

WEIMAR

I N S T I T U T E

Bachelor of Science in
Natural Science
Program Syllabus

Spring 2018

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Weimar Institute

BS in Natural Science

Program Syllabus

Program Mission

The Weimar Institute (WI) vision, *To Heal a Hurting World*, readily finds congruence within the Natural Science baccalaureate program because of our unique mission.

Why the BS in Natural Science program exists:

To Heal a Hurting World through Comprehensive Health Evangelism.

How we intend to accomplish this:

Through an integrative, whole-person focused baccalaureate program committed to the ideals of Seventh-day Adventist education.

What we do:

Follow Jesus' methods of teaching and healing by blending practical comprehensive health evangelism with the theoretical core sciences in a close-knit community of dedicated learners.

The Health Sciences Department exists to educate pre-health professional students in the knowledgeable application of God's natural laws of health. The program builds on the rich medical missionary heritage of the Seventh-day Adventist Church and strives to balance scientific study with applied learning.

Programs Offered

- BS in Natural Science, Track 1 (Pre-Med/Pre-PA/Pre-Dent Track)
- BS in Natural Science, Track 2 (Pre-PT Track)
- Natural Science Minor
- Biology Minor
- Chemistry Minor
- Health and Wellness Minor
- Health Ministry Minor

The flagship program of the Health Sciences Department is the B.S. in Natural Science, described below. This program of study exists to educate pre-health professional students in the knowledgeable application of God's natural laws of health. The program builds on the rich medical missionary heritage of the Seventh-day Adventist Church and strives to balance scientific study with applied learning.

BS in Natural Science

The Natural Science B.S. prepares students to pursue further studies in the health-related fields, included but not limited to those listed above,** or secondary science education after appropriate post-graduate studies.

Tracks 1 and 2 of the Natural Science BS degree each require the Health and Wellness minor, which provide a pre-professional degree that prepares graduates to enter medical, dental, physical therapy, physician's assistant or other health science-related professional programs. Both degree tracks have the needed pre-requisites for entry into the requisite post-graduate field of study as well as additional courses designed to prepare the Weimar graduate to excel in both the theoretical and clinical setting.

The Natural Science BS together with the required General Education and co-curricular activities provide a rich and varied experience in Comprehensive Health Evangelism (CHE) as well as other skills needed for post-graduate education.

**Students desiring to pursue health related fields outside of the traditional areas mentioned above, or who wish to pursue a field of study in secondary science education, may choose from either Track 1 or 2, as determined by his or her varied career goals. Students wishing to pursue this course of study should consult with the Natural Science Program chair to discuss their career options.

What kind of program is the BS in Natural Science?

The BS in Natural Science focuses on core science subjects such as chemistry, biology, physics and their related sub-disciplines, which are foundational to success in post-graduate study in the health sciences. These courses are taught with a decidedly biblical and health-based focus while providing practical hands-on experience in medical situations through clinical rotations in the NEWSTART Lifestyle and Nedley Ten-Day Residential Depression and Anxiety Recovery Programs. In addition to these on-campus experiences, students will also have the opportunity to be involved in local, national and international mission experiences.

The Natural Science program prepares students to pursue graduate study in the health science fields such as medicine, dentistry, and/or physical therapy fields. Moreover, this course of study is designed not only to prepare the student for the rigors of future professional training, but also to give them the experience and appreciation of being a medical missionary through multiple opportunities to practice Comprehensive Health Evangelism in the community and abroad.

Important elements of the program include:

- Mastery of core pre-professional science subjects including biology, chemistry, physics and their related sub-disciplines
- Experience in community-based health programing, which may include, but is not limited to health expos, health coaching, and the Eight-Week Nedley Depression & Anxiety Recovery® Program.
- Opportunity to shadow and gain practical hands-on experience in the NEWSTART Lifestyle® and Nedley Ten-Day Residential Depression and Anxiety Recovery® Programs
- Gain knowledge of the biblical and scientific basis for Creation and the arguments raised by evolutionary theory
- Culminating experience in the Natural Science Capstone where students integrate the knowledge, skills, and interests gained through the Weimar experience

What will the instruction be like?

The Natural Science degree includes interactive classroom instruction along with significant laboratory experiences in the core sciences that will prepare students for the MCAT/DAT or other pre-professional exams. The program also strives to promote a balance of theory with hands-on, real-life learning experiences. Examples include observation and hands-on training in complementary health care and lifestyle medicine undertaken during clinical times with the NEWSTART® Lifestyle Program and Nedley Depression and Anxiety Recovery Program® nurses and physicians. Students that successfully finish this program of study will have a broad experience in health and natural healing techniques that will greatly enhance their future effectiveness as medical missionary health professionals.

Who should attend this type of program?

The Natural Science program is ideal for students who have a high regard for Scripture, who wish to engage in a life of Christian service as medical missionary teachers, physicians, dentists, physical therapists, and scientists; and who desire to delve deeply into the science fields of biology, chemistry and physics.

For what type of employment is this program designed to prepare students?

Natural Science program graduates may find opportunities as missionary physicians, dentists, physical therapists, public health servants, educators, or other allied-health careers after completing the appropriate post-graduate studies. Graduates will be prepared to minister to their local and global community through Comprehensive Health Evangelism in a community-based setting.

At this time Weimar Institute is not fully accredited and entrance into any graduate-level professional degree is at the discretion of the graduate institution. Students should contact the Natural Sciences Program Chair regarding their specific needs, graduate school possibilities and where other students have successfully transferred their coursework or degrees.

What are the expected outcomes for graduates upon successful completion of the program?

Students graduating from the BS in Natural Science will:

- Be prepared for the MCAT or other pre-professional exams
- Be competent in creation/evolution issues
- Gain a greater understanding of God through the study of core courses
- Recognize the relationship between spiritual truths and the sciences

BS in Natural Science Program Requirements

Students intending to complete a BS in Natural Sciences are required to meet the following criteria and the general admissions policy of Weimar Institute (see section on General Education), including minimal levels of prior education, preparation, or training.

Program Admission Requirements

As future health care providers and leaders in health evangelism training and practice, the Natural Science graduate must have a reputable character, intellectual capacity, a deep commitment to the well-being of both their local and global community, and dedication to service. These components are assessed in the initial application process and throughout the program.

While students may declare Natural Science as a major, formal admission to the BS in Natural Science degree program is open to students during the middle of their second year (see updated requirement checklist in the Registrar's office). Students will submit an application requesting admittance into the program. If denied, students may submit more than one application. The Natural Science program faculty together with the Academic Standards Committee will determine whether or not the student qualifies for the program.

The criterion for admittance into the program includes, but is not limited to the following:

- Spiritual commitment
- Dedication to health evangelism and service
- High ethical standing
- Respected among faculty and peers
- Compassion for people
- Dedication to a healthy lifestyle, including NEWSTART® principles
- Academic Eligibility (3.5 GPA or higher, with no grade lower than B in core courses. Up to two (2) core courses may be repeated to meet or maintain eligibility. Students not qualifying may still complete the BS in Natural Science degree, but may find their opportunities for postgraduate studies limited.)

Graduation Requirements

A minimum of 126 credits are required for the BS in Natural Science. Students pursuing the Bachelor of Science in Natural Science need to fulfill all General Education requirements as well as the graduation requirements for the degree. Major degree requirements include Core Courses, Core Cognate, Required Experiences, Required Competencies and a minor. To graduate, students must continue to meet the initial Program Admission Requirements (above). Students who intend to use the degree for Pre-Med, Pre-PA, Pre-Dent (Track 1), or Pre-PT (Track 2) are required to include the Health & Wellness minor in their degree plan.

- Natural Science B.S. Major, Track 1, 58 credits
 - Core requirements, 39 credits
 - Cognates, 12 credits
 - Electives, 7 credits
 - Total of 126 credits for degree completion
- Natural Science B.S. Major, Track 2, 58 credits
 - Core requirements, 36 credits
 - Cognates, 13 credits
 - Electives, 9 credits
 - Total of 126 credits for degree completion
- Health & Wellness Minor, 21 credits
- General Education requirements, required for all tracks, 46 credits
- Students pursuing either degree track must complete a minimum of 126 credits and fulfill all other graduation requirements to graduate.

Students who wish to pursue the degree for other purposes, such as a career in secondary science education, are encouraged to meet with their academic advisor. Students who desire a career in public health are encouraged to meet with the Natural Science Program Director to discuss the additional or preferred coursework and experiences needed to meet their planned future career needs.

A possible course of study for education or other allied health fields is as follows:

- Natural Science B.S. Major requirements (any track), 62 credits
- General Education requirements, 43 credits
- Appropriate minor or supplemental courses

Credit Hour Policy

Weimar Institute recognizes one semester credit hour of didactic instruction, marking student achievement through intended learning outcomes and verified by tangible evidence of student learning, represents 3 hours of work per week over a fifteen week academic semester, totaling 45 hours per semester credit hour.

For example, a 3 credit lecture class will be scheduled with 45 hours of instructional time per semester. Typically, a 3 credit class is scheduled to meet 3 times per week for 50 minutes or twice a week for 80 minutes, for a minimum of 15 weeks. In addition, the expectation for students is to work (study, read, develop class deliverables, etc.) outside of class 6 hours per week. The balance of in-class and out-of-class work may be adjusted to best suit learning Outcomes.

One semester credit hour of practicum represents 60 hours of laboratory, practicum, or observation experience.

Natural Science Program Philosophy of Science Education

The Psalmist wrote, “The heavens declare the glory of God; And the firmament shows His handiwork... ere is no speech nor language where their voice is not heard” (Psalm 19:1-3, NKJV). Further, the apostle Paul declared that God’s “invisible attributes are clearly seen, being understood by the things that are made,” even as it is in “bondage to decay” (Romans 8:20–22, NKJV).

In the book *Counsels to Parents, Teachers and Students*, Ellen White communicates an of our biblical and scientific responsibilities:

The first great lesson in all education is to know and understand the will of God....To learn science through human interpretation alone is to obtain a false education, but to learn of God and Christ is to learn the science of heaven. The confusion in education has come because the wisdom and knowledge of God have not been exalted. (White, 1913/1943, p. 447).

The faculty of the Natural Science program realizes the great value of the scientific contribution and also that God created a single, undivided world—hence, there is not a divided “secular” world and a “sacred” world. The psalmist writes,

“Teach me your way, Lord, that I may rely on your faithfulness; give me an undi- vided heart, that I may fear your name” (Psalm 86:11, NIV).

Consequently, each course in the Natural Science Program is prefixed by the phrase, “Knowing God Better rough the Study of _____.”

Program Student Learning Outcomes

A description of the seven *Program Student Learning Outcomes (PSLOs)* for graduates of the BS degree in Natural Science are outlined here and on the following pages. Rubrics fully describing each PSLO included.

Students follow Jesus as....

NS PSLO 1 Truth-Centered Scientists	<i>Students develop a biblical worldview perspective as they effectively identify and integrate key concepts from the core sciences (biology, chemistry, and physics) as they relate to Scripture and the Spirit of Prophecy.</i>
NS PSLO 2 Comprehensive Health Evangelists	<i>Students practice and promote physical, emotional, mental, and spiritual healing by leading in collaborative, community-based programming among diverse people groups domestically or internationally.</i>
NS PSLO 3 Critical Thinkers	<i>Students investigate a controversy, problem, or question related to the core sciences (biology, chemistry, and physics) or the medical field where diverse perspectives are assembled, analyzed, and used to draw an informed conclusion that considers the influence of context, possible sources of bias and a priori assumptions.</i>
NS PSLO 4 Effective Communicators	<i>Students communicate the key (threshold) concepts of the core sciences (biology, chemistry, and physics) in both written and oral forms.</i>
NS PSLO 5 Scientific Problem Solvers	<i>Students interpret and solve quantitative problems using one or more threshold concepts of the core science fields (biology, chemistry, and physics).</i>

A fuller description of each PSLO, including direct and indirect assessment, the assessment tool, and expected levels of performance may be found in the following pages. Rubrics for each of the PSLOs may be found in Appendix A.

Graduates from the BS in Natural Science program will follow Jesus as:

PSLO 1 — TRUTH-CENTERED SCIENTISTS

Students will identify, develop and articulate the connections that integrate the key core sciences (biology, chemistry, and/or physics) and biblical truth into a coherent framework (worldview).

Rationale and Summary of the Prophetic Support: Throughout the Natural Science’s biology, chemistry, and physics curriculum, Weimar Institute students are challenged to identify the connections between the apparently disconnected concepts found within the Bible and the core scientific disciplines. Students identify biblical passages, themes or principles that are relevant to and illustrative of various points/concepts or topics within the core sciences. That is, “How do the core science topics reveal the character or nature of God and His kingdom?”

As a further part of their study, students become versed in the core scientific arguments (apologetics) for the truth and rationality of Christian belief—including the threshold concept of a short Special Creation, the Fall, and a worldwide Flood portrayed in Genesis 1-11 and reiterated in the last day message found in Revelation 14:6-7, “worship Him who created heaven and earth the sea and springs of water.” Toward this end, the faculty of Weimar Institute hold that there is no conflict between “God’s truth” and “scientific truth”—rather, conflict arises when there are incompatible interpretations, presuppositions, preferences and worldviews.

• Relationship to WSCUC Recommended and Core Competencies

- This PSLO includes components of the recommended WSCUC competencies: *Lifelong Learning*, *Creative Thinking*, and *Integrative Learning*.

• Assessment Tools for PSLO 1

- The direct assessment tool for PSLO #1 is the Natural Science PSLO #1: Truth-Centered Scientist Rubric, below.

• Signature Assignment for PSLO 1

- **Direct Assessment** — Written, oral or media based presentation demonstrating the student’s ability to identify, develop, and articulate the connections that integrate core sciences and biblical truth into a coherent framework assessed via the *PSLO #1: Truth-Centered Scientist Rubric*, below.

Specifically this includes:

- 1) Devotionals Integrating Science and Scripture—collected in upper division courses in CHEM 311/312 (Organic Chemistry 1/2) and/or CHEM 353 (Biochemistry)
 - a) PSLO 1a (Identification of Connections)
 - b) PSLO 1b (Integration of Connections)
 - c) PSLO 1c (Depth of Scriptural Defense)
 - d) PSLO 1d (Depth of Scientific Defense)
 - 2) Oral presentation — collected in NSCI 290 (now NSCI 310)¹ *Issues in Origins* via the Final Exam where students are given a case study detailing an encounter where they are be asked to give a reason for their faith.
 - a) PSLO 1c (Depth of Scriptural Defense)
 - b) PSLO 1d (Depth of Scientific Defense)
 - 3) Embedded questions from written mid-term exam for NSCI 290 (now NSCI 310), *Issues in Origins*
 - a) PSLO 1e (Core Christian Apologetics) — What would be the implications and ramifications if God created through progressive creation or theist evolution? Name as many as you can with as much depth as you can. (Example from Mid-Term Spring 2018, Question 1)
 - b) PSLO 1f (Awareness of Conflicts) — Explain the Term “Evolution Through Natural Selection” including the role that “mutation” and “phenotypes” play in this theory. (Mid-Term Spring 2018, Question 6)
- **Indirect Assessment** — Student learning is indirectly assessed through end-of-course student evaluations or surveys which provide feedback as to the student perception of their level of learning in this area.

¹ This course is a required course for all Natural Science, B.S. major and Religion, B.A. majors; however, beginning with the 2018-2019 Academic Handbook, this course will also be used for General Education Program assessment.

- **Specific Performance Criteria (PCs) for PSLO #1:**

- Expected PC is >75% of successful graduates scoring at Proficient or higher for each rubric component (RC) of the Truth-Centered Scientist Rubric
- cf. Appendix A — PSLO 1 Rubric — Truth Centered Scientists
- cf. Appendix F — Program Assessment Map
- cf. Appendix G — Multi-Year Program Assessment Plan

Graduates from the BS in Natural Science program will follow Jesus as:

PSLO 2 — COMPREHENSIVE HEALTH EVANGELISTS

Students practice and promote physical, emotional, mental, and spiritual healing by leading in collaborative, community-based programming among diverse people groups domestically or internationally.

Rationale and Summary of the Prophetic Support: Weimar Institute Natural Science program graduates will “carry out in their daily lives the spirit of God's commandments... (by) *exercising true benevolence to man,*” which will give them “*moral power to move the world*” (White, 4T, 58.1). Isaiah 58 reveals the ministry that is encompassed by “comprehensive health evangelism”—to loose the bonds of wickedness (spiritual healing), undo heavy burdens (emotional and mental healing), to let the oppressed go free, to break every yoke, to share your bread with the hungry (physical healing), to bring to your house the poor who are cast out, and to cover the naked.

To accomplish our Natural Science Program vision to Heal a Hurting World, we believe students who graduate from Weimar Institute Natural Science Program must embrace the principles that promote physical, emotional, mental and spiritual health as revealed in the life and ministry of Jesus Christ, that he “went throughout all the cities and villages, teaching in their synagogues and proclaiming the gospel of the kingdom and healing every disease and every affliction” (Matthew 9:35). The level to which students embrace these principles will be best understood by their everyday behaviors as well as their level of participation in community-based health programs—provided to a few or for many.

• **Relationship to WSCUC Recommended and Core Competencies.**

- This PSLO includes components of the recommended WSCUC competencies: *Civic Engagement, Creative/ Innovative Thinking, and Appreciation for Diversity.*

• **Assessment Tools for PSLO 2**

- The assessment tool for PSLO #2 is the *Natural Science's PSLO #2: Comprehensive Health Evangelists Rubric*, below.

Signature Assignment for PSLO 2

- **Direct assessment**—written, oral or media based presentation documenting the student’s ability to promote physical, emotional, mental and spiritual wellness by leading out in collaborative, community-based programming among diverse people groups.
- **Indirect assessment**—Student learning is indirectly assessed through student self-evaluation through end-of-semester surveys, self-reflective essay, and course evaluations. These provide feedback as to the student perception of their level of engagement and learning in this area.

• **Specific Performance Criteria (PCs) for PSLO 2**

- Expected PC is >75% of successful graduates scoring at *Proficient* or higher for each rubric component (RC) of the *Comprehensive Health Evangelist Rubric*—developed through required experiences and assessed in the Capstone course and/or during clinical rotations (HLED 331, 431, 441).
- cf. Appendix A — PSLO 2 Rubric — Comprehensive Health Evangelists
- cf. Appendix F — Program Assessment Map
- cf. Appendix G — Multi-Year Program Assessment Plan

Graduates from the BS in Natural Science program will follow Jesus as:

PSLO 3 — CRITICAL THINKERS

Students investigate a question related to the core sciences (biology, chemistry, physics) and display their ability to discriminate between scholarly and non-scholarly publications as they articulate a relevant question, assemble a collection of publications and identify strengths and weaknesses in conclusions including sources of bias, and a priori assumptions.

Rationale and Summary of the Inspired Support: “Critical Thinking” has been variously defined in the academic literature as the ability to analyze, contrast, criticize and assess truth claims based on objective standards (Sousa, 2011, p. 253, 262) and to integrate previous knowledge with new knowledge—making numerous links between ideas (Houghton, 2004).

In the book *Education*, we read:

“Every human being, created in the image of God, is endowed with a power akin to that of the Creator—individuality, power to think and to do....It is the work of true education to develop this power, to train the youth to be thinkers, and not mere reflectors of other men's thought.” (White, 1903/1952, p. 17)

Throughout Scripture, the prophets called upon God's people to make good, discriminating choices (Joshua 24:15). King Solomon asked of God an “understanding mind” that he might know how to “discern between good and evil” (1 Kings 3:9). In the New Testament, the apostle Paul admonished his hearers to “test all things; hold fast what is good” (1 Thessalonians 5:21), and the apostle John added, “Beloved, do not believe every spirit, but test the spirits to see whether they are from God. For many false prophets have gone out into the world” (1 John 4:1). Thus, God calls on His followers to decide, “not...from impulse, but from from the weight of evidence” (Desire of Ages, p. 458).

In our own search for truth, we have no fear of rigorous examination. In fact, we recognize that as limited human agents we understand truth only partially. Indeed, it is our honor and duty to join the never-ending search for truth, and yet we quickly add that where and how we search for truth is of vital importance—that is, not all information sources are equally correct and worthy of deep exploration.² Thus, as part of a faith-based institution of higher learning, the Natural Science faculty, staff and students have chosen to explore an educational philosophy and practice that is decidedly informed by the biblical model expressed in the Holy Scripture (God's primary means of revelation) and the writings of Ellen G. White.

At the same time, we believe our calling is not to control minds, but to develop a community of learners who are “thinkers, and not mere reflectors of [other's] thought” (White, 1903/1952, p. 17). Consequently, we also realize that we may also study and utilize nature (Psalm 19), “reason, reflection, and research to discover truth and its implications for human life here and in the hereafter, while recognizing the limitations inherent in all human endeavors” (A Statement of Seventh-day Adventist Educational Philosophy, Version 7.9).

Toward this end, Natural Science students are required to reflect upon their discoveries in the following questions:

- 1) Are there any areas within Weimar Institute Foundational Documents that are related to the area of research?
- 2) How do their conclusions fit with the documents?

• **Relationship to WSCUC Recommended and Core Competencies.**

- This PSLO includes several of the required and recommended WSCUC core competencies: *Critical Thinking*, *Information Literacy*, *Creative Thinking*, *In-Depth Study in a Major Field*, and *Lifelong Learning*.

• **Assessment Tool for PSLO 3**

- The assessment tool for PSLO #3 is the *Natural Science's PSLO #3: Critical Thinkers Rubric*, below.

• **Signature Assignment for PSLO 3**

- **Direct Assessment**—Literature review that demonstrates the student ability to discriminate between scholarly and non-scholarly publications by articulating a relevant question, assembling a collection of publications and identifying strengths and weaknesses in methods and conclusions including sources of bias, and a priori assumptions.

² Adapted from the Weimar Institute *Philosophical and Educational Foundations and Academic Freedom Policy*, Section 4.4.1.

- **Indirect Assessment**—Student learning is indirectly assessed through student self-evaluation or self-reflective essay which provide feedback as to the level of student engagement and perceived learning in this area. Students may also be asked to provide a recollection of their search strategies for locating sources.
- **Specific Performance Criteria (PCs) for PSLO 3**
 - Expected PC is >75% of successful graduates scoring at *Proficient* or higher for each rubric component (RC) of the *Critical Thinking Rubric*—developed through General Education and Natural Science Program courses and assessed within upper level program courses or the Natural Science Capstone.
 - cf. Appendix A — PSLO 3 Rubric — Critical Thinkers
 - cf. Appendix F — Program Assessment Map
 - cf. Appendix G — Multi-Year Program Assessment Plan

Graduates from the BS in Natural Science program will follow Jesus as:

PSLO 4 — EFFECTIVE COMMUNICATORS

Students communicate the threshold (key) concepts of their field in both written and oral forms.

Rationale and Summary of the Prophetic Support: Throughout history, God has called his people to be communicators of truth—both by demonstration and declaration, in both written and oral form. To Abraham he said, “In you all the families of the earth shall be blessed” (Genesis 12:3; Acts 13:47). Through the prophet Isaiah, God spoke, “I will make you as a light for the nations, that my salvation may reach to the end of the earth” (Isaiah 49:6; Luke 2:42). The apostle Paul admonished the early church, “Let your speech always be gracious, seasoned with salt” (Colossians 4:6); the prophet Isaiah, wrote of the Messiah that He would “know how to speak a word in season to him that is weary” (Isaiah 50:4, Proverbs 15:23). Solomon declared that “a word fitly spoken is like apples of gold in a setting of silver” (Proverbs 25:11).

Thus, the extent of one’s usefulness as an educated person is often limited by the ability to communicate. Indeed, Ellen White writes, “However great a man’s knowledge, it is of no avail unless he is able to communicate it to others” (White, 1943/1915, 253), and “The extent of a Christian’s usefulness is measured by his power to communicate that which he has received” (White, 1988, 43).

• Relationship to WSCUC Recommended and Core Competencies

- This PSLO includes several of the required and recommended WSCUC core competencies: *Written Communication*, *Oral Communication*, and *Information Literacy*.

• Assessment Tool for PSLO 4

- The direct assessment tool for PSLO #4 is the *Natural Science’s PSLO #4: Effective Communicators Rubric*, below.

• Signature Assignment for PSLO 4

- **Direct Assessment**—Written and oral presentations where students demonstrate the ability to clearly communicate the learnings of the core sciences in both written and oral format.
- **Indirect Assessment**—Student learning is indirectly assessed through self-reflective essay on the perceived level of their learning or on their strategies for completing the assignment. These provide feedback as to the student’s level of engagement and his or her perception of learning in this area.

• Specific Performance Criteria (PCs) for PSLO 4

- Expected PC is >75% of successful graduates scoring at *Proficient* or higher for each rubric component (RC) of the *Effective Communicators Rubric*—developed through General Education and Natural Science Program courses and assessed within upper level program courses or the Natural Science Capstone.
- cf. Appendix A — PSLO 4 Rubric — Effective Communicators
- cf. Appendix F — Program Assessment Map
- cf. Appendix G — Multi-Year Program Assessment Plan

Graduates from the BS in Natural Science program will follow Jesus as:

PSLO 5 — SCIENTIFIC PROBLEM SOLVERS

Students interpret and solve quantitative problems using one or more threshold concepts of the core science-fields, including biology, chemistry and physics.

Quantitative literacy and the ability to solve problems has been described as the ability to analyze quantitative information (graphs, tables, mathematical formulas), interpret quantitative information and draw appropriate inferences from it, estimate and check answers to mathematical problems, communicate quantitative information verbally, numerically, algebraically and/or graphically, and recognize the limitation of mathematical and/or statistical methods (CUPM Subcommittee on Quantitative Literacy, 1994).

The ability to solve quantitative problems within the core sciences is a characteristic we wish to see developed in the WI Natural Science Program graduate. Huba and Freed define problem solving as the ability to identify and assemble necessary information and the ability to engage intensely and initiate tasks that push the limits of their own knowledge and abilities, in the face of ambiguity, when answers or solutions are not immediately apparent (2000, p. 112-113). Such ability is paramount in today's complex society.

The Natural Science key (threshold) concepts include the following:

• **Biology/Biochemistry:**

- Principles that govern the ability of molecules, cells, tissues, and organs within living organisms to interact together to maintain a stable environment within an ever-changing external environment.
- Principles that govern the structure, function, and reactivity of biologically important molecules including DNA, RNA, proteins, carbohydrates and lipids.
- Principles that govern the transmission of genetic information via DNA, RNA, and proteins.
- Principles that govern bioenergetics and fuel metabolism in biological systems, including glycolysis, gluconeogenesis, the citric acid cycle, and the electron transport chain.
- Principles that govern the structure and function of cell membranes, including inter- and intracellular signaling, and membrane transport.
- Principles that govern the statistical analysis of biological and research data.
- Principles that govern dynamic chemical equilibrium and the steady state condition in biological systems.
- Principles that govern the separation and purification of organic and biomolecules.

• **Chemistry/Physics:**

- Nature of atoms and their electronic structure.
- Principles that govern the physical properties of gases, liquids, solutions, and solids, including intermolecular attractive forces (IMFs) and colligative properties.
- Nature of molecules and the principles that govern the physical properties and chemical reactivity in both chemical and biological systems, including ionic and covalent bonding, hybridization theory, molecular orbital theory and electron movement (arrow pushing).
- Principles that govern rates of reactions and chemical kinetics in biological (enzymatic) and chemical systems.
- Principles that govern thermodynamics in biological and chemical systems—including the implication of entropy (S), enthalpy (H) and Gibbs Free Energy (G) on directionality (flux) of chemical reactions.
- Principles that govern electrochemical reactions and electrochemical circuits

• **Relationship to the WSCUC Recommended and Core Competencies.**

- This PSLO includes several of the required and recommended WSCUC core competencies: *Quantitative Literacy*, *In-Depth Study in a Major Field*, and *Critical Thinking*

• **Assessment Tools for PSLO #5.**

- The direct assessment tool for PSLO #5 is the *Natural Science's PSLO #5: Scientific Problem Solvers Rubric*, Appendix A.

• **Signature Assignment for PSLO #5:**

- **Direct Assessment**—Assignments where students interpret and solve quantitative problems using threshold concepts of the core sciences, including biology, chemistry and physics.

- **Indirect Assessment**—Student learning is indirectly assessed through student self-reflection on his or her problem solving ability and a reflection on his or her own process of problem solving. This will provide feedback as to the student’s level of engagement and perception of his or her learning in this area.
- **Specific Performance Criteria (PCs) for PSLO #5:**
 - A raw score of >70 % (or national average > 80%) on the General Chemistry ACS exam (and/or selected questions from the ACS national exam based on content deemed pertinent to non-chemistry major, Pre-Med students preparing for the MCAT exam) in CHEM 151 and CHEM 152 for >90% of the students completing the course(s).
 - A raw score of >70% (or national average > 80%) on the Organic Chemistry ACS exam (and/or selected questions from the ACS national exam based on content deemed pertinent to non-chemistry major, Pre-Med students preparing for the MCAT exam) in CHEM 311 and CHEM 312 for >90% of the students completing the course(s).
 - Expected PC is >90% of successful graduates scoring at *Proficient* or higher for each rubric component (RC) of the *Scientific Problem Solvers Rubric*—developed through General Education and Natural Science Program courses and assessed within upper level program courses.
 - cf. Appendix A — PSLO 4 Rubric — Effective Communicators
 - cf. Appendix F — Program Assessment Map
 - cf. Appendix G — Multi-Year Program Assessment Plan

References

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Natural Science Program Faculty

Faculty / Education

Courses Taught

CHRISTINA R. HARRIS (2010)

- Chair, Health Sciences Department
- Faculty, Health Sciences Department
- Director of Assessment & Institutional Research
- Post-Doctoral Training, 1998-2000
Memorial Sloan Kettering Cancer Center
New York, New York
- PhD, Organic Chemistry
University of Colorado, Boulder, 1997
- BS, Chemistry
Oklahoma State University, Stillwater, 1992

- CHEM 151/151a, General Chemistry 1
- CHEM 152/152a, General Chemistry 2
- CHEM 311/311a, Organic Chemistry 1
- CHEM 312/312a, Organic Chemistry 2
- CHEM 353, Biochemistry
- CHEM 111, Survey of Chemistry
- NSCI 310, Issues in Origins (GE)



JOHN PEACOCK (2012)

- Faculty, Health Sciences Department
- Chair, General Education Committee
- MA, Applied Physics
Oregon Health & Science University, 1994
- BS, Physics and Math
Elmhurst College, 1989

- MATH 121/121a, Survey of Math (GE)
- MATH 122/122a, Pre-Calculus 1 (GE)
- MATH 126, Pre-Calculus 2
- PHYS 271/271a, Physics 1
- PHYS 272/272a, Physics 2
- NSCI 310, Issues in Origins (GE)



RON CELESTINE (2016)

- Faculty, Health Sciences Department
- Chair, Diversity Committee
- Doctor of Naturopathic Medicine, 2015
Bastyr University, Kenmore, WA
- PhD, Biological Sciences
Western Michigan University, Kalamazoo, 2006
- MS, Biology
Andrews University, Berrien Springs, MI, 2001
- BS, Biology, Andrews University via University of
the Southern Caribbean, Trinidad, 1996

- BIOL 134/134a, Biology 1
 - BIOL 135/135a, Biology 2
 - BIOL 223/223a, Microbiology
 - BIOL 361/361a, Advanced Physiology
 - HLED 231/231a, Intro to *CDLS
Medicine
 - HLED 331/331a, *CDLS Medicine 1
Rotation
 - HLED 431/431a, *CDLS Medicine 2
Rotation
 - NSCI 310, Issues in Origins (GE)
- *Chronic Disease & Lifestyle Medicine



MASATO MARK KINJO (2017)

- Faculty, Health Sciences Department
- Doctor of Naturopathic Medicine, 2007
Bastyr University, Kenmore, WA
- Loma Linda University, 1998
Basic Medical Science
- B.A. Health Science, Cum Laude
Walla Walla University, 1998

- BIOL 120/120a, Survey of A&P
- BIOL 121/121a, A&P 1
- BIOL 122/122a, A&P 2
- FDNT 214, Human Nutrition



Berquin Feese (2018)

- Faculty, Health Sciences Department
- PhD, Biological Sciences
Carnegie Mellon University, Pittsburg, 2017
- BS, Chemistry
William Carey University, Hattiesburg, MS, 2011

- CHEM 111/111a, Survey of Chemistry
- BIOL 223/223a, Microbiology
- BIOL 402, Cell Biology / Genetics
- NSCI 311, Intro to Neuroscience
Seminar
- NSCI 312, Diseases of the Nervous
System



Faculty / Education

Courses Taught

ROGER GALLANT (2015)

- Adjunct Faculty, Health Sciences Department
- Physician, Stallant Health Care
- MD, Loma Linda University, 1994
- BS, Biology, Loma Linda University, 1988

- HLED 331/331a, Chronic Disease and Lifestyle Medicine 1 Rotation
- HLED 431/431a, Chronic Disease and Lifestyle Medicine 2 Rotation



NEIL NEDLEY (2008)

- Adjunct Faculty, Health Sciences Department
- President, Weimar Institute
- Post-Doctoral Training, 1986-1989
Kettering Medical Center/Wright State University
Dayton, Ohio
- MD, Loma Linda University, 1986
Loma Linda, California
- Andrews University, 1979-1982
Major: Biochemistry, Minor: Religion

- HLED 111, Optimize Your Brain (GE)
- HLED 324, Principles of Health (GE)
- HLED 441, Depression and Anxiety Recovery Rotation



EDDIE RAMIREZ (2015)

Adjunct Faculty, Health Science Department

- Adjunct Faculty, Health Sciences Department
- CEUX -Centro de Estudios Universitarios Xochicalco
2005-2011, Medical Doctor
- UABC - Universidad Autonoma de Baja California
1990-1994, Degree: B.S. in Computer Science

- HLED 461, Research Methods
- HLED 462, Adv. Research Methods



Appendix A: PSLO Rubrics

PSLO 1 RUBRIC — TRUTH-CENTERED SCIENTISTS

#	‡		Emerging	Developing	Proficient	Exemplary
4a	1a	Identification of Field-Related Connections ^{3,4}	<ul style="list-style-type: none"> shows a minimal awareness of the connections between biblical truth and examples, facts, or theories from the major field of study or perspective. requires prompting to recognize connections. 	<ul style="list-style-type: none"> shows a some sense of the connections between biblical truth and examples, facts, or theories from the major field of study or perspective. requires some prompting to recognize deeper connections. may represent that presented by the instructor with minor developments. 	<ul style="list-style-type: none"> connects the biblical truth with examples, facts, or theories from the major field of study or perspective. independently identifies points in which field-related concepts complement and illuminate biblical truth (or <i>vice versa</i>). may represent that presented by the instructor but with significant development. 	<ul style="list-style-type: none"> insightfully connects biblical truth with examples, facts, or theories from the major field of study or perspective in a creative and novel manner. independently identifies points in which field-related concepts complement, enrich and illuminate biblical truth (or <i>vice versa</i>). is novel to that which was presented during class.
4b	1b	Integration of Field-Related Content ^{4,5,6}	<ul style="list-style-type: none"> has connections that are not clear with no obvious sense of integration between the field and biblical content. connections are overly simple; does not advance the intended purpose. leaves out obvious connections. 	<ul style="list-style-type: none"> has connections that are “loose” or overly simple. shows a limited, yet developing ability to advance the intended purpose. leaves some obvious connections overlooked or under-developed. 	<ul style="list-style-type: none"> has solid connections. advances the intended purpose. solidly developed the intended connections. 	<ul style="list-style-type: none"> solidly advances the intended purpose. arrives at a sophisticated understanding. solidly integrates both field-related and biblical modes of thinking. leaves no important connections overlooked. develops some less obvious connections.
4c	1c	Depth of Biblical Content	<ul style="list-style-type: none"> is fairly simple. may not include sufficient or accurate Scriptural or prophetic content. has <u>some</u> noticeable biblical misunderstandings. 	<ul style="list-style-type: none"> is somewhat shallow but obvious efforts to develop biblical content is apparent. may show difficulty in using both Scriptural prophetic content. has some minor biblical misunderstandings. 	<ul style="list-style-type: none"> is insightful. uses appropriate Scriptural <u>and</u> prophetic content. Scriptural and prophetic references are accurate. has <u>no</u> biblical misunderstandings 	<ul style="list-style-type: none"> is biblically deep and insightful. uses appropriate Scriptural <u>and</u> prophetic content. has <u>no</u> biblical misunderstandings. Scriptural references are accurate.
4d	1d	Depth of Science Content	<ul style="list-style-type: none"> shows a relatively simple understanding of the scientific content has one ore more significant scientific misunderstandings. multiple errors in science-related terminology usage. shows little direct reference to previous learning in the sciences. 	<ul style="list-style-type: none"> presents appropriate scientific content. has an appropriate but somewhat pedestrian understanding of the scientific content. has minor errors in understanding and/or occasionally uses incorrect scientific terminology. makes shallow references to previous learning. 	<ul style="list-style-type: none"> presents adequate <u>and</u> appropriate scientific content with an appropriate level of understanding. has essentially no errors or misunderstandings. correctly uses scientific terminology. makes appropriate references to previous scientific learning. 	<ul style="list-style-type: none"> presents deep, insightful, and appropriate core science content. shows a high level of understanding with no apparent errors or misunderstandings. consistently uses the correct scientific terminology. makes explicit and appropriate references to previous scientific learning.

#	‡		Emerging	Developing	Proficient	Exemplary
4e	1e	Core Christian Apologetics	<p>Student's work:</p> <ul style="list-style-type: none"> shows minimal ability to identify areas where the field-related content supports the Christian world view. uses minimal or very few field-related <u>or</u> science-based concepts in a defensible Christian apologetic. has noticeable errors in logic or reasoning. 	<p>Student's work:</p> <ul style="list-style-type: none"> shows a limited but developing ability to identify areas where the field-related content supports the Christian world view. shows a limited but still developing ability to use field-related <u>or</u> science-based concepts in a defensible Christian apologetic. has a few errors in logic or reasoning. 	<p>Student's work:</p> <ul style="list-style-type: none"> shows a proficient ability to identify areas where the field-related content supports the Christian world view. shows a proficient ability to use field-related <u>or</u> science-based concepts in a defensible Christian apologetic. has no errors in logic or reasoning. 	<p>Student's work:</p> <ul style="list-style-type: none"> shows a distinguished ability to identify areas where field-related content supports the Christian world view. shows a distinguished ability to use field-related <u>or</u> science-based concepts in a defensible Christian apologetic. well-developed logic and reasoning with no errors.
4f	1f	Awareness of Conflicts	<p>Student's work:</p> <ul style="list-style-type: none"> vaguely identifies areas of apparent conflict between biblical faith and field-related concepts. shows minimal or no ability to identify pre-suppositions, assumptions, and/or limitations of current field-related understandings <u>or</u> scientific naturalism. shows minimal or no ability to distinguish between facts and the interpretation of facts. 	<p>Student's work:</p> <ul style="list-style-type: none"> shows limited ability to identify one or two areas of apparent conflict between biblical faith and field-related concepts. shows a limited but developing ability to identify pre-suppositions, assumptions, and/or limitations of current field-related understandings <u>or</u> scientific naturalism. shows a limited but developing ability to distinguish between facts and the interpretation of facts. 	<p>Student's work:</p> <ul style="list-style-type: none"> identifies one or two areas of apparent conflict between biblical faith and field-related concepts. identifies pre-suppositions, assumptions, and/or limitations of current field-related understandings <u>or</u> scientific naturalism. shows proficient (adequate) ability to distinguish between facts and the interpretation of facts. 	<p>Student's work:</p> <ul style="list-style-type: none"> shows a <u>developed and mature ability</u> to identify and discuss <u>areas</u> of apparent conflict between biblical faith and current field-related understandings. <u>clearly and thoroughly</u> identifies and discusses pre-suppositions, assumptions, and limitations of current field-related understandings <u>or</u> scientific naturalism. <u>adeptly</u> distinguishes between facts and the interpretation of facts.

‡ Program Student Learning Outcome (PSLO)

corresponding Institutional Student Learning Outcome (ISLO)

¹Concept and components of this rubric were adapted from: Boix Mansilla, V., Dawes Duraisingh, E., Wolfe, C.R., & Haynes, C. (2009).

Targeted Assessment Rubric: An Empirically Grounded Rubric for Interdisciplinary Writing. *The Journal of Higher Education* 80 (3) 334 – 353.

²Signature Assignments for this PSLO will likely be done in writing and/or through an oral presentation—if so, please assess the assignment using (portions) of the rubric developed for PSLO #4, *Effective Communicators*.

³Adapted from AAC&U VALUE Rubric: Life Long Learning (Transfer)

⁴Adapted from AAC&U VALUE Rubric: Creative Thinking (Connecting, Synthesizing, Transforming)

⁵Adapted from AAC&U VALUE Rubric: Creative Thinking (Innovative Thinking)

⁶Adapted from AAC&U VALUE Rubric: Integrative Learning (Connection to Discipline)

PSLO 2 RUBRIC — COMPREHENSIVE HEALTH EVANGELISTS

#	‡		Emerging	Developing	Proficient	Exemplary
2a	2a	Practices NEWSTART Principles	<p>Student:</p> <ul style="list-style-type: none"> realizes the importance of the NEWSTART¹ principles but does not practice them consistently in daily life. occasionally shows reckless behavior in health of body, mind and spirit. 	<p>Student:</p> <ul style="list-style-type: none"> realizes the importance of the NEWSTART¹ principles and incorporates many of the principles in daily life. may on occasion be inconsistent in daily life. 	<p>Student:</p> <ul style="list-style-type: none"> <u>consistently</u> practices <u>nearly all</u> of the NEWSTART¹ principles in daily life. documents evidence of improved practices² and/or improved physical health.³ 	<p>Student:</p> <ul style="list-style-type: none"> <u>consistently</u> practices <u>all</u> of the NEWSTART¹ principles encourages others by example. documents evidence of improved practices² and/or improved physical health.³
2b	2b	Promotes NEWSTART Principles	<p>Student:</p> <ul style="list-style-type: none"> realizes the importance of whole-person⁴ community health programming. has participated in a one-day event.⁵ has limited or no experience with long-term programming.⁶ 	<p>Student:</p> <ul style="list-style-type: none"> promotes whole-person⁴ community-based programming frequently <u>participates in</u> either short or long-term community health programming.⁵⁻⁶ 	<p>Student:</p> <ul style="list-style-type: none"> promotes whole-person healing.⁴ gives evidence of the ability to <u>organize or lead out</u> in some aspect of short- or long-term community health programming.⁵⁻⁶ 	<p>Student:</p> <ul style="list-style-type: none"> actively and energetically promotes whole-person healing⁴ give evidence of the ability to effectively <u>lead out or organize</u> some aspect of short or long-term community based programming.⁵⁻⁶
2c	2c	Identifies Community Needs⁷	<p>Student:</p> <ul style="list-style-type: none"> shows the desire to <u>participate</u> in the process of assessing whole-person⁴ community needs. displays little ability to assist in identifying resources to implement community-based CHE. 	<p>Student:</p> <ul style="list-style-type: none"> <u>participates</u> in the process to assess whole-person community health needs.⁴ displays some ability to assist in the identification of resources to implement community-based CHE.⁸ 	<p>Student:</p> <ul style="list-style-type: none"> <u>participates</u> in and is able to <u>collaboratively identify</u> whole-person community health needs.⁴ can identify, procure and mobilize many of the needed resources to implement community-based CHE.⁸ 	<p>Student:</p> <ul style="list-style-type: none"> has a distinguished ability to <u>collaboratively lead</u> to identify community health needs.⁴ is able to identify, procure and mobilize nearly all of the needed resources to implement CHE⁸ in the community.
2d	2d	Engages in Collaborative Leadership⁹	<p>Student:</p> <ul style="list-style-type: none"> engages team members by taking turns. listens to others without interrupting. 	<p>Student:</p> <ul style="list-style-type: none"> engages team members in ways that facilitate their contributions to meetings. restates the views of other team members and/or asking questions for clarification developing ability to build upon or synthesize the contributions of others. 	<p>Student:</p> <ul style="list-style-type: none"> takes initiative in collaborative leadership assists in meeting ministry goals engages team members in ways that facilitate their contributions by constructively building upon or synthesizing the contributions of others. 	<p>Student:</p> <ul style="list-style-type: none"> has a distinguished ability to lead collaboratively. guides and assists in meeting ministry goals. communicates a vision, mission or purpose that encourages commitment and action from others. Seeks and values the involvement of others. Listens to and considers others' points of view.
2e	2e	Engages with Diverse People Groups¹⁰	<p>Student:</p> <ul style="list-style-type: none"> has a limited but emerging awareness of the perspectives and assumptions of his / her Christian worldview.¹¹ prefers to work with persons of his or her own socioeconomic, cultural, ethnic and/or religious group has an emerging desire to learn from other people groups.¹² 	<p>Student:</p> <ul style="list-style-type: none"> has an emerging yet somewhat developed awareness of the perspectives and assumptions of his / her Christian worldview;¹¹ has an emerging ability to act in a supportive manner that recognizes and empathizes with the feelings and challenges of diverse people groups; works successfully with diverse people groups;¹² has a developing desire to learn from other people groups. 	<p>Student:</p> <ul style="list-style-type: none"> is aware of the perspectives and assumptions of his / her Christian worldview;¹¹ often acts in a supportive, respectful manner. recognizes and empathizes with the feelings and challenges of others. works successfully with people of diverse backgrounds desires to learn from other people groups.¹² 	<p>Student:</p> <ul style="list-style-type: none"> has a sophisticated awareness of the perspectives and assumptions of his / her Christian worldview;¹¹ acts in a supportive manner. recognizes and empathizes with the feelings and challenges of diverse people groups. adapts to and works successfully with people of diverse backgrounds; learns from other people groups.¹²

#	‡		Emerging	Developing	Proficient	Exemplary
2f	2f	Evidence of Personal Growth and Commitment to CHE¹³	Student: <ul style="list-style-type: none"> provides little evidence of personal growth as result participating in CHE; gives evidence which indicates that involvement was the result of requirements; student shows no sense of continued commitment to CBCHE. 	Student: <ul style="list-style-type: none"> provides some evidence of personal growth as result of CBCHE; suggests that involvement was the result of required experiences rather than a benevolent sense of community identity; shows that as a result of the experience, student has a developing desire for continued commitment to CBCHE. 	Student: <ul style="list-style-type: none"> provides evidence of personal and professional growth as result of CBCHE; describes his or her personal growth as it relates to a reinforced and clarified sense of community identity shows a desire for continued commitment to CBCHE is evident. 	Student: <ul style="list-style-type: none"> provides evidence of significant personal and professional growth as result of CBCHE; describes his or her personal growth as it relates to a strongly reinforced and clarified sense of community identity; displays significant desire for continued CBCHE.

‡ Program Student Learning Outcome (PSLO)

corresponding Institutional Student Learning Outcome (ISLO)

1. NEWSTART is a lifestyle program that originated at the Weimar Institute (1980's) that includes the following eight principles of wellness: Nutrition, Exercise, Water, Sunlight, Temperance, Air, Rest and Trust in God.
2. Improved practices may include giving evidence of improved diet vis a vis a daily food journal or other student-derived evidence.
3. Improved physical health may include evidence of needed weight loss (or weight gain), increased muscle mass, improved blood stats (cholesterol / lipid panel, etc.).
4. Whole-person community-based health programming /healing seeks to include physical, emotional, mental and/or spiritual healing for the whole person.
5. Examples of one-day events include: cooking schools, or health expos, which are typically half-day or one day community programs that provide physical health screening (blood pressure, blood sugar, weight, BMI, etc.), mental health screening, health coaching, and/or spiritual resources.
6. Long-term community-based programs may include: Eight-Week Nedley Depression & Anxiety Recovery/Peak Mental Performance Program™, Complete Health Improvement Plan (CHIP)™, ongoing healthy cooking schools, and/or Eight Weeks to Wellness™ programs, etc.
7. Civic Engagement VALUE Rubric: (Civic Identity and Commitment)
8. Comprehensive Health Evangelism (CHE), Community-Based Comprehensive Health Evangelism (CBCHE)
9. CAS Student Learning and Development Outcome: (Interpersonal Development—Effective Leadership)
10. Civic Engagement VALUE Rubric: (Diversity of Communities and Cultures), Intercultural Knowledge and Commitment VALUE Rubric: (Skills — Empathy)
11. cf. Foundational Documents for a discussion of the Christian Worldview.
12. Diverse groups includes those of another socio-economic, cultural, ethnic or religious group.
13. Civic Engagement VALUE Rubric: (Civic Action and Reflection)

PSLO 3 RUBRIC — CRITICAL THINKERS

#	‡		Emerging	Developing	Proficient	Exemplary
3a	3a	Explanation of Controversy or Problem¹	<p>Student's work:</p> <ul style="list-style-type: none"> shows difficulty defining the scope of the question so that the chosen topic is too general or wide-ranging as to be manageable. has difficulty determining key concepts. states question without adequate clarification or description. 	<p>Student's work:</p> <ul style="list-style-type: none"> defines the scope of the question incompletely so that the question or controversy is too narrow or too broad such that important aspects of the topic are omitted. is able to identify key concepts. states the question. 	<p>Student's work:</p> <ul style="list-style-type: none"> completely defines the scope of the question into a manageable topic. determines key concepts. describes the question with appropriate depth to addresses key aspects of the topic. 	<p>Student's work:</p> <ul style="list-style-type: none"> completely and clearly defines the scope of the question into a manageable topic. determines key concepts. comprehensively describes the question with sufficient depth to addresses significant aspects of the topic.
3b	3b	Assembles Relevant Scholarly Literature from a Variety of Perspectives²	<p>Student's references:</p> <ul style="list-style-type: none"> were retrieved randomly and lack quality. represent a limited number of perspectives.³ are too few to support the demands of the topic. include many non-scholarly.⁴ publications of questionable quality (>40%). do not offer time-appropriate views. 	<p>Student's references:</p> <ul style="list-style-type: none"> were retrieved using simple search strategies from limited and similar sources. represent limited perspectives.³ are limited in ability to support the demands of the topic. include several non-scholarly publications⁴ of questionable quality (>20%). may not offer time-appropriate views. 	<p>Student's references:</p> <ul style="list-style-type: none"> were retrieved using a variety of search strategies and relevant information sources. represent various perspectives.³ adequately support the demands of the topic, but quality may be uneven. include only a few non-scholarly publications⁴ (<10%). offer time-appropriate views. 	<p>Student's references:</p> <ul style="list-style-type: none"> were retrieved from a variety of well-established search strategies. represent a diversity of perspectives.³ adequately to support the demands of the topic. includes only scholarly publications.⁴ offer time-appropriate views.
3c	3c	Analysis of the Controversy or Problem^{5a,5b}	<p>Student's work:</p> <ul style="list-style-type: none"> has little evidence of background research. provides little insight beyond the very basic facts, indicates a low interest.^{5b} has information taken from sources without any interpretation. does not reveal important patterns, differences or similarities. 	<p>Student's work:</p> <ul style="list-style-type: none"> has evidence of an attempt to perform background research. provides occasional insight indicating mild interest in the subject.^{5b} has information taken from sources with some interpretation but not enough to allow a coherent analysis. does not effectively reveal important patterns, differences, or similarities related to the chosen topic. 	<p>Student's work:</p> <ul style="list-style-type: none"> has evidence of appropriate background research. provides in-depth analysis indicating interest in the subject.^{5b} has information taken from sources with enough interpretation to perform a coherent analysis. reveals important patterns, differences, or similarities related to the chosen topic. 	<p>Student's work:</p> <ul style="list-style-type: none"> has evidence of appropriate background research of literature. has an in-depth analysis, yielding a rich awareness, indicating substantial interest in the subject. has information taken from sources with enough interpretation to give a comprehensive analysis. reveals insightful patterns, differences, or similarities related related to the chosen topic.
3d	3d	Recognizes and Discusses Limitations^{3,6}	<p>Student's work:</p> <ul style="list-style-type: none"> does not attempt to discuss relevant limitations of the sources or does so inadequately. does not adequately differentiate fact from opinion or emotional responses. takes expert opinions at face value. 	<p>Student's work:</p> <ul style="list-style-type: none"> attempts to discuss relevant limitations of the sources. does not consistently differentiate fact from opinion or emotional responses. often takes expert opinions at face value. 	<p>Student's work:</p> <ul style="list-style-type: none"> discusses relevant limitations of the sources. is often able to differentiate fact from opinion or emotional responses. questions viewpoints of experts. 	<p>Student's work:</p> <ul style="list-style-type: none"> insightfully discusses relevant limitations of the published research. consistently differentiates fact from opinion or emotional responses. appropriately questions viewpoints of experts.

#	‡		Emerging	Developing	Proficient	Exemplary
3e	3e	Identifies Strengths and Weaknesses in Conclusions ⁷	<p>Student:</p> <ul style="list-style-type: none"> rarely identifies (or incorrectly identifies) specific examples of strengths and weaknesses in research conclusions. rarely identifies and questions <i>a priori</i> assumptions. rarely recognizes and considers sources of bias present in publication's conclusions. 	<p>Student:</p> <ul style="list-style-type: none"> occasionally identifies and provides specific examples of potential strengths and weaknesses in research conclusions. occasionally identifies and questions <i>a priori</i> assumptions. occasionally recognizes and considers sources of bias present in publication's conclusions. 	<p>Student:</p> <ul style="list-style-type: none"> provides specific examples of strengths and weaknesses in research conclusions, when appropriate; and, identifies and questions <i>a priori</i> assumptions. recognizes and considers <u>many</u> sources of bias present in the references. 	<p>Student:</p> <ul style="list-style-type: none"> consistently provides specific examples of potential strengths and weaknesses in research conclusions, when appropriate; and, <u>consistently</u> and <u>thoroughly</u> identifies, evaluates and questions <i>a priori</i> assumptions present within the supporting arguments.
3f	3f	Considers One's Own and Others Assumptions ⁸	<p>Student:</p> <ul style="list-style-type: none"> resists considering views that differ from his/her own. does not recognize or considers sources of bias present within the references. <u>does not recognize</u> his or her own bias and assumptions. identifies a <u>few of the</u> contexts that are relevant when presenting the position. 	<p>Student:</p> <ul style="list-style-type: none"> is sometimes capable of considering views that differ from his/her own. recognizes and considers <u>some</u> sources of bias present within the references. <u>may not yet</u> recognize his/her own bias and assumptions. identifies <u>some</u> of the contexts that are relevant when presenting the position. 	<p>Student:</p> <ul style="list-style-type: none"> considers views that differ from his/her own. recognizes and considers <u>many</u> sources of bias present within the references. <u>often</u> recognizes, analyzes and/or articulates his/her own bias and assumptions. identifies and evaluates how <u>several</u> of these contexts are relevant when presenting the position. 	<p>Student:</p> <ul style="list-style-type: none"> responsibly considers views that differ from his/her own. consistently and accurately recognizes and considers potential sources of bias present within references. <u>consistently</u> recognizes, analyzes and/or articulates his/her own bias and assumptions. clearly identifies and evaluates how <u>each</u> these contexts are relevant when presenting the position.
3g	3g	Formulates an Informed Conclusion ⁹	<p>Student's conclusion to the controversy or problem:</p> <ul style="list-style-type: none"> is informed by limited points of view. shows no synthesis of information, information is fragmented. does not consider the complexities of the controversy. is ambiguous, illogical, simplistic and/or overly obvious, not considering the deeper context of the issue. may be unsupported based on inquiry findings. 	<p>Student's conclusion to the controversy or problem:</p> <ul style="list-style-type: none"> is informed by limited literature research. shows that information from the sources is not synthesized. takes into account only limited the complexities of the controversy. is so general that is may also apply beyond the scope of the inquiry. acknowledges different sides of the controversy or problem. 	<p>Student's conclusion to the controversy or problem:</p> <ul style="list-style-type: none"> is informed by in-depth literature research. shows a synthesis of information from multiple sources; but, contains no extrapolation beyond the inquiry findings. takes into account the complexities of the controversy. acknowledges others' points of view within the stated conclusion. 	<p>Student's conclusion to the controversy or problem:</p> <ul style="list-style-type: none"> is informed by in-depth literature research. shows a synthesis of information from multiple sources with good clarity and depth. extrapolates from the inquiry findings. takes into account the complexities of the controversy. acknowledges the limits of the his/her own position and personal bias. integrates others' points, when appropriate, within the student's position.
3h	3h	Relationship to Foundational Documents ¹⁰	<ul style="list-style-type: none"> Student's evaluation does not consider how it relates to the Weimar Institute Foundational documents. 	<ul style="list-style-type: none"> Student evaluation considers the Weimar Institute Foundational documents, yet merely in a surface treatment. 	<ul style="list-style-type: none"> Student evaluation considers the implications of his or her informed conclusion or judgment as it relates to the Weimar Institute Foundational documents. 	<ul style="list-style-type: none"> Student's evaluation concomitantly and carefully considers both "secular" sources and the Weimar Institute foundational documents in arriving at an informed conclusion.

‡ Program Student Learning Outcome (PSLO)

corresponding Institutional Student Learning Outcome (ISLO)

This rubric has been adapted from: VALUE rubrics and <http://guides.library.cornell.edu/scholarlyjournals>

¹ Adapted from: VALUE Rubric—Critical Thinking (Explanation of Issues)

² Adapted from: VALUE Rubric—Information Literacy (Access the Needed Information)

³ The limitations of sources may include certain characteristics of the design or methodology research study that impacted or influenced the interpretation of the findings that were presented in the source—i.e. to what extent are the results generalizable, valid, reliable, etc. For further discussion, cf. <http://libguides.usc.edu/writingguide/limitations> (last accessed 2/7/2016). The implications of a research article include ethical implications, implications for further research and/or implications of the study in questions.

⁴ Scholarly publications typically include those that are peer-reviewed, (i.e., refereed journal articles) and written by experts in the field; whereas non-scholarly publications (i.e., popular press) are frequently written to arouse curiosity or interest and do not provide an unbiased reporting.

⁵ Adapted from : VALUE Rubric—Inquiry and Analysis (Analysis); Inquiry & Analysis (Existing Knowledge, Research and/or Views)

⁶ Adapted from : VALUE Rubric—Inquiry and Analysis (Limitations and Implications)

⁷ Adapted from : VALUE Rubric—Information Literacy (Evaluate Information and Its Sources Critically)

⁸ Adapted from: VALUE Rubric—Critical Thinking (Influence of Contexts and Assumptions)

⁹ Adapted from: VALUE Rubric—Creative Thinking (Embracing Contradictions); Critical Thinking (Student’s Position); Critical Thinking (Conclusions and Related Outcomes); Inquiry and Analysis (Conclusions)

¹⁰ Weimar Institute Foundational Documents include, but are not limited to the Bible, the writings of Ellen White, and the Seventh-day Adventist Church positions statements on key topics.

PSLO 4 RUBRIC — EFFECTIVE COMMUNICATORS

#	‡		Emerging	Developing	Proficient	Exemplary
5a	4a	Context and Purpose¹	<p>Student’s presentation:</p> <ul style="list-style-type: none"> shows minimal attention to context, purpose, and audience. shows an expectation of only the instructor or self as the audience. uses language that is not appropriate to the audience. 	<p>Student’s presentation:</p> <ul style="list-style-type: none"> shows awareness of the context, purpose, and audience. shows awareness of the audiences’s perceptions and assumptions. uses language that is appropriate to the audience. 	<p>Student’s presentation:</p> <ul style="list-style-type: none"> shows adequate consideration of the context, purpose, and audience. shows alignment with the audience, purpose, and context. uses language that is appropriate to the audience. 	<p>Student’s presentation:</p> <ul style="list-style-type: none"> shows a thorough understanding of the context, purpose, and audience. shows clear awareness of the audience’s perceptions and assumptions. uses language that appropriate to the audience.
5b	4b	Organization and Central Message³	<p>Student’s:</p> <ul style="list-style-type: none"> organizational pattern is not observable within the presentation. work is difficult to “follow.” central message can be deduced, but is not explicitly stated in the presentation. 	<p>Student’s:</p> <ul style="list-style-type: none"> organizational pattern is intermittently observable within the presentation. work may be difficult to “follow” at times. central message is basically understandable but is not often repeated and is not memorable. 	<p>Student’s:</p> <ul style="list-style-type: none"> organizational pattern is clearly and consistently observable within the presentation. students work is readily “followed.” central message is clear and consistent with the supporting material. 	<p>Student’s:</p> <ul style="list-style-type: none"> organizational pattern is clearly, skillful and consistently observable making the content of the presentation cohesive. central message is precisely stated, readily “followed,” appropriately repeated, memorable, and strongly supported.
5c	4c	Content Development₂	<ul style="list-style-type: none"> Students content development is weak. May be inappropriate at times. 	<ul style="list-style-type: none"> Student uses appropriate / relevant content to develop / explore ideas throughout much of the work. 	<ul style="list-style-type: none"> Student uses appropriate, relevant, and compelling content to explore ideas. 	<ul style="list-style-type: none"> Student uses appropriate, relevant, and compelling content to illustrate mastery of the subject.
5d	4d	Control of Syntax and Mechanics⁴	<ul style="list-style-type: none"> Student’s language sometimes impedes meaning because of errors in usage; includes many errors. 	<ul style="list-style-type: none"> Student’s language generally conveys meaning to readers with clarity; writing may include some errors. 	<ul style="list-style-type: none"> Student’s language is straightforward and generally conveys meaning to readers; writing has few errors. 	<ul style="list-style-type: none"> Student’s language is used gracefully and skillfully to communicate meaning to readers with clarity and fluency; writing is virtually error-free.
5e	4e	Access and Use Information Ethically and Legally⁵	<p>Student uses correctly $\leq 2/5$ of following strategies:</p> <ul style="list-style-type: none"> use of citations and references. choice of paraphrasing, summary or quoting. uses of information in ways that are true to the original context. distinguishes between common knowledge and ideas requiring attribution. full understanding of the ethical and legal restrictions on the use of published information. 	<p>Student uses correctly $3/5$ of the following strategies:</p> <ul style="list-style-type: none"> use of citations and references. choice of paraphrasing, summary or quoting. uses of information in ways that are true to the original context. distinguishes between common knowledge and ideas requiring attribution. full understanding of the ethical and legal restrictions on the use of published information. 	<p>Student uses correctly $4/5$ of the following strategies:</p> <ul style="list-style-type: none"> use of citations and references. choice of paraphrasing, summary or quoting. uses information in ways that are true to the original context. distinguishes between common knowledge and ideas requiring attribution. full understanding of the ethical and legal restrictions on the use of published information. 	<p>Student uses correctly $5/5$ of the following strategies:</p> <ul style="list-style-type: none"> use of citations and references. choice of paraphrasing, summary or quoting. uses of information in ways that are true to the original context. distinguishes between common knowledge and ideas requiring attribution. full understanding of the ethical and legal restrictions on the use of published information.
5f	4f	Sources and Evidence⁶	<ul style="list-style-type: none"> Student attempts to use sources to support ideas, but may not adequately support the discipline and genre of the writing. 	<ul style="list-style-type: none"> Student attempts to use credible and/or relevant sources to support ideas that are appropriate for the discipline and genre of the writing. Sources appear <i>pro-forma</i>. 	<ul style="list-style-type: none"> Student consistently uses credible, relevant sources to support ideas that are within the discipline and genre of writing. 	<ul style="list-style-type: none"> Student skillfully uses high quality, credible, and relevant sources to develop ideas that are appropriate to the discipline and genre of the writing.

#	‡		Emerging	Developing	Proficient	Exemplary
5g	4g	Delivery Technique⁷	<ul style="list-style-type: none"> Student's delivery techniques detract from the understandability of the presentation. Student appears uncomfortable; does not use appropriate visual aids or illustrations in the presentation. (5h) 	<ul style="list-style-type: none"> Student's delivery techniques make the presentation understandable Student appears tentative. Student uses appropriate visual aids and illustrations in the presentation to a minimal extent. 	<ul style="list-style-type: none"> Student's delivery techniques make the presentation interesting. Student appears comfortable. Student uses appropriate and somewhat compelling visual aids and illustrations during the presentation. 	<ul style="list-style-type: none"> Students delivery techniques make the presentation compelling. Student appears polished and confident. Student uses attractive, appropriate and compelling visual aids and illustrations during the presentation.
5h	4h	Supporting Material⁸ (Oral)	<p>Student:</p> <ul style="list-style-type: none"> uses insufficient supporting materials. makes reference to information or analysis that is not shown or minimally supports his or her presentation. minimally establishes his or her credibility / authority on the topic. (5j) 	<p>Student:</p> <ul style="list-style-type: none"> uses supporting materials to make appropriate reference to information or analysis that partially supports his or her presentation. only partially establishes the his or her credibility / authority on the topic. 	<p>Student:</p> <ul style="list-style-type: none"> uses supporting materials to make appropriate reference to information or analysis that generally supports his or her presentation. is able to establish his or her credibility / authority on the topic. 	<p>Student:</p> <ul style="list-style-type: none"> uses a variety of types of supporting materials. makes appropriate reference to information or analysis that significantly supports his or her presentation. is able to establish his or her credibility / authority on the topic.

‡ Program Student Learning Outcome (PSLO)

corresponding Institutional Student Learning Outcome (ISLO)

* Refers to both written and oral communication.

- Adapted from VALUE Rubric: Written Communication (Context of and Purpose for Writing); Oral Communication (Language)
- Adapted from VALUE Rubric: Oral Communication (Organization); Oral Communication (Central Message)
- Adapted from VALUE Rubric: Written Communication (Content Development)
- Adapted from VALUE Rubric: Written Communication (Control of Syntax and Mechanics)
- Adapted from VALUE Rubric: Information Literacy (Access and Use Information Ethically and Legally)
- Adapted from VALUE Rubric: Written Communication (Sources and Evidence)
- Adapted from VALUE Rubric: Oral Communication (Delivery)
- Adapted from VALUE Rubric: Oral Communication (Supporting Material)
- Delivery techniques*: Posture, gestures, eye contact, and use of the voice. Delivery techniques enhance the effectiveness of the presentation when the speaker stands and moves with authority, looks more often at the audience than at his/her speaking materials/notes, uses the voice expressively, and uses few vocal fillers ("um," "uh," "like," "you know," etc.).
- Central message*: The main point/thesis/"bottomline"/"takeaway" of a presentation. A clear central message is easy to identify; a compelling central message is also vivid and memorable.
- Supporting material*: Explanations, examples, illustrations, statistics, analogies, quotations from relevant authorities, and other kinds of information or analysis that supports the principal ideas of the presentation. Supporting material is generally credible when it is relevant and derived from reliable and appropriate sources. Supporting material is highly credible when it is also vivid and varied across the types listed above (e.g., a mix of examples, statistics, and references to authorities). Supporting material may also serve the purpose of establishing the speakers credibility. For example, in presenting a creative work such as a dramatic reading of Shakespeare, supporting evidence may not advance the ideas of Shakespeare, but rather serve to establish the speaker as a credible Shakespearean actor.

PSLO 5 RUBRIC — SCIENTIFIC PROBLEM SOLVERS

#	‡		Emerging	Developing	Proficient	Exemplary
—	5a	Defines & Explains Key (Threshold) Concepts in the Core Sciences	<p>Student has a limited disciplinary knowledge base:</p> <ul style="list-style-type: none"> is able to correctly define / explain <u>fewer than half</u> of the (designated) major concepts. 	<p>Student has a developing disciplinary knowledge base:</p> <ul style="list-style-type: none"> is able to correctly define / explain <u>approximately half</u> (50-75%) of the (designated) major concepts. 	<p>Student has a developing disciplinary knowledge base:</p> <ul style="list-style-type: none"> Student is able to define / explain <u>many</u> (~75-90%) of the (designated) major concepts. 	<p>Student has a developing disciplinary knowledge base:</p> <ul style="list-style-type: none"> Student is able to define / explain nearly all (>90%) of the (designated) major concepts.
—	5b	Uses Key (Threshold) Concepts to Analyze and Evaluate Core Science-related Problems	<p>Student has an emerging ability:</p> <ul style="list-style-type: none"> uses limited field-related terminology when responding to questions or problems. ideas do not stem from any particular disciplinary perspective. shows little or no awareness of disciplinary methods or habits of mind. noticeable misconceptions exist. 	<p>Student has a developing ability:</p> <ul style="list-style-type: none"> uses some field-related terminology when responding to questions or problems. uses disciplinary concepts, theories, perspectives in simplistic, general, or mechanical ways. shows an awareness of disciplinary methods and modes of thinking. some misconceptions are present. 	<p>Student has a proficient ability:</p> <ul style="list-style-type: none"> uses appropriate field-related terminology when responding to questions or problems. uses concepts and theories according to discipline standards. uses disciplinary perspectives, findings, and examples. accurately employs disciplinary methods of thinking with few misconceptions. 	<p>Student has an exemplary ability:</p> <ul style="list-style-type: none"> uses appropriate terminology. includes an organized network of concepts, theories, perspectives, findings, and examples when responding to questions or problems.. offers insightful analysis and interpretation. employs disciplinary methods and habits of minds with no apparent misconceptions.
6b	5c	Interprets Mathematical Constructs in the Core Sciences¹	<p>Student:</p> <ul style="list-style-type: none"> attempts to explain information presented in mathematical forms; but, draws incorrect conclusions about what the information means. significant errors are present. 	<p>Student:</p> <ul style="list-style-type: none"> provides somewhat accurate explanations of information presented in mathematical forms. occasionally makes minor errors related to computations or units. 	<p>Student:</p> <ul style="list-style-type: none"> provides accurate explanations of information presented in mathematical forms. few errors are apparent but do not effect the final answer. 	<p>Student:</p> <ul style="list-style-type: none"> provides accurate explanations of information presented in mathematical forms. makes appropriate inferences based on that information. no errors are present.
6d	5d	Identify Strategies² and Necessary Assumptions³	<p>Student:</p> <ul style="list-style-type: none"> does not attempt to or fails to identify the important aspects of the problem that must be considered. employs a single strategy that is incomplete and/or lacks justification. unsuccessfully describes assumptions or makes unstated assumptions. 	<p>Student:</p> <ul style="list-style-type: none"> identifies a small percentage of the important aspects of the problem. employs only one possible strategy to solve the problem. attempts to describe some assumptions but makes some unstated assumptions. provides little or limited justification for using the chosen strategy. 	<p>Student:</p> <ul style="list-style-type: none"> identifies some of the important aspects of the problem that must be considered. considers multiple possible strategies to solve the problem. provides a reason for using the chosen strategy. includes information regarding some of the required assumptions. 	<p>Student:</p> <ul style="list-style-type: none"> identifies important aspects of the problem along with other possible strategies. gives reasons for using the chosen strategy and not an alternative. includes information regarding necessary assumptions. shows awareness that confidence is limited by the accuracy of the assumptions.
6a	5e	Uses Key Disciplinary Concepts to Solve Quantitative Problems⁴	<p>Student's:</p> <ul style="list-style-type: none"> calculations are attempted but are neither successful nor comprehensive. 	<p>Student's:</p> <ul style="list-style-type: none"> calculations are unsuccessful; or, represent only a portion of the calculations required to comprehensively solve the problem. 	<p>Student's:</p> <ul style="list-style-type: none"> calculations are essentially successful. calculations are sufficiently comprehensive to solve the problem. 	<p>Student's:</p> <ul style="list-style-type: none"> calculations are all successful. calculations are thoroughly comprehensive to solve the problem. calculations are presented elegantly.

6c	5f	Communicates⁵ and ⁶Represents Quantitative Information from the Key Core Sciences	Student: <ul style="list-style-type: none"> • converts quantitative information into a mathematical portrayal¹⁷ that is inaccurate or inappropriate given the topic. • errors may impede correct interpretation of information presented. 	Student: <ul style="list-style-type: none"> • converts quantitative information into a mathematical portrayal¹⁷ that is partially accurate or not completely appropriate given the topic. • errors do not significantly impede correct interpretation of information presented. 	Student: <ul style="list-style-type: none"> • competently converts quantitative information into an appropriate mathematical portrayal¹⁷ that is adequate to describe the topic. • negligible errors. 	Student: <ul style="list-style-type: none"> • skillfully converts quantitative information into an effective mathematical portrayal¹⁷ that contributes to a deeper or better understanding of the topic. • no noticeable errors.
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‡ Program Student Learning Outcome (PSLO)

corresponding Institutional Student Learning Outcome (ISLO)

12. Adapted from VALUE Rubric: Quantitative Literacy (Interpretation) Baseline: For example, attempts to explain the trend data shown in a graph, but will frequently misinterpret the nature of that trend, perhaps by confusing positive and negative trends. Milestone 1: For instance, accurately explains trend data shown in a graph, but may miscalculate the slope of the trend line. Milestone 2: For instance, accurately explains the trend data shown in a graph. Capstone: For example, accurately explains the trend data shown in a graph and makes reasonable predictions.
13. Adapted from VALUE Rubric: Problem Solving (Identifies Strategies)
14. Adapted from VALUE Rubric: Quantitative Literacy (Assumptions)
15. Adapted from VALUE Rubric: Quantitative Literacy (Calculations); S. E. Shadle, E. C. Brown, M. H. Towns, D. L. Warner, *J. Chem. Ed.* 2012, 89, 319-325
16. Adapted from VALUE Rubric: Quantitative Literacy (Communication)
17. Adapted from VALUE Rubric: Quantitative Literacy (Representation)
18. Mathematical portrayal/forms includes, but is not limited to, a symbolical, graphical or numerical means.

Appendix B: Degree Plans

BS in Natural Science, Track 1 (2018-2019)

Major: BS in Natural Science, Track 1							Total =	57
Major Core Courses								
BIOL	134	Biology 1	3	PHYS	272	Physics 2	3	
BIOL	134a	Biology 1 Lab	1	PHYS	272a	Physics 2 Lab	1	
BIOL	135	Biology 2	3	NSCI	310	Issues in Origins (3)		
BIOL	135a	Biology 2 Lab	1	CHEM	311	Organic Chemistry 1	3	
CHEM	151	General Chemistry 1	3	CHEM	311a	Organic Chemistry 1 Lab	1	
CHEM	151a	General Chemistry 1 Lab	1	CHEM	312	Organic Chemistry 2	3	
CHEM	152	General Chemistry 2	3	CHEM	312a	Organic Chemistry 2 Lab	1	
CHEM	152a	General Chemistry 2 Lab	1	CHEM	353	Biochemistry	4	
PHYS	271	Physics 1	3	NSCI	490	Natural Science Capstone	1	
PHYS	271a	Physics 1 Lab	1	NSCI	491	Natural Science Capstone	1	
							Total Core Courses =	38
Major Electives***			7	*Required Competencies				
BIOL	223	Intro Microbiology w/ Lab	4	• 8-Week Nedley Depression & Anxiety Recovery				
BIOL	361	Adv Human Phys w/Lab	4	• 4 Half-day Health Expos				
BIOL	402	Cell Biology / Genetics	3	• Your Best Pathway to Health Event (or similar)				
				• Overseas or US Based Mission Trip				
Major Cognates			12	**Required Readings				
STAT	314	Introduction to Statistics	3	• Depression: The Way Out				
MATH	126	Pre-Calculus 2	3	• SOS: Help For Troubled Emotions				
HLED	461	Research Methods	3	• Telling Yourself the Truth				
SOCI	210	Sociology (CLEP)	3					
<p>*Students will be expected to have experience in each type of programming and <u>lead out</u> in some aspect of 4 of 6 of the following programs; Eight-week Nedley Program is Community based.</p> <p>**Required reading must be completed prior to enrolling in HLED 441/441a. ***These are possible courses; at least 4 credits must be upper division; preferred to take BIOL 361 w/ lab and BIOL 402.</p>								

Minor: Health and Wellness (Fall 2017)							21
BIOL	121	Anatomy & Physiology I	3				3
BIOL	121a	Anatomy & Physiology I, Lab	1				1
BIOL	122	Anatomy & Physiology II	3				3
BIOL	122a	Anatomy & Physiology II, Lab	1				1
FDNT	214	Human Nutrition	3				3
HLED	231	Introduction to Chronic Disease and Lifestyle Medicine	3				3
HLED	432	Chronic Disease and Lifestyle Medicine	3				3
HLED	432a	Chronic Disease and Lifestyle Medicine Internship	1				1
HLED	441	Depression & Anxiety Recovery Program	2				2
HLED	441a	Depression & Anxiety Recovery Program Internship	1				1

BS in Natural Science, Track 2 (2018-2019)

Major: BS in Natural Science, Track 2						Total = 57	
Major Core Courses							
BIOL	135	Biology 2	3	NSCI	310	Issues in Origins (3)	
BIOL	135a	Biology 2 Lab	1	CHEM	311	Organic Chemistry 1	3
CHEM	151	General Chemistry 1	3	CHEM	311a	Organic Chemistry 1 Lab	1
CHEM	151a	General Chemistry 1 Lab	1	CHEM	312	Organic Chemistry 2	3
CHEM	152	General Chemistry 2	3	CHEM	312a	Organic Chemistry 2 Lab	1
CHEM	152a	General Chemistry 2 Lab	1	CHEM	353	Biochemistry	4
PHYS	271	Physics 1	3	NSCI	490	Natural Science Capstone 1	1
PHYS	271a	Physics 1 Lab	1	NSCI	491	Natural Science Capstone 2	1
PHYS	272	Physics 2	3			Medical Terminology [‡]	1
PHYS	272a	Physics 2 Lab	1			Total Core Courses =	35
Major Electives***			9	*Required Competencies			
BIOL	223/a	Intro. Micro w/ Lab (4)		• 8-Week Nedley Depression & Anxiety Recovery			
BIOL	361/a	Adv Human Physiol w/Lab (4)		• 4 Half-day Health Expo's, All Aspects			
BIOL	402	Cell Biology (3)		• Your Best Pathway to Health Event (or similar)			
				• Overseas or US Based Mission Trip			
Major Cognates			13	**Required Readings			
HLED	101	Fit & Well	1	• Depression: The Way Out			
MATH	126	Pre-Calculus 2	3	• SOS: Help For Troubled Emotions			
PSYC	223	Developmental Psychology	3	• Telling Yourself the Truth			
STAT	314	Introduction to Statistics	3	Required Experiences			
RELM	327	Cross Cultural Missions (OR)	3	• Licensed Physical Therapist shadowing (80 hr)			
RELT	385	Christian Ethics (3)					
<p><i>*Students will be expected to have experience in each type of programming and <u>lead out</u> in some aspect of 4 of 6 of the programs.</i></p> <p><i>**Required reading must be completed prior to enrolling in HLED 441/441a. ***These are possible courses; at least 4 credits must be upper division. Pre-PT requires 351/351a OR 361/361a. [‡]Medical Terminology should be taken by distance education. [‡]</i></p>							

Minor: Health and Wellness				21
BIOL	121	Anatomy & Physiology I	3	
BIOL	121a	Anatomy & Physiology I, Lab	1	
BIOL	122	Anatomy & Physiology II	3	
BIOL	122a	Anatomy & Physiology II, Lab	1	
FDNT	214	Human Nutrition	3	
HLED	231	Introduction to Chronic Disease and Lifestyle Medicine	3	
HLED	432	Chronic Disease and Lifestyle Medicine	3	
HLED	432a	Chronic Disease and Lifestyle Medicine Internship	1	
HLED	441	Depression & Anxiety Recovery Program	2	
HLED	441a	Depression & Anxiety Recovery Program Internship	1	

BS in Natural Science, Track 1 (2017-2018)

Major: BS in Natural Science, Track 1						Total =	59
Major Core Courses							
BIOL	134	Biology 1	3	PHYS	272	Physics 2	3
BIOL	134a	Biology 1 Lab	1	PHYS	272a	Physics 2 Lab	1
BIOL	135	Biology 2	3	NSCI	290	Issues in Origins	2
BIOL	135a	Biology 2 Lab	1	CHEM	311	Organic Chemistry 1	3
CHEM	151	General Chemistry 1	3	CHEM	311a	Organic Chemistry 1 Lab	1
CHEM	151a	General Chemistry 1 Lab	1	CHEM	312	Organic Chemistry 2	3
CHEM	152	General Chemistry 2	3	CHEM	312a	Organic Chemistry 2 Lab	1
CHEM	152a	General Chemistry 2 Lab	1	CHEM	353	Biochemistry	4
PHYS	271	Physics 1	3	NSCI	490	Natural Science Capstone	1
PHYS	271a	Physics 1 Lab	1	NSCI	491	Natural Science Capstone	1
						Total Core Courses =	40
Major Electives***			7	*Required Competencies			
BIOL	223	Intro Microbiology w/ Lab	4	• 8-Week Nedley Depression & Anxiety Recovery			
BIOL	361	Adv Human Phys w/Lab	4	• 4 Half-day Health Expos			
BIOL	402	Cell Biology / Genetics	3	• Your Best Pathway to Health Event (or similar)			
				• Overseas or US Based Mission Trip			
Major Cognates			12	**Required Readings			
STAT	314	Introduction to Statistics	3	• Depression: The Way Out			
MATH	126	Pre-Calculus 2	3	• SOS: Help For Troubled Emotions			
SOCI	215	Intro to Sociology	3	• Telling Yourself the Truth			
HLED	461	Research Methods	3				
<p><i>*Students will be expected to have experience in each type of programming and lead out in some aspect of 4 of 6 of the following programs; Eight-week Nedley Program is Community based.</i></p> <p><i>**Required reading must be completed prior to enrolling in HLED 441/441a. ***These are possible courses; at least 4 credits must be upper division.</i></p>							

Minor: Health and Wellness				20
BIOL	121	Anatomy & Physiology I	3	
BIOL	121a	Anatomy & Physiology I, Lab	1	
BIOL	122	Anatomy & Physiology II	3	
BIOL	122a	Anatomy & Physiology II, Lab	1	
FDNT	214	Human Nutrition	3	
HLED	231	Introduction to Chronic Disease and Lifestyle Medicine	2	
HLED	432	Chronic Disease and Lifestyle Medicine	3	
HLED	432a	Chronic Disease and Lifestyle Medicine Internship	1	
HLED	441	Depression & Anxiety Recovery Program	2	
HLED	441a	Depression & Anxiety Recovery Program Internship	1	

BS in Natural Science, Track 2 (2017-2018)

Major: BS in Natural Science, Track 2						Total = 57	
Major Core Courses							
BIOL	135	Biology 2	3	NSCI	290	Issues in Origins	2
BIOL	135a	Biology 2 Lab	1	CHEM	311	Organic Chemistry 1	3
CHEM	151	General Chemistry 1	3	CHEM	311a	Organic Chemistry 1 Lab	1
CHEM	151a	General Chemistry 1 Lab	1	CHEM	312	Organic Chemistry 2	3
CHEM	152	General Chemistry 2	3	CHEM	312a	Organic Chemistry 2 Lab	1
CHEM	152a	General Chemistry 2 Lab	1	CHEM	353	Biochemistry	4
PHYS	271	Physics 1	3	NSCI	490	Natural Science Capstone 1	1
PHYS	271a	Physics 1 Lab	1	NSCI	491	Natural Science Capstone 2	1
PHYS	272	Physics 2	3				
PHYS	272a	Physics 2 Lab	1			Total Core Courses =	36
Major Electives***			7	*Required Competencies			
BIOL	223/a	Intro. Micro w/ Lab (4)		• 8-Week Nedley Depression & Anxiety Recovery			
BIOL	361/a	Adv Human Physiol w/Lab (4)		• 4 Half-day Health Expo's, All Aspects			
BIOL	402	Cell Biology (3)		• Your Best Pathway to Health Event (or similar)			
				• Overseas or US Based Mission Trip			
Major Cognates			14	**Required Readings			
HLED	101	Fit & Well	1	• Depression: The Way Out			
MATH	126	Pre-Calculus 2	3	• SOS: Help For Troubled Emotions			
PSYC	223	Developmental Psychology	3	• Telling Yourself the Truth			
STAT	314	Introduction to Statistics	3	Required Experiences			
RELM	327	Cross Cultural Missions (OR)	3	• Licensed Physical Therapist shadowing (80 hr)			
RELT	385	Christian Ethics (3)					
		Medical Terminology‡	1				

**Students will be expected to have experience in each type of programming and lead out in some aspect of 4 of 6 of the programs.
 Required reading must be completed prior to enrolling in HLED 441/441a. *These a possible courses; at least 4 credits must be upper division. Pre-PT requires 351/351a OR 361/361a. ‡Medical Terminology should be taken by distance education.*

Minor: Health and Wellness				21
BIOL	121	Anatomy & Physiology I	3	
BIOL	121a	Anatomy & Physiology I, Lab	1	
BIOL	122	Anatomy & Physiology II	3	
BIOL	122a	Anatomy & Physiology II, Lab	1	
FDNT	214	Human Nutrition	3	
HLED	231	Introduction to Chronic Disease and Lifestyle Medicine	3	
HLED	431	Chronic Disease and Lifestyle Medicine	3	
HLED	431a	Chronic Disease and Lifestyle Medicine Internship	1	
HLED	441	Depression & Anxiety Recovery Program	2	
HLED	441a	Depression & Anxiety Recovery Program Internship	1	

BS in Natural Science, Track 1 (2016-2017)

Major: BS in Natural Science, Track 1						Total =	59
Major Core Courses							
BIOL	134	Biology 1	3	PHYS	272	Physics 2	3
BIOL	134a	Biology 1 Lab	1	PHYS	272a	Physics 2 Lab	1
BIOL	135	Biology 2	3	NSCI	290	Issues in Origins	2
BIOL	135a	Biology 2 Lab	1	CHEM	311	Organic Chemistry 1	3
CHEM	151	General Chemistry 1	3	CHEM	311a	Organic Chemistry 1 Lab	1
CHEM	151a	General Chemistry 1 Lab	1	CHEM	312	Organic Chemistry 2	3
CHEM	152	General Chemistry 2	3	CHEM	312a	Organic Chemistry 2 Lab	1
CHEM	152a	General Chemistry 2 Lab	1	CHEM	353	Biochemistry	4
PHYS	271	Physics 1	3	NSCI	490	Natural Science Capstone	1
PHYS	271a	Physics 1 Lab	1	NSCI	491	Natural Science Capstone	1
						Total Core Courses =	40
Major Electives***			6	*Required Competencies			
BIOL	223	Intro Microbiology w/ Lab	4	• 8-Week Nedley Depression & Anxiety Recovery			
BIOL	361	Adv Human Phys w/Lab	4	• 4 Half-day Health Expos			
BIOL	402	Cell Biology	3	• Your Best Pathway to Health Event (or similar)			
				• Overseas or US Based Mission Trip			
Major Cognates			13	**Required Readings			
STAT	314	Introduction to Statistics	3	• Depression: The Way Out			
MATH	126	Pre-Calculus 2	4	• SOS: Help For Troubled Emotions			
SOCI	215	Intro to Sociology	3	• Telling Yourself the Truth			
HLED	461	Research Methods	3				
*Students will be expected to have experience in each type of programming and lead out in some aspect of 4 of 6 of the following programs; Eight-week Nedley Program is Community based.							
Required reading must be completed prior to enrolling in HLED 441/441a. *At least 4 credits must be upper division.							

Minor: Health and Wellness (Fall 2016)				22
BIOL	121	Anatomy & Physiology I	3	
BIOL	121a	Anatomy & Physiology I, Lab	1	
BIOL	122	Anatomy & Physiology II	3	
BIOL	122a	Anatomy & Physiology II, Lab	1	
FDNT	214	Human Nutrition	3	
HLED	331	Chronic Disease and Lifestyle Medicine I	3	
HLED	331a	Chronic Disease and Lifestyle Medicine I Internship	1	
HLED	431	Chronic Disease and Lifestyle Medicine II	3	
HLED	431a	Chronic Disease and Lifestyle Medicine II Internship	1	
HLED	441	Depression & Anxiety Recovery Program	2	
HLED	441a	Depression & Anxiety Recovery Program Internship	1	

BS in Natural Science, Track 2 (2016-2017)

Major: BS in Natural Science, Track 2							Total = 54
Major Core Courses							
BIOL	135	Biology 2	3	NSCI	290	Issues in Origins	2
BIOL	135a	Biology 2 Lab	1	CHEM	311	Organic Chemistry 1	3
CHEM	151	General Chemistry 1	3	CHEM	311a	Organic Chemistry 1 Lab	1
CHEM	151a	General Chemistry 1 Lab	1	CHEM	312	Organic Chemistry 2	3
CHEM	152	General Chemistry 2	3	CHEM	312a	Organic Chemistry 2 Lab	1
CHEM	152a	General Chemistry 2 Lab	1	CHEM	353	Biochemistry	4
PHYS	271	Physics 1	3	NSCI	490	Natural Science Capstone 1	1
PHYS	271a	Physics 1 Lab	1	NSCI	491	Natural Science Capstone 2	1
PHYS	272	Physics 2	3				
PHYS	272a	Physics 2 Lab	1			Total Core Courses =	36
Major Electives***			7	*Required Competencies			
BIOL	223/a	Intro. Micro w/ Lab	4	• 8-Week Nedley Depression & Anxiety Recovery			
BIOL	351/a	Exercise Physiol w/ Lab	4	• 4 Half-day Health Expo's, All Aspects			
BIOL	361/a	Adv Human Physiol w/Lab	4	• Your Best Pathway to Health Event (or similar)			
BIOL	402	Cell Biology	3	• Overseas or US Based Mission Trip			
Major Cognates			11	**Required Readings			
HLED	101	Fit & Well	1	• Depression: The Way Out			
MATH	126	Pre-Calculus 2	4	• SOS: Help For Troubled Emotions			
PSYC	223	Developmental Psychology	3	• Telling Yourself the Truth			
STAT	314	Introduction to Statistics	3	Required Experiences			
		Medical Terminology [‡] (1)		• Licensed Physical Therapist shadowing (80 hr)			
*Students will be expected to have experience in each type of programming and lead out in some aspect of 4 of 6 of the programs.							
Required reading must be completed prior to enrolling in HLED 441/441a. *At least 4 credits must be upper division. Pre-PT requires 351/351a OR 361/361a. ‡Medical Terminology should be taken by distance education.							

Minor: Health and Wellness							22
BIOL	121	Anatomy & Physiology I	3				3
BIOL	121a	Anatomy & Physiology I, Lab	1				1
BIOL	122	Anatomy & Physiology II	3				3
BIOL	122a	Anatomy & Physiology II, Lab	1				1
FDNT	214	Human Nutrition	3				3
HLED	331	Chronic Disease and Lifestyle Medicine I	3				3
HLED	331a	Chronic Disease and Lifestyle Medicine I Internship	1				1
HLED	431	Chronic Disease and Lifestyle Medicine II	3				3
HLED	431a	Chronic Disease and Lifestyle Medicine II Internship	1				1
HLED	441	Depression & Anxiety Recovery Program	2				2
HLED	441a	Depression & Anxiety Recovery Program Internship	1				1

Appendix C: General Education Requirements

General Education Requirements (2018-2019)

GENERAL EDUCATION			46
Religion (9 credits)			9
RELB	101	Life and Teachings of Jesus	3
RELB	301	Daniel & Personal Evangelism	3
RELB	302	Revelation	3
		(OR) RELH 203/302 SDA Church History (3 credits)	
Language/Communication (9 credits)			9
ENG	101	College English I	3
ENG	102	College English II	3
COMM	202	Speech Communication (or RELP 308, Homiletics)	3
Fine Arts/Humanities (6 credits)			6
HIST	101	Survey of World History	3
		<i>Fine Arts elective (Art, Music, or Literature)</i>	3
		<i>Minimum 1 credit from Music</i>	
Life/Physical Sciences (4 credits)			4
HLED	324	Principles of Health	3
HLED	111	Optimize Your Brain	1
		<i>GE science requirement is not required for NS majors.</i>	
Mathematics (3 credits)			3
MATH	121	Precalculus I (may demonstrate proficiency by exam)*	3
Social Sciences (10 credits)			10
EDUC	105	Philosophy of Adventist Education	3
PSYC	101	Christian Psychology	3
SOCI	214	Christian Marriage & Family	3
		<i>Leadership Elective</i>	1
GE Electives (3 credits)			3
NSCI	310	Issues in Origins (3) (OR)	3
PSYC	310	Abnormal Psychology (3)	3
Practical/Applied Arts (2 credits)			2
WKED	190	Vocational Training	1
		Agriculture elective	1
Additional experiences and competencies are also required.			

*May fulfill the MATH 121 requirement by exam, which reduces GE requirements to 3 credits. Please see the Registrar for more information.

General Education Requirements (2017-2018)

GENERAL EDUCATION			43
Religion (13 credits)			9
RELB	101	Life and Teachings of Jesus	3
RELB	301	Daniel & Personal Evangelism	3
RELB	302	Revelation	3
		(OR) RELH 203/302 SDA Church History (3 credits)	
Language/Communication (9 credits)			9
ENG	101	College English I	3
ENG	102	College English II	3
COMM	202	Speech Communication (or RELP 308, Homiletics)	3
Fine Arts/Humanities (7 credits)			6
HIST	101	Survey of World History	3
		<i>Fine Arts elective (Art, Music, or Literature)</i>	3
		<i>Minimum 1 credit from Music</i>	
Life/Physical Sciences (4 credits)			4
HLED	324	Principles of Health	3
HLED	111	Optimize Your Brain	1
		<i>GE science requirement is not required for NS majors.</i>	
Mathematics (3 credits)			3
MATH	121	Precalculus I (may demonstrate proficiency by exam)*	3
Social Sciences (10 credits)			10
EDUC	105	Philosophy of Adventist Education	3
PSYC	101	Christian Psychology	3
SOCI	214	Christian Marriage & Family	3
		<i>Leadership Elective</i>	1
Practical/Applied Arts (7 credits)			2
WKED	190	Vocational Training	1
		Agriculture elective	1
WKED		Work Education (2 credit hours per semester attendance)	
Additional experiences and competencies are also required.			

*May fulfill the MATH 121 requirement by challenge exam, which reduces GE requirements to 40 credits (for Natural Science majors). Please see the Registrar for more information.

General Education Requirements (2016-2017)

GENERAL EDUCATION			58
Religion (13 credits)			13
RELB	101	Life and Teachings of Jesus	3
RELH	215	Methods of Bible Study	3
RELB	250	Principles of Christian Faith (or RELB 350)	3
		(OR) RELH 203/302 SDA Church History (3 credits)	
RELB	301	Daniel & Personal Evangelism	4
Language/Communication (9 credits)			9
ENG	101	College English I	3
ENG	102	College English II	3
COMM	202	Speech Communication (or RELP 308, Homiletics)	3
Fine Arts/Humanities (7 credits)			6
HIST	101	Survey of World History	3
		<i>Fine Arts elective (Art, Music, or Literature)</i>	3
		<i>Minimum 1 credit from Music</i>	
Life/Physical Sciences (4 credits)			4
HLED	324	Principles of Health	3
HLED	111	Optimize Your Brain	1
		<i>GE science requirement is not required for NS majors.</i>	
Mathematics (3 credits)			3
MATH	121	Precalculus I (may demonstrate proficiency by exam)*	3
Social Sciences (10 credits)			10
EDUC	105	Philosophy of Adventist Education	3
PSYC	101	Christian Psychology	3
SOCI	214	Christian Marriage & Family	3
		<i>Leadership elective</i>	1
Practical/Applied Arts (7 credits)			7
WKED	101	Work Education	5
WKED	190	Vocational Training	1
		Agriculture elective	1
Electives			6
		<i>Electives</i>	
Additional experiences and competencies are also required.			

*May fulfill the MATH 121 requirement by exam, which reduces GE requirements to 55 credits. Please see the Registrar for more information.

Appendix D: Sample Course Plans

Sample Course Plan, Track 1 (2018-2019)

Natural Science Major, Pre-Med/Dent/PA Track w/ Health & Wellness Minor					
Fall, First Year	15	Spring, First Year	16	Summer, First Year	3
Gen Chemistry 1 w/ Lab (NS) [‡]	4	Gen Chemistry 2 w/ Lab (NS) [‡]	4	Sociology (NS) ^{*‡} (CLEP)	3
General Biology 1 w/ Lab (NS) [‡]	4	General Biology 2 w/ Lab (NS) [‡]	5	Mission Trip	
Life & Teachings of Jesus (GE) [*]	3	Survey of World History (GE)	3		
College English 1 (GE) [*]	3	Christian Marriage & Fam (GE)	3		
Optimize Your Brain (GE) [‡]	1	#Music / Leadership / Agri (GE)	1		
Fall, Second Year	14	Spring, Second Year	16	Summer, Second Year	11
Org Chemistry 1 w/ Lab (NS) [‡]	4	Org Chemistry 2 w/ Lab (NS) [‡]	4	General Biochemistry (NS) [‡]	4
Pre-Calc 1 (GE) [‡]	3	Pre-Calc 2 (NS) [‡]	3	Chronic Dis & LS Med	4
Christian Education (GE)	3	Intro to Chronic Dis & LS Med	3	Dep/Anx Recovery Prog (HW)	3
Christian Psychology (GE) [*]	3	Daniel (GE)	3		
#Music / Leadership / Agri (GE)	1	College English 2	3		
Fall, Third Year	12	Spring, Third Year	16	Summer, Third Year	0
Physics 1 w/ Lab (NS) [‡]	4	Physics 2 w/ Lab (NS) [‡]	4	MCAT/DAT/GRE	
Research Methods (NS) [‡]	3	Statistics (NS) [‡]	3		
Principles of Health (GE)	3	Issues in Origins (NS)	3		
#Music / Leadership / Agri (GE)	1	Speech	3		
#Music / Leadership / Agri (GE)	1	SDA Church History/Revelation	3		
Fall, Fourth Year	13	Spring, Fourth Year	9		
NS Capstone I (NS)	1	NS Capstone II (NS)	1		
NS Elective (Adv Phys. w/Lab)	4	NS Elective (Cell Biology)	3		
A&P 1 w/ Lab (HW) [*]	4	A&P 2 w/ Lab (HW) [*]	4		
Nutrition (HW) [*]	3	#Music / Leadership / Agri (GE)	1		
#Music / Leadership / Agri (GE)	1				
				GE + Major + Minor =	124
				Total Credits =	125

- Students not prepared for traditional sequence may require an extra 1-2 semesters to complete their degree.
- A proficiency exam in remedial chemistry and math is given to all entering or transferring students. *Nursing Prerequisites ‡MCAT Prep; #Music/Art (3), Leadership (1), Agriculture/Vocational Training (2)
- ‡Those students who complete SOCI 215 via CLEP will have 123 credits instead of 126. Students must still maintain the required number of credits for graduation—recommend an additional elective, preferably an upper division biology course or Abnormal Psychology, PSYC 310. Students who successfully challenge MATH 122 and/or 126 will need to still maintain the required number of credits (126) for graduation.

Sample Course Plan, Track 1 (2017-2018)

Natural Science Major, Pre-Med/Dent/PA Track w/ Health & Wellness Minor					
Fall, First Year	17	Spring, First Year	16	Summer, First Year	3
Gen Chemistry 1 w/ Lab (NS)‡	4	Gen Chemistry 2 w/ Lab (NS)‡	4	Sociology (NS)* (CLEP)	3
General Biology 1 w/ Lab (NS)‡	4	General Biology 2 w/ Lab (NS)‡	4	Mission Trip	
Life & Teachings of Jesus (GE)*	3	Issues in Origins (NS)	2		
College English 1 (GE)*	3	Christian Marriage & Fam (GE)	3		
Optimize Your Brain (GE)‡	1	#Music / Leadership / Agri (GE)	1		
Work Education (2)	2	Work Education (2)	2		
Fall, Second Year	16	Spring, Second Year	17	Summer, Second Year	11
Org Chemistry 1 w/ Lab (NS)‡	4	Org Chemistry 2 w/ Lab (NS)‡	4	General Biochemistry (NS)‡	4
Pre-Calc 1 (GE)‡	3	Pre-Calc 2 (NS)‡	3	Chronic Dis & LS Med	4
Christian Education (GE)	3	Intro to Chronic Dis & LS Med	2	Dep/Anx Recovery Prog (HW)	3
Christian Psychology (GE)*	3	Daniel (GE)	3		
#Music / Leadership / Agri (GE)	1	College English 2	3		
Work Education (2)	2	Work Education (2)	2		
Fall, Third Year	14	Spring, Third Year	15	Summer, Third Year	0
Physics 1 w/ Lab (NS)‡	4	Physics 2 w/ Lab (NS)‡	4	MCAT/DAT/GRE	
Research Methods (NS)‡	3	Statistics (NS)‡	3		
Principles of Health (GE)	3	Speech	3		
#Music / Leadership / Agri (GE)	1	Survey of World History (GE)	3		
#Music / Leadership / Agri (GE)	1	Work Education (2)	2		
Work Education (2)	2				
Fall, Fourth Year	15	Spring, Fourth Year	14		
NS Capstone I (NS)	1	NS Capstone II (NS)	1		
A&P 1 w/ Lab (HW)*	4	A&P 2 w/ Lab (HW)*	4		
Nutrition (HW)*	3	NS Elective (Cell Biology)	3		
NS Elective (Adv Phys. w/Lab)	4	#Music / Leadership / Agri (GE)	1		
#Music / Leadership / Agri (GE)	1	SDA Church History or Revelation	3	Total Credits - Work Education =	122
Work Education (2)	2	Work Education (2)	2	GE + Major + Minor =	
				Total Credits =	

- Students not prepared for traditional sequence may require an extra 1-2 semesters to complete their degree.
- A proficiency exam in remedial chemistry and math is given to all entering or transferring students. *Nursing Prerequisites ‡MCAT Prep; #Music/Art (3), Leadership (1), Agriculture/Vocational Training (2)
- Those students who complete SOCI 215 via CLEP will have 119 credits instead of 122. Students must still maintain the required number of credits for graduation. Students who successfully challenge MATH 122 and/or 126 will need to still maintain the required number of credits (120) for graduation.

Samples Course Plan, Track 2 (2017-2018)

Natural Science Major, Pre-PT Track w/ Health & Wellness Minor					
Fall, First Year	17	Spring, First Year	17	Summer, First Year	0
Gen Chemistry 1 w/ Lab (NS)‡	4	Gen Chemistry 2 w/ Lab (NS)‡	4	May Mission Trip	
A&P 1 w/ Lab (HW)*	4	A&P 2 w/ Lab (HW)*	4		
Life & Teachings of Jesus (GE)*	3	Speech (GE)*	3		
College English 1 (GE)*	3	Survey of World History (GE)	3		
Optimize Your Brain (GE)‡	1	#Music / Leadership / Agri (GE)	1		
Work Education (2)	2	Work Education (2)	2		
Fall, Second Year	17	Spring, Second Year	16	Summer, Second Year	8
Org Chemistry 1 w/ Lab (NS)‡	4	Org Chemistry 2 w/ Lab (NS)‡	4	General Biochemistry (NS)‡	4
Fit & Well	1	Pre-Calc 2 (NS)‡	3	Chronic Dis & LS Med 2 (HW)	4
Pre-Calc 1 (GE)	3	Issues in Origins (NS)	2		
Christian Psychology (GE)*	3	Intro to Chronic Dis & LS Med	2		
College English 2 (GE)	3	Christian Marriage & Fam (GE)	3		
#Music / Leadership / Agri (GE)	1	Work Education (2)	2		
Work Education (2)	2				
Fall, Third Year	14	Spring, Third Year	17	Summer, Third Year	3
Physics 1 w/ Lab (NS)‡	4	Physics 2 w/ Lab (NS)‡	4	Dep/Anx Recovery Prog (HW)	3
Medical Terminology (NS)*	1	General Biology 2 w/ Lab (NS)‡	4		
Christian Education (GE)	3	Statistics (NS)	3		
Principles of Health (GE)	3	Daniel (GE)	3		
#Music / Leadership / Agri (GE)	1	#Music / Leadership / Agri (GE)	1		
Work Education (2)	2	Work Education (2)	2		
Fall, Fourth Year	14	Spring, Fourth Year	12		
NS Capstone I (NS)	1	NS Capstone II (NS)	1		
NS Elective	3	Issues in Origins (NS)	2		
NS Elective	4	Christian Ethics	3		
Nutrition (HW)*	3	SDA Church Hist. or Revelation	3		
#Music / Leadership / Agri (GE)	1	#Music / Leadership / Agri (GE)	1		
Work Education (2)	2	Work Education (2)	2		
				Major + Minor + GE Credits =	
				Total Credit =	135

*Nursing Prerequisites

**Required for Pre-PT at Andrews University—recommend fulfilling this requirement by distance education

‡Students may challenge Pre-Calculus I, but must still maintain the required number of credits for graduation.

#Music/Art (3), Leadership (1), Agriculture/Vocational Training (2)

Sample Course Plan, Track 1 (2016-2017)

Natural Science Major, Pre-Med/Dent/PA Track w/ Health & Wellness Minor					
Fall, First Year	16	Spring, First Year	15	Summer, First Year	7
Gen Chemistry 1 w/ Lab (NS)‡	4	Gen Chemistry 2 w/ Lab (NS)‡	4	Chronic Dis & LS Med 1 (HW)	4
General Biology 1 w/ Lab (NS)‡	4	General Biology 2 w/ Lab (NS)‡	4	Sociology (NS)* (CLEP)	3
Life & Teachings of Jesus (GE)*	3	Survey of World History (GE)	3		
College English 1 (GE)*	3	Christian Marriage & Fam (GE)	3		
Optimize Your Brain (GE)‡	1	Work Education (GE)	1		
Work Education (GE)	1				
Fall, Second Year	15	Spring, Second Year	16	Summer, Second Year	8
Org Chemistry 1 w/ Lab (NS)‡	4	Org Chemistry 2 w/ Lab (NS)‡	4	General Biochemistry (NS)‡	4
Pre-Calc 1 (GE)‡	3	Pre-Calc 2 (NS)‡	4	Chronic Dis & LS Med 2 (HW)	4
Christian Education (GE)	3	Principles Christian Faith (GE)	3		
Christian Psychology (GE)*	3	College English 2	3		
#Music / Leadership / Agri (GE)	1	#Music / Leadership / Agri (GE)	1		
Work Education (GE)	1	Work Education (GE)	1		
Fall, Third Year	15	Spring, Third Year	14	Summer, Third Year	3
Physics 1 w/ Lab (NS)‡	4	Physics 2 w/ Lab (NS)‡	4	Dep/Anx Recovery Prog (HW)	3
NS or GE Elective	3	Issues in Origins (NS)	2	MCAT/DAT	
Bible Study Methods (GE)	3	Statistics (NS)‡	3		
Principles of Health (GE)	3	Speech	3		
Work Education (GE)	1	#Music / Leadership / Agri (GE)	1		
#Music / Leadership / Agri (GE)	1	#Music / Leadership / Agri (GE)	1		
Fall, Fourth Year	15	Spring, Fourth Year	15		
NS Capstone I (NS)	1	NS Capstone II (NS)	1		
A&P 1 w/ Lab (HW)*	4	Research Methods (NS)‡	3		
Nutrition (HW)*	3	A&P 2 w/ Lab (HW)*	4		
NS or GE Elective	3	Daniel (GE)	4		
NS or GE Elective	3	NS or GE Elective	3		
#Music / Leadership / Agri (GE)	1			GE + Major + Minor =	139
				Total Credits =	139

Students not prepared for traditional sequence may require an extra 1-2 semesters to complete their degree. A proficiency exam in remedial chemistry and math is given to all entering or transferring students. *Nursing Prerequisites ‡MCAT Prep; #Music/Art (3), Leadership (1), Agriculture/Vocational Training (2)

Appendix E: Faculty Teaching Schedule

✓ = instructor			FT	FT	FT	FT	FT	Adjunct
Natural Science Faculty/Staff			Celestine	Feese	Harris	Kinjo	Peacock	—
BIOL	120/120a	Survey of A&P				✓		
BIOL	121/121a	A&P I / Lab				✓		
BIOL	122/122a	A&P II / Lab				✓		
BIOL	134/134a	Biology 1 w/ Lab	✓					
BIOL	135/135a	Biology 2 w/ Lab	✓					
BIOL	223/223a	Microbiology w/ Lab (4)		✓				
BIOL	351/351a	Exercise Physiology / Lab (3)	✓					
BIOL	361/361a	Advanced Physiology / Lab (4)	✓					
BIOL	402	Cell Biology		✓				
CHEM	111/111a	Survey of Chemistry		✓				
CHEM	151/151a	General Chemistry 1 w/ Lab			✓			
CHEM	152/152a	General Chemistry 2 w/ Lab			✓			
CHEM	311/311a	Organic Chemistry 1 w/ Lab			✓			
CHEM	312/312a	Organic Chemistry 2 w/ Lab			✓			
CHEM	353	Biochemistry			✓			
FDNT	214	Human Nutrition				✓		
HLED	231/231a	Intro to Chronic Dis. & Lifestyle	✓					
HLED	331/331a	Chronic Dis & Lifestyle I	✓					Gallant
HLED	431/431a	Chronic Dis & Lifestyle II	✓					Gallant
HLED	441	Nedley Depression Recovery			✓			Nedley
HLED	461	Research Methods						Ramirez
HLED	462	Adv. Research Methods						Ramirez
MATH	120/120a	Survey of Math					✓	
MATH	121/121a	Pre-Calculus 1					✓	
MATH	126	Pre-Calculus 2					✓	
NSCI	310	Issues in Origins	✓		✓		✓	
NSCI	321	Intro to Neuroscience Sem		✓				
NSCI	321	Disease of the Nervous System		✓				
NSCI	490	Natural Science Capstone	✓		✓		✓	
NSCI	491	Natural Science Capstone	✓		✓		✓	
PHYS	271/271a	Physics 1 w/ Lab					✓	
PHYS	272/272a	Physics 2 w/ Lab					✓	
STAT	314	Introduction to Statistics						Palit
SOCI	215	Intro to Sociology						TBD

✓ = instructor				Fall 1	Spring 1	Summer 1	Fall 2	Spring 2	Summer 2
Natural Science Faculty/Staff									
BIOL	120	3	Survey of A&P		✓			✓	
BIOL	121/121a	4	A&P I / Lab	✓			✓		
BIOL	122/122a	4	A&P II / Lab		✓			✓	
BIOL	134/134a	4	Biology 1 w/ Lab	✓			✓		
BIOL	135/135a	4	Biology 2 w/ Lab		✓			✓	
BIOL	223/223a	4	Microbiology w/ Lab		✓			✓	
BIOL	351/351a	4	Exercise Physiology / Lab						
BIOL	361/361a	4	Advanced Physiology / Lab	✓			✓		
BIOL	402	3	Cell Biology		✓			✓	
CHEM	111/111a	4	Survey of Chemistry	✓			✓		
CHEM	151/151a	4	General Chemistry 1 w/ Lab	✓			✓		
CHEM	152/152a	4	General Chemistry 2 w/ Lab		✓			✓	
CHEM	311/311a	4	Organic Chemistry 1 w/ Lab	✓			✓		
CHEM	312/312a		Organic Chemistry 2 w/ Lab		✓			✓	
CHEM	353	4	Biochemistry			✓			✓
FDNT	214	3	Human Nutrition	✓			✓		
HLED	231/231a	3	Intro to Chronic Dis. & Lifestyle		✓			✓	
HLED	331/331a	4	Chronic Dis & Lifestyle I			✓			✓
HLED	431/431a	4	Chronic Dis & Lifestyle II			✓			✓
HLED	441	3	Nedley Depression Recovery			✓			✓
HLED	461	3	Research Methods	✓			✓		
HLED	462	3	Adv. Research Methods						
MATH	120/120a	3	Survey of Math	✓			✓		
MATH	121/121a	3	Pre-Calculus 1	✓			✓		
MATH	126	3	Pre-Calculus 2		✓			✓	
NSCI	310	3	Issues in Origins		✓			✓	
NSCI	321	1	Intro to Neuroscience Sem	✓			✓		
NSCI	321	1	Diseases of the Nervous System	✓			✓		
NSCI	490	1	Natural Science Capstone	✓			✓		
NSCI	491	1	Natural Science Capstone		✓			✓	
PHYS	271/271a	4	Physics 1 w/ Lab	✓			✓		
PHYS	272/272a	4	Physics 2 w/ Lab		✓			✓	
STAT	314	3	Introduction to Statistics		✓			✓	
SOCI	215	3	Intro to Sociology		✓			✓	

Appendix F: Curriculum Assessment Map

Natural Science Program SLO			Syllabus Review	GE PSLO	PSLO 1	PSLO 2	PSLO 3	PSLO 4	PSLO 5
Corresponding ISLO					ISLO 4	ISLO 2	ISLO 4	ISLO 5	ISLO 6
BIOL	120	3	Survey of A&P						
BIOL	121/121a	4	A&P I / Lab						
BIOL	122/122a	4	A&P II / Lab						
BIOL	134/134a	4	Biology 1 w/ Lab						
BIOL	135/135a	4	Biology 2 w/ Lab						
BIOL	223/223a	4	Microbiology w/ Lab						
BIOL	351/351a	4	Exercise Physiology / Lab						
BIOL	361/361a	4	Advanced Physiology / Lab						
BIOL	402	3	Cell Biology						
CHEM	111/111a	4	Survey of Chemistry						
CHEM	151/151a	4	General Chemistry 1 w/ Lab						
CHEM	152/152a	4	General Chemistry 2 w/ Lab						
CHEM	311/311a	4	Organic Chemistry 1 w/ Lab						
CHEM	312/312a	4	Organic Chemistry 2 w/ Lab						
CHEM	353	4	Biochemistry						
FDNT	214	3	Human Nutrition						
HLED	231/231a	3	Intro to Chronic Dis. & Lifestyle						
HLED	331/331a	4	Chronic Dis & Lifestyle I						
HLED	431/431a	4	Chronic Dis & Lifestyle II						
HLED	441	3	Nedley Depression Recovery						
HLED	461	3	Research Methods						
HLED	462	3	Adv. Research Methods						
MATH	120/120a	3	Survey of Math						
MATH	121/121a	3	Pre-Calculus 1						
MATH	126	3	Pre-Calculus 2						
NSCI	310	3	Issues in Origins						
NSCI	321	1	Intro to Neuroscience Seminar						
NSCI	321	1	Diseases of the Nervous System						
NSCI	490	1	Natural Science Capstone						
NSCI	491	1	Natural Science Capstone						
PHYS	271/271a	4	Physics 1 w/ Lab						
PHYS	272/272a	4	Physics 2 w/ Lab						
STAT	314	3	Introduction to Statistics						
SOCI	215	3	Intro to Sociology						
—	Other	—	Mission Trip						
—	Other	—	Total Community Involvement						
—	Other	—	Course Evaluations						
—	Other	—	Course Syllabus						
—	Other	—	Institutional Survey						

Appendix G: Multi-Year Program Assessment Plan

Year	Year	Outcomes (PSLO)	Means of Assessment Direct Assessment (Where, When, What)	Responsible Person	Benchmark (Expected Level)
1	2017-2018	Outcome #1 Truth-Centered Scientists	<p><u>Direct methods:</u></p> <ul style="list-style-type: none"> Final oral exam (PSLO 1c-1d), written mid-term exam (PSLO 1e-1f) in NSCI 290 (Issues in Origins) Essays in Core Sciences (CHEM 311/312/353 and/or upper division BIOL) (PSLO 1a-1d) <p><u>Indirect methods:</u></p> <ul style="list-style-type: none"> Syllabi Review, NSCI 290, CHEM 151/2, 311/2, 353; BIOL 133/4, PHYS 271/2 Course Survey in NSCI 290, "Issues in Origins" 	NS Faculty	<ul style="list-style-type: none"> >75% of successful graduates scoring at Proficient level or higher for each rubric component of the Truth-Centered Scientist Rubric
2	2018-2019	Outcome #2 Health Evangelists	<p><u>Direct methods:</u></p> <ul style="list-style-type: none"> Instructor, physician, patient-guest evaluation in HLED 331, 431 and 441. Portfolio demonstrating required competencies in community-based programming and/or mission trips NSCI 490 Project (Capstone) <p><u>Indirect methods:</u></p> <ul style="list-style-type: none"> Syllabi Review, HLED 331, 431, 441, NSCI 490 Student self-report (Survey) 	NS Faculty	<ul style="list-style-type: none"> >75% of successful graduates scoring at Proficient level or higher for each rubric component of the Health Evangelists Rubric
3	2019-2020	Outcome #3 Critical Thinkers	<p><u>Direct methods:</u></p> <ul style="list-style-type: none"> Literature Review in CHEM 312, 353 or upper division BIOL (cell bio, genetics, adv physiology) <p><u>Indirect methods:</u></p> <ul style="list-style-type: none"> Syllabi Review, CHEM 151/2, 311/2, 353; BIOL 133/4, other upper level biology syllabi Student self-report 	NS Faculty	<ul style="list-style-type: none"> >75% of successful graduates scoring at Proficient level or higher for each rubric component of the Critical Thinkers Rubric
4	2020-2021	Outcome #4 Effective Communicators	<p><u>Direct methods:</u></p> <ul style="list-style-type: none"> Written essays and oral presentations in the core sciences and in NSCI 490 (Capstone) <p><u>Indirect methods:</u></p> <ul style="list-style-type: none"> Syllabi Review, CHEM 151/2, 311/2, 353; BIOL 121/2, 133/4, HLED 331, 431, 441, other upper level biology electives (cell bio, genetics, adv physiology) Student self-report 	NS Faculty	<ul style="list-style-type: none"> >75% of successful graduates scoring at Proficient level or higher for each rubric component of the Effective Communicators Rubric
5	2021-2022	Outcome #5 Scientific Problem Solvers	<p><u>Direct methods:</u></p> <ul style="list-style-type: none"> Embedded test questions in Core Science courses of chemistry, biology, physics, and math. <p><u>Indirect methods:</u></p> <ul style="list-style-type: none"> Syllabi Review, CHEM 151/2, 311/2, 353; PHYS 271/2; MATH 121/6 Student self-report 	NS Faculty	<ul style="list-style-type: none"> >75% of successful graduates scoring at Proficient level or higher for each rubric component of the Scientific Problem Solvers Rubric
6	2022	Comprehensive Program Review	<p><u>Direct methods:</u></p> <ul style="list-style-type: none"> Projects, Portfolios, and embedded test questions (as above) <p><u>Indirect methods:</u></p> <ul style="list-style-type: none"> Syllabi Review, Student self-report, Student Survey 	NS Faculty	

Appendix H: Pre-Professional Program Requirements

Pre-Physical Therapy Requirements

DPT at Andrews University

Requirement: 92 total semester credits with at least 15 in upper division courses.

Religion

- One religion course per academic year

Language/Communication:

- ENGL 101 College English 1
- ENGL 102 College English 2
- COMM 202 Speech Communication

History:

- HIST 101 Survey of World History

Fine Arts/Humanities:

- Introductory course in music, art, photography, philosophy, literature (200 level or higher), or one year of ensemble music.

Life/Physical Sciences:

- BIOL 122/122a Anatomy & Physiology I w/ Lab
- BIOL 123/123a Anatomy & Physiology II w/ Lab
- BIOL 134/134a Biology II
- BIOL 361/361a Advanced Human Physiology w/ Lab (OR) BIOL 351/351a Exercise Physiology
- PHYS 271/271a Physics I w/ Lab
- PHYS 272/272a Physics II w/ Lab
- CHEM 151/151a General Chemistry I w/ Lab
- CHEM 152/152a General Chemistry II w/ Lab

Mathematics:

- STAT 314 Introduction to Statistics (OR) HLED 461 Research Methods

Social Sciences:

- PSYC 101 General Psychology
- PSYC 223 Developmental Psychology

Fitness Education:

- HLED 101 Fit & Well

Medical Terminology:

- Recommend distance education (Andrews) (1)

Recommended Electives:

- FDNT 214 Human Nutrition (3), upper division science courses

For further information: <https://www.andrews.edu/shp/pt/entry-level/prerequisites.html>

Pre-Dentistry Requirements at Loma Linda University School of Dentistry

- | Required | Recommended
(listed in order of priority) | Recommended
(listed in order of priority) |
|--|--|--|
| <ul style="list-style-type: none"> • General Biology 1 & 2 w/ lab • General Chemistry 1 & 2 w/ lab • Organic Chemistry 1 & 2 w/ lab • Biochemistry (1 semester) • General Physics 1 & 2 w/ lab • English Composition | <ul style="list-style-type: none"> • Histology • Anatomy & Physiology 1 & 2 w/ lab • Microbiology • Cell & Molecular Biology • Immunology • Neuroscience • Genetics | <ul style="list-style-type: none"> • Small Business Management • Human Resource Management • Ceramics • Business & the Law • Accounting • Human Development • Marketing • Sculpture • Interpersonal Communication |
| <ul style="list-style-type: none"> • Pre-requisites must be taken in the U.S or Canada. A Baccalaureate degree is preferred. • Science coursework completed at a four year school is preferred. A minimum of 96 semester or 144 quarter units are required from an accredited school. A grade of “C” or higher is required to meet LLUSD requirements. Science sequences must be completed within five (5) years of admission. • A science GPA of 3.3 or higher is recommended. The minimum GPA is 2.7. To be a competitive applicant, a 3.5 or higher is recommended. • DAT scores of 20 or higher are recommended. Preference is given to applicants who complete the test by October. For DAT information contact the ADA at 312-440-2689 or www.ada.org • DAT Preparation Resources (Listed in order of Priority) <ul style="list-style-type: none"> - DAT Bootcamp: www.datbootcamp.com - DAT Destroyer: www.orgoman.com - Chad's Videos: www.coursesaver.com - Crack the DAT: www.crackdat.com - DAT Achiever: www.datachiever.com - Kaplan: www.kaplanmedical.com | | |

Pre-Physician Assistant Requirements at Loma Linda University

- 2,000 hours of hands-on patient care experience must be completed prior to enrollment.
- Preferred experiences include accredited, credentialed professions that provide patient assessment, treatment, patient care plans, and diagnostic testing.
- Preferred applicants will have direct patient care experience working in clinical settings that involve a range of patient responsibility and involve a high level of critical thinking. Only paid hours are acceptable.

Required

- Anatomy & Physiology 1 & 2 w/ lab
- General Chemistry 1 & 2 w/ lab
- Advanced Physiology w/ lab
- Microbiology w/ lab

GE Requirements

- General Sociology
- Pre-Calculus 1
- English 1 & 2
- Christian Psychology

Recommended

- Medical Terminology
- Statistics

- Examples of preferred clinical experiences
 - Military medic or corpsman
 - Paramedic/EMT (waiting time not included in hours)
 - Nurse (LVN or RN)
 - Radiology technologist
 - Physical therapist
 - Respiratory therapist
 - Occupational therapist
 - Medical technologist
 - Medical assistant (certified; back office hours only)
 - Athletic trainer