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Correlation of Undergraduate Courses Aligned with the Future of Health Industry Studies

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Correlation of Undergraduate Courses Aligned with the Future of Health Industry Studies

by

Eyman Zaitar

An Honors Capstone

submitted in partial fulfillment of the requirements

for the Honors Diploma

to

The Honors College

of

The University of Alabama in Huntsville

March 21, 2020

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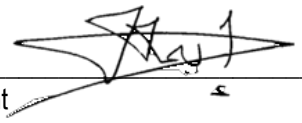

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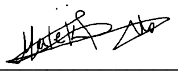
Malek Abunaemeh  04/11/2020

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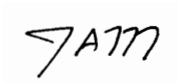

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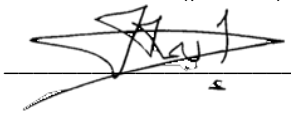

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Dedication

I would like to first sincerely thank my family for all the support I have received from them throughout the four years at UAH. Without them, I would have never gotten to this point. I would also like to thank my pre-professional advisor, Brooke Sheetz, for helping me throughout my dental application process when applying to dental schools. Ms. Sheetz's great help was truly appreciated. I would also like to thank all my professors, especially Dr. Malek Abunaemeh, Dr. Jayawardena Surangi, and Dr. Luis Cruz-Vera, for writing me letters of recommendation to all dental schools. Without everyone mentioned, I would have never been able to get accepted into a dental school, become a future dentist, and best serve the community by following my dream. Thank you to everyone.

Notwithstanding, I decided to write a paper dedicated to all pre-health students planning on attending a health professional school and further pursuing a career in the field of medicine, dentistry, optometry, physical therapy and or any other health professional schools. This thesis is to give pre-health undergraduate students an idea of what courses to take and to always seek help when needed.

Abstract

A large number of undergraduate students start their college careers aiming for medical, dentistry, optometry, veterinary, and other health fields. Yet, a significant portion drops out or changes majors due to the limited understanding of the background of the courses that will prepare them to learn the necessary tools to succeed in the health industry. This thesis will take a look at the different science and other courses offered by most four-year universities and the role that will help the students to become prepared candidates in their future health field.

Introduction

The roadmap on getting accepted into a medical, dental, veterinary, optometry, or any other health professional school requires many aspects such as shadowing, volunteering, taking the standardized examination and, most importantly, getting into the proper classes that will be excellent guidance when attending a health professional school. It is an essential key to carefully plan throughout the four years as an undergraduate student because health professional schools' glance at everything the student has accomplished and was part of throughout the undergraduate years before guaranteeing pre-health students an acceptance.[1]

Medical, dental, optometry, and other health professional schools expect pre-health students to have a solid foundation of natural sciences and other college classes, such as biology, chemistry, physics, mathematics, art, foreign languages, and social sciences. Many health professional schools require all the mentioned courses to be taken by the students as prerequisites, other schools require basic college courses, and a small number of schools do not have any specific course prerequisites.[2] Therefore, taking the particular college courses will be very beneficial when applying for the standardized exams such as the MCAT for medical schools, the DAT for dental schools, OAT for optometry schools.[3]

This thesis will explain the college courses that are required and encouraged to take before getting into medical, dental, veterinary, optometry, or any other health professional school to guarantee acceptance and enhance the application process of pre-health students.

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[1] Cervero, Ronald M, Anthony R Artino, Barbara J Daley, and Steven J Durning. "Health Professions Education Undergraduate Programs Are a Pathway to Strengthening Continuing Professional Development." The Journal of continuing education in the health professions. U.S. National Library of Medicine, 2017.
[2] LaChance, Diana. "UAH Pre-Health Program Helps Students Pursue Healthcare Dreams." The University of Alabama in Huntsville. Pre-Professional Advising, February 6, 2015.
[3] Li, Alice and Bugarinovic, George. "A Guide to Medical School Admission for Premed Students." History Studies International Journal of History 3, no. 6 (2017): 1–61.

Chapter 1: Biological Science

The study of the biological science courses is an essential aspect for all pre-health students that decide to enter medical, dental, optometry, physical therapy, pharmacy, nursing, and any other health professional school. Biological science is the study of life and living organisms. It concentrates on how living organisms adapt in life, their life cycles, environment, movement, and everything that is living organism oriented.[4] There are many different areas of study under the umbrella of biological science, including:

- Fundamentals and Principles of Biology.
- Human Anatomy and Physiology.
- Immunology.
- Genetics and Evolution.
- Cell and Development biology.
- Biochemistry.
- Microbiology.
- Psychopharmacology.

Biological sciences are the most crucial education that health professional schools require for upcoming students to have a strong background.[4] This aspect of study, including all the different biological science areas, will be further restudied in-depth in all health professional schools because it covers the basics of what health professional students require to obtain and understand in order to use toward the rest of their future health careers.

[4] Raven, Peter H. Biology. Dubuque, IA: McGraw-Hill, 2011.

1.1 Fundamentals and Principles of Biology

This biological course introduces the basic concepts and fundamentals of biology. It covers the natural principles of how the cell is structured, its functions, the process of metabolism, and the steps in reproduction. Discussions of the living organisms and principles of ecology and evolution are also introduced in this course with the touching of the biological functions of all living organisms.[5]

This course is considered necessary for all pre-health students because it teaches them the fundamentals of biology studies and the basics of living organisms. The health students are required to learn about living organisms and their surroundings in order to determine how to treat the human body and their environment.[5]

1.2 Human Anatomy and Physiology

This biological course covers detailed information about the structure of the human body, its function with an emphasis on the diseases found in the human body. It summarizes all the major organs and organ systems and their relationship with each other. In addition, this course signifies the human system relationships with their applications and simulations.[5]

In the laboratory section, introductions to the anatomical terminology and histology of the human tissues related to common pathologies. It also focuses on the human skeletal and muscular systems with recognitions and dissections of the human bones, surface markings, and major muscles by using muscular models. Also, the study of the physiology of the cell membranes, epithelial, and cellular transport is taught in this laboratory section. In addition, recognition and

[5] "Biological Sciences (BYS)." Biological Sciences < UAH - University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014.

dissection of the eye, lung, brain, heart, kidney, and the gastrointestinal tract are part of the laboratory section.[5]

Furthermore, the lecture and laboratory sections of the human anatomy and physiology focus on the study of the nervous, cardiovascular, respiratory, renal, and digestive systems. Also, there is a determination of the actions of enzymes in the digestive system and the urinary system with students calculating the glomerular filtration rate.[5]

This course is considered necessary for all students applying to health professional schools because it prepares them for the advanced anatomy and physiology courses, they will take in health professional schools. It includes everything a health student needs to know in the human body and how it functions in order to understand how to treat it.

1.3 Immunology

This biological course involves the study of the immune system by explicitly focusing on the humoral, innate, and cell-mediated immunity in the human body. The immune system is the most crucial system that protects the human body from diseases and infections by many lines of defense created by the body. It plays a considerable role in battling viruses and infections affecting the body. The immune system protects the body by recognizing and distinguishing foreign objects from entering the body. The examination of cells and tissues are studied as part of the immune system. The immunoglobulin structure and its function are also included in the immunology course with investigating the nature of interactions with their antigens.[5]

This course is considered necessary for all students applying to health professional schools because it provides an understanding of how the body reacts to foreign objects and how to fight

diseases. Pre-health students need to know how diseases are studied, such as cancer, AIDS, and biotherapeutics.[5]

1.4 Genetics and Evolution

This biological course covers the different aspects of evolution throughout the microevolution and macroevolution periods. There will be a recognition of genetics population, genetics quantitative, phylogenetic analysis, gene mapping, molecular evolutionary life biology, and speciation of genetics. Determination of what a gene is, the way it functions, the idea of inheritance, and alternation are introduced in the course.[5]

In addition, there will be an introduction of mutations of the genes, Mendelian's concept of genetics, transmission systems, cellular regulations, genetic development, cytoplasmic, and multifactorial inheritance.[5]

This course is considered necessary for all students applying to health professional schools because it touches on the basics of the DNA, genes, and their function. Pre-health students are required to learn genetics because it is very relatable to many diseases that these students can later identify by inheritance. Also, learning about the genes of the human body is an essential aspect of many things that are happening in the human body.[5]

1.5 Cell and Development of Biology

This biological course includes the studying of the cells in the body, cell membranes, organelles types, and movements in the cytoskeleton. There will be an understanding of the cell growth and the cell division, the way cells communicate with other parts of the body, and the mechanisms behind each cellular event.[5]

This course is considered essential for all students applying to health professional schools because it houses everything pre-health students need to understand before entering health professional schools. Cell and Development biology course focuses heavily on the human body and everything related to the biomedical science application and knowledge by understanding the way the body works. It also involves the mechanisms of life in the health and diseases in humans, and everything needed to build the human body in a biological manner way.[5]

1.6 Biochemistry

This biological course covers the study of all pathways found in the human body and the mechanisms of each. There will also be an examination of the proteins, the way they function, and their structure. Also, this biochemistry course includes the mechanisms of the enzyme, the way they recognize substrates and reaction rates that enhance their mechanism. Finally, metabolism reactions in the body are also examined in this course by discussing all the metabolic pathways, their control, and regulations.[5]

This course is considered important for all students applying to health professional schools because it covers all the mechanisms and pathways in the body. It educates students on how regulations in the body are controlled and what causes them. Health professional students need to understand the way the body works with enzymes and the mechanisms in the human body.[5]

1.7 Microbiology

This biological course touches on the studies of pathogens affected the human body, such as bacteria, fungi, viruses, and parasites. It also covers in-depth about the characteristics and

mechanisms of the pathogen, how they transmit substances, their host, who controls them, and how to prevent and treat them.[5]

This course is considered important for all students applying to health professional schools because it introduces them to the many pathogens and the diseases associated with them by also learning the terms and concepts of the diseases, pathogens, and ways the human body becomes immune.

1.8 Psychopharmacology

This biological course introduces students to the classifications of different drugs, their function on the human body from a physiological and psychological point of view. Different terms of prescription drugs, their uses, their effect on the body, and their side effects are all considered in this course.[5]

This course is recommended for all students applying to health professional schools because it teaches all terms of medical drugs that these students need to learn when working in their future health career. The names, uses, side effects in the mental health of the human body are also taught in this course. Determination of the complementary and alternative medicines and referral and consultation requirements are all important to know when being a health student. Students need to know what prescription drugs are given to the body and what to use it for before working in the health field.[5]

Chapter 2: Chemistry

Chemistry is one of the science courses that concentrate on how elements and compounds are composed of atoms, ions, and molecules. It talks about the elements and compounds compositions, chemical and physical properties, structure, behavior, and how they interact with other compounds.[6]

Chemistry is the branch of science that is in-between physics and biology. Chemistry is also known as intermediate science since it is the science that helps in understanding the scientific order.[6] There are many different areas of study under the umbrella of chemistry science, including:

- General Chemistry.
- Organic Chemistry.
- Quantitative Analysis.
- Physical Chemistry.
- Biophysical Chemistry.
- Inorganic Chemistry.

Chemistry college classes are crucial since they address issues like cooking an egg, and combustion of wood. The four different types of chemical bonds, such as covalent bonds (when compounds share electrons in the last valence shell); ionic bonds (donating or receiving electrons to make cations or anions), hydrogen bonds; and Van der Waals force bonds.[6] This aspect of studies, including all the different chemistry science areas, will be further restudied in-depth in all health professional schools because it covers the basics of what health professional students require to obtain and understand in order to use toward the rest of their future health careers.

[6] Brown, Theodore L., H. Eugene. LeMay, and Bruce E. Bursten. Chemistry: The Central Science. Upper Saddle River, NJ: Prentice Hall, 2000.

2.1 General Chemistry

This chemistry course summaries all the fundamental concepts of inorganic chemistry. It introduced concepts of chemical bonding, matter, atoms, molecules, solutions, thermochemistry, and intermolecular and intramolecular forces. It also covers the properties of solutions, kinetics, metals and nonmetals, nuclear chemistry, and electrochemistry.[7]

This course is considered essential for all students applying to health professional schools because many contributions to health care have been formed by chemistry. The many medical drugs are part of the chemistry field because it involves chemical analysis and synthesis of new forming compounds. When creating a drug, it needs to be chemically tested and studied before assuring how effective and safe the drug is.[7]

2.2 Organic Chemistry

This chemistry course explains to pre-health students about the structural, nomenclature, properties, chemical bonding, and the reaction of carbon compounds. The course also touches on the chemistry of different organic structures such as alkanes, alkenes, alkynes, acids and bases, alcohols, ethers, esters, epoxides, sulfides, and nitrates. There will be a determination of functional group reactions, the interactions of these functional groups and compounds, infrared spectroscopy, mass spectrometry, nuclear magnetic resonance, chromatography, titration, and ultraviolet-visible spectroscopy. Biochemistry, proteins, carbohydrates, nucleic acids are also introduced in the organic chemistry course.[7]

This course is considered essential for all students applying to health professional schools because it provides a strong fundamental understanding of the different imbalances in the human

[7] Chemistry (CH).” Chemistry < UAH - University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014.

body, such as the acid-base imbalances. It also helps understand how medical drugs function and how different relatable elements are in order to treat the body and explain the manufacture of all medications.[7]

2.3 Quantitative Analysis

This chemistry course explores the different techniques, instruments, and principles in the quantitative analysis of chemistry. It also touches on the clinical applications of titration, chromatography, acid-base reactions, and purification. The course also teaches about the basics of analytical procedures with emphasizing physiology, including systems of carbohydrates, lipids, proteins, enzymes, different metabolism, hormones, electrolytes, vitamins, the human body's fluid, and many more. Furthermore, studying the human organ system, the way it functions in normal and abnormal conditions are also a part of this course. It also includes proper laboratory safety, preparation, regulations, and statistical methods.[7]

This course is considered necessary for all students applying to health professional schools because it is crucial to know quantitative analysis before researching in order to have an idea of laboratory safety, research methods, patient illness preventions, the importance of measurements, accuracy and statistical modeling.[7]

2.4 Physical Chemistry

This chemistry course prepares pre-health students to the studying of atomic, subatomic, the use of microscopy, and the theories of physics. The theories of physics include concepts of motion, force, energy, thermodynamics, time, statistical mechanics, quantum chemistry, chemical equilibrium, and the analytical dynamics.[7]

This course is considered essential for all students applying to health professional schools because it gives an idea of the physical forces operating in the human body, correlating it with chemicals and different reactions in the human body. However, the physical chemistry course is one that some health professional schools do not require, but it will be beneficial in health professional schools.[7]

2.5 Biophysical Chemistry

This chemistry course is the study of the physical properties regarding biological studies in the human body with an emphasis on chemistry. It correlates all three sciences; biology, physics, and chemistry and how they relate to each other. It also used to study the scientific techniques of the physical properties regarding the biological macromolecules in a chemistry level using chromatography, nuclear magnetic resonance, titration, spectroscopy, and x-ray crystallography.[7]

This course is considered critical for all students applying to health professional schools because it gives an idea of the physical forces operating in the human body correlating with the foundation of biology and how the body functions as a whole with using chemical concepts. However, the biophysical chemistry course is one that some health professional schools do not require, but it will be beneficial in health professional schools.[7]

2.6 Inorganic Chemistry

This chemistry course deals with the synthesis, mechanism, and behavior of inorganic compounds. It covers all chemical compounds not taught in organic chemistry courses of carbon-based compounds. This chemistry course overlaps with a quantity of organic chemistry course materials but focuses on the inorganic side of chemistry. It includes inorganic structures, functions,

reactions, concepts, methods, and theories. There is an overlap in the movement of organometallic chemistry in both organic and inorganic chemistry courses.[7]

Moreover, applications of inorganic chemistry are found in chemical industries that involve pigments, catalysis, enzymes, fuels, agriculture, medications, surfactants, and material science.[7]

This course is considered essential for all students applying to health professional schools because it overlaps with the studies obtained from basic chemistry and goes further in-depth with the ideas of chemical properties and imbalances in the human body. It also helps understand the way the human body regulates and helps form medications for what the body needs. Pre-health students are highly encouraged to take this course to get a further understanding of the inorganic section of chemistry.[7]

Chapter 3: Physics

Physics is the area of science that involves studying the motion and behavior of matter through different objects and gases. It is the foundation of the science subjects because it helps elucidate the several fundamental questions in the universe. Physics is the oldest academic discipline due to the research about astronomy. During the scientific revolution, physics, biology, chemistry, and different branches of mathematics, became independent sciences. Physics, like many sciences, involves different parts of various sciences such as chemistry and biology.[8] There are many different areas of study under the umbrella of physics, including:

- General Physics.
- General Physics with Calculus.
- Intermediate Mechanics.
- Math Methods in Physics.

These physics courses help enhance new and different technologies. Some examples of physics in everyday life are the use of alarm clock, headphones, nuclear weapons, walking, seatbelts, and pens. These advances in technologies have changed society to a more accessible and advanced place.[8] This aspect of studies, including all the different physics areas, will be further restudied in-depth in all health professional schools because it includes the basics of what health professional students need to obtain and understand in order to be used in the student's future health careers.

[8] Dresselhaus, Mildred S. Condensed-Matter and Materials Physics: The Science of the World around Us. Washington, DC: National Academies Press, 2007.

3.1 General Physics

This course encompasses physics fundamental concepts, including forces, kinetics, heat, fluids, thermodynamics, motion, and sound. Concepts of electricity, properties of matter, magnetism, optics, waves, radiation, dynamics, and electromagnetism are also introduced in this course. In addition, it touches on the concept of oscillations, sounds, and numerical problem-solving.[9]

This course is considered important for all students applying to health professional schools because physics is a course that introduces key medical terms and concepts, such as understanding laws of motion, volume, pressure, and thermodynamics which helps understand the importance of cardiology and the different forces found in the human body.[9]

3.2 General Physics with Calculus

This calculus-based physics course includes the study of three-dimensional kinematics with an emphasis on integral calculus, numerical integration, plot analysis and the understanding of vector kinematic, dynamics, circular motion, applications of mechanics and gravitation. Laws such as Newton's laws, work, energy, linear momentum, and motion are also covered in this course. In addition, algebra is included when studying vector, statistics, and elasticity.[9]

This course is considered important for all students applying to health professional schools because it improves the creativity of pre-health students to think critically and apply interpretive, analytical skills to life experiences. It also helps develop the consistency of logic, adequacy of evidence, and be able to evaluate physical phenomena.[9]

[9] Physics (PH).” Physics < UAH - University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014.

Furthermore, it improves the mind to visualize situations in a three-dimensional vision that helps health students in their specific health professional fields when becoming doctors, physical therapists, optometrist and physicians, and more.[9]

3.3 Intermediate Mechanics

This physics course touches on concepts such as Lagrangian mechanics, motion, and oscillations. It heavily focuses on Newtonian mechanics Hamilton's and LaGrange's equations, Noether's theorem and laws, and Newton's laws of motion. In addition, topics of continuous media, single-particle and Newtonian dynamics, mechanical problem solving, concepts of central forces, inertia tensor, velocity, dispersion, acceleration, speed, vector analysis, and kinematics are all component of the intermediate mechanic's course.[9]

This course is considered indispensable for all students applying to health professional schools because it unfolds the brain to critical solving and thinking that are used in medical situations. Also, it primes the brain to think promptly in many circumstances, such as medical conditions.[9]

3.4 Math Methods in Physics

This physics course entails the studying of problem-solving in physics using analytical techniques. Topics such as electricity, optics, thermodynamics, and mechanics are all emphasized in this course with an impact on the concepts of vectors, coordinate systems, tensor analysis, and linear algebra. Moreover, there will be an application of eigenvalues, matrices, coordinate transformations, infinite spaces, geometry, and statistics in this course.[9]

This course is considered essential for all students applying to health professional schools because learning about optics, vectors, and problem-solving can help emphasize skills to use on the daily basis of a health professional student such as for medical, optometrists, dentists and physical therapists' students.[9]

Chapter 4: Mathematics

Mathematicians of different types of math help create new conjectures. The phenomenon is excellent examples of math structures and math reasoning, which can help with natural predictions. Calculating algebra, the motion of objects, and measuring are considered the basics of mathematics. Also, empirical math started in the 6th century B.C.[10] There are many different areas of study under the umbrella of mathematics, including:

- Application of Algebra.
- Trigonometry.
- Geometry.
- Calculus.
- Statistical Analysis.

Mathematics can is utilized in many different careers such as science, economics, physics, and the social sciences. Mathematics rules are led by applying mathematics, such as probability theory, and statistics. Mathematical applications are later discovered by pure mathematicians.[10] This aspect of studies, including all the different mathematics areas, will be further restudied in-depth in all health professional schools because it includes the basics of what health professional students need to gain and understand in order to be used in the student's future health careers.

[10] Kneebone, G. T. Mathematical Logic and the Foundations of Mathematics: An Introductory Survey Dover Publications. Dover Publications, 2001.

4.1 Application of Algebra

This mathematics course encompasses concepts of linear algebra, quadratic algebra, algebraic equations, graphical algebra, matric algebra, and mathematical models. Exponential rational, logarithmic functions, polynomial functions, and complex numbers and operations are also included in the course.[11]

Furthermore, topics of absolute value, inequalities matrices, equational systems, and determinants are all discussed with an emphasis on topics such as probabilities, sequences, fundamental algebra problems, and combinatorics.[11]

This course is considered necessary for all students applying to health professional schools because the concepts of math are essential in the daily lives of all medical, physician, and dental students, which helps them to measure precisely in laboratories and when designating medicinal drugs and dosage. It is very important to learn how to solve basic math in order to use it daily in health professional jobs.[11]

4.2 Precalculus Trigonometry

This mathematics course covers topics of logarithmic and trigonometric functions, graphing, triangle angles, applied functions, verifying identities, and trigonometric forms of complex numbers. Laws of sine, cosine, tangent, secant, cosecant, and cotangent are also heavily focused on in this course with importance on vectors, notations, geometric sequences, and DeMoivre's theorem.[11]

This course is considered necessary for all students applying to health professional schools because learning about the geometry of triangles helps the students understand the waves of all

[11] Mathematics (MA).” Mathematics < UAH - University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014.

radiation waves, x-rays waves, ultraviolet waves, water waves, and their impact on the human body. It can also be used when learning about the human nerves, how they are damaged, and ways to treat it. In addition, it helps many health operations in measuring the accurate angles, such as when molding prosthetic arms and leg parts.[11]

4.3 Geometry

This mathematics course combines the concepts of all mathematical shapes, graphing, optimization problem application, and curve sketching. Exponents function, logarithms function, derivatives, and integration are examined in this course. An introduction to the concepts of calculus application and problems are also included in this geometry course.[11]

This course is considered essential for all students applying to health professional schools because geometry is very critical in teaching students' various ways of sketching, calculating distances when dealing with health technologies such as X-rays, CAT scans, MRIs. It is also used in surgeries and diagnosis, helping health professional students to perform better in their future health careers.[11]

4.4 Calculus

This mathematics course precedes to techniques of derivative and all of its application in graphing, optimizing, and problem-solving. Explorations of calculus theorem, volume calculation, and integrations are included in this course. The calculus course also touches on the concepts of integration application, finite and infinite sequences, oscillation, and sequence solutions.[11]

This course is necessary for all students applying to health professional schools because calculus can help health professional students learn of the many body processes, the prognosis of

diseases, disease rate, and treat them by legal drugs and medications. It also helps understand critical and analytical skills that can be beneficial for doctors, dentists, optometrists, and all the other health fields.[11]

4.5 Statistical Analysis

This mathematics course deliberately concentrates on the concepts of probability, methodologies, and descriptive statistics. Hypothesis testing, sample distribution, estimation, regression, and critical thinking are also a part of this course. It also touches on business handling and the numeric concepts that should be understood in the business world.[11]

This course is considered essential for all students applying to health professional schools because it assists with estimating risks of patients and find treatments at an advanced level. It also supports explaining evidence summaries and laboratory test results, understanding research publications, and information. Despite this, many health professional students end up opening businesses of their own and taking a statistical class will advance them in knowing how to incorporate business with their health careers, how to prevent mathematical concepts, and find errors.[11]

Chapter 5: Art and World Languages

Art is a common humane way of expressing inner feelings, imaginations, and expressions. Some examples of art techniques are sculpture, visual arts, plastic arts, applied arts, performance arts, decorative arts, and drawing.[12]

In addition, a foreign language is a language that originates from a different country than the person learns to speak it. Second languages can be seen as the same as foreign languages; however, second languages are what people learn on top of their original language.[13] There are many different areas of study under the umbrella of art and world languages courses, including:

- Three-Dimensional Design.
- Drawing: Foundations.
- Sculpture.
- Foreign language.
- Intro to Women and Gender's Studies.
- English.

The main branches of art are sculpting, painting, and architecture. Art is seen as a form of proficiency, until the 17th century, when fine arts isolated and differentiated from sciences or crafts.[12] Then, the fine arts separated into sections of different art, such as applied or performance arts. This aspect of studies, including all the different art and world language areas, will be further restudied in-depth in all health professional schools because it includes the basics of what health professional students need to obtain and understand in order to benefit them in their future health careers.

[12] Levinson, Jerrold. The Oxford Handbook of Aesthetics. Oxford: Oxford University Press, 2013.
[13] Keim, Brandon. "Thinking in a Foreign Language Makes Decisions More Rational". Oxford: Oxford University Press. WIRED. November 17, 2013.

5.1 Three-Dimensional Design

This art course introduces students to the fundamentals of art creation and applying it to life applications, including sculpturing, woodworking, model-making, wood-making, molding, and sewing.[14]

This course is considered necessary for all students applying to health professional schools because it helps develop accuracy and precision, which positively helps especially for fields that massively focus on working with the hands such as dentistry, physical therapy, and the different medical fields.[14]

5.2 Drawing: Foundations

This art course covers the different techniques, materials, and principles of drawing. Students are taught how to draw in different drawing concepts correlating with visual skills, artistic skills, and expression and aesthetics.[14]

This course is considered necessary for all students applying to health professional schools because it allows health students to learn visual and manual skills along with critical thinking and problem-solving. It develops accuracy and precision for hand usage, which genuinely helps in professional school when working with hands.[14]

5.3 Sculpture

This art course advances students in many different artistic fields such as work-working, mold-making, metal welding, and grinding, 3D printing, and model-making. It introduces the many traditional and non-traditional tools of art materials.[14]

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[14] Art Studio (ARS).” Art Studio < UAH - University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014.

This course is considered essential for all students applying to health professional schools because it develops gross motor skills, which also influences health professional students about patience, being detailed-oriented, and accurate. It will help when interacting with patients by the student's hand skills.[14]

5.4 Foreign language

This course can be taken in many different languages, which are offered in Spanish, Arabic, Chinese, Korean. German, and many more. It teaches the basics of each language, concept, rule, pronunciation, and spelling.[15]

This course is essential for pre-health students because it is more professional to speak many languages as a health professional student and aspiring doctors, dentists, and physicians because it is very likely that the students will interact with a vast diversity of patients speaking languages other than English. Therefore, it will help have better interaction with patients in a more relaxed way if they prefer other languages than English.[15]

5.5 Intro to Women and Gender's Studies

This course focuses on understanding gender throughout history and how the definition of gender changed throughout the centuries. It emphasizes how the world reacts over feminism, different genders, and relationships. It also touches on diversity and multicultural learning.[16]

This course is considered important for all students applying to health professional schools because many of these schools emphasize diversity as part of their missions, which is a critical

[15] World Languages and Cultures (WLC)." World Languages and Cultures < UAH – University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014.
[16] Women's and Gender Studies (WGS)." Women's and Gender Studies < UAH - University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014.

aspect to know. When taking a class like this one, it will help students gain insight into other cultures and diversities.[16]

5.6 English

This course introduces students to academic writing, rhetorical knowledge, and critical reading. It also emphasizes research questions and concepts.[17]

This course is considered crucial for all students applying to health professional schools because it helps them strengthen their critical thinking and writing skills. It is essential to learn the rules of writing in order to use in research, which is a massive part of many health schools.[17]

[17] English (EH).” English < UAH - University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014

Chapter 6: Social Science

Social science is the part of science that is dedicated to analyzing how humans work and their relationships with others around them. It explains the changes in humans in society and how they act alone.[18] Examples of social science are archeology, psychology, sociology, economics, law, and history.[19] Auguste Comte was the first thinker to use the term; social sciences.[20] There are many different areas of study under the umbrella of social science, including:

- Introduction to Sociology.
- Introduction to Philosophy.
- General Psychology.

The processes used by social scientists such as understanding society, social critique, or defining science in depth are interpretivism of social skills.[20] Instead of composing analytically false theories, this way, science is gratified in a broad sense.[19] This aspect of studies, including all the different social science areas, will be further restudied in-depth in all health professional schools because it includes the basics of what health professional students need to obtain and understand in order in their future health careers.

[18] Watson, Tony J. Sociology, Work and Industry. London: Routledge, 2008.
[19] Gazzaniga, Michael S., Diane F. Halpern, and Todd F. Heatherton. Psychological Science.Nework: W.W. Norton & Co., 2010.
[20] Dundas, Paul. The Jains. London: Routledge, 2010.

6.1 Introduction to Sociology

This social science course gives an introduction to studies of the different cultures, societies, social interactions, and changes. It goes in-depth on the various ways that society uses to interact, solve problems, change, and the many social issues.[21]

This course is considered important for all students applying to health professional schools because it helps the students learn how to interact with different types of people professionally. Learning how to speak to patients by studying their personality at first glance, which helps know and understand the ways of treating various kinds of patients, such as stressful, afraid, and older patients. It will teach students ways to make patients feel much better before any operation or how to handle their medical needs and many more.[21]

6.2 Introduction to Philosophy

This social science course concentrates on the study of ethics, political and social philosophy, cultural viewpoints, and epistemology. It goes in-depth on the different known philosophies, including Western and Eastern philosophies.[22]

This course is considered important for all students applying to health professional schools because it prepares the students for how to treat their future patients and the best decisions to make for each patient. Therefore, it gives them better decisions when handling all types of patients.[22]

[21] Sociology (SOC).” Sociology < UAH - University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014.
[22] Philosophy (PHL).” Philosophy < UAH - University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014.

6.3 General Psychology

This social science course emphasizes topics of memory, cognition, learning, human development, and human behavior. Learning human behaviors, including their emotions, personalities, stress, pathology, and perception, are all heavily touched on in this unique science course.[23]

This course is considered necessary for students applying to health professional schools because learning how the human body behaves is very valuable when pursuing a career in the health field. Every health professional student needs to comprehend how to treat their patients and their health issues in general. Learning how to do it in a psychologistic way is very beneficial for both the health professional student and their future patients.[23]

[23] Psychology (PY).” Psychology < UAH - University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014.

Conclusion

Overall, it is always dependable on the school the pre-health student is planning on attending, but it is also imperative to stay prepared by taking as many college courses that are guaranteed to be acquired by all health professional schools which also helps enhance the student's education and application to these schools.[1]

Not only do these undergraduate courses help enhance pre-health student's application before attending college, but it also will be very beneficial when taking the standardized examinations for each health field such as the MCAT for medical students, DAT for dental students, OAT for optometry student, etc. All of the standardized exams are based on information gained from the courses taken throughout the four years of undergraduate college. Therefore, knowing what exact classes to take will help when studying for all types of standardized examinations.[3]

Consequently, taking all of the recommended courses of the natural sciences, mathematics, art, English, foreign languages, and social sciences will be very beneficial for all health field aspects.[24] It will allow pre-health students to have a strong foundation when getting into health professional schools, along with enhancing their application when applying.

[24] "Pre-Professional Program." Pre-Professional Program < UAH - University of Alabama in Huntsville. Pre-Professional Advising, 2014.

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23. Psychology (PY)." Psychology < UAH - University of Alabama in Huntsville. The University of Alabama in Huntsville, 2014. https://catalog.uah.edu/undergrad/course-descriptions/py/.

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