & 50 \text{ students} \times 8 \text{ SCH} \times \$35 = \$14,000 \\ & 35 \text{ students} \times 1 \text{ SCH} \times \$20 = \$ 700 \\ & 35 \text{ students} \times 18 \text{ SCH} \times \$35 = \$22,050 \\ & 20 \text{ students} \times 3 \text{ SCH} \times \$20 = \$ 1,200 \\ & 20 \text{ students} \times 9 \text{ SCH} \times \$35 = \underline{\$ 6,300} \\ & \qquad \qquad \qquad \$44,250 \end{aligned}$$

C. Projected Surplus/Deficit

There are no new expenses for this degree as our listed faculty are currently already teaching the Kinesiology courses listed for this degree. The estimated expenses do not necessarily reflect “new expenses”. Therefore, any new students to the university who enroll in this degree would generate additional surplus revenue. As explained above, approximately 85% of our current Kinesiology majors (676) stated by survey that they were interested in a health career. We anticipate that initially, the majority of current Kinesiology students would gravitate toward the Integrative Physiology degree. Our rationale of determining the number of students in the degree above is based on a very conservative estimate of new students to Kansas State University who would enroll in this degree. Therefore, the projected surplus (or deficit in YR 1) for this degree we believe to be a very conservative estimate. Based on similar degrees from other institutions (e.g., University of Colorado-Boulder), we anticipate that enrollment in this degree would be much higher than listed once we are able to market the degree to students interested in a health related career.

XI. References

Bureau of Labor Statistics, <https://www.bls.gov/ooh/healthcare/exercise-physiologists.htm>

Kansas Board of Regents, https://kansasregents.org/academic_affairs/program_search.

University of Colorado – Boulder, <https://www.colorado.edu/iphy/>

ZipRecruiter, <https://www.ziprecruiter.com/Salaries/Physiologist-Salary>