**Proposal to Convert a Quarter-System Program to a Semester-System Program**

**Biology B.S or B.A. / Doctor of Dental Surgery**

**Combination Curriculum**

A combination curriculum refers to a program of study which leads to the granting of two degrees. The program can be completed in a shorter time than the two degrees would take if pursued consecutively. An undergraduate student is required to complete undergraduate major requirements and general education requirements within the first 3 years. The coursework from the first year of the professional or graduate program will double-count as the fourth year of the undergraduate major program as well as the first year of the professional or graduate program.

This proposal is to update the quarter-system ASC BS/DDS combination curriculum by establishing a semester-system Biology BS or BA/DDS combination curriculum. An undergraduate student will complete the major program requirements of the current Biology BS or BA curriculum in the Health Professions track and all general education requirements. In the student’s third year, s/he will take the [Dental Admissions Test (DAT)](http://www.ada.org/en/education-careers/dental-admission-test/) and apply for admission to the Doctor of Dental Surgery (DDS) program in the College of Dentistry. Once admitted, the student must successfully complete the first year of the DDS program to be awarded the ASC undergraduate BS degree.

The curricula of the Biology undergraduate programs have changed in meaningful ways since the quarter-system BS/DDS combination program was offered, and the College of Dentistry is very precise about the undergraduate coursework that is critical for a student to be well-prepared to succeed in the DDS program. The result is that, for a semester-system Biology BS/DDS program, a student’s undergraduate program would be 132 hours (see Appendix C: *4-Year Sample Plan BS/DDS*). As an alternative, a Biology BA program which also accommodates the DDS undergraduate prerequisite requirements results in an undergraduate program which could be completed with 123 hours (see Appendix C: *4-Year Sample Plan BA/DDS*). The size of a BA/DDS program is consistent with the expectations of the Ohio Department of Higher Education (ODHE).

Another important change over time since the quarter-system BS/DDS existed has been the large and expanding numbers of students entering college with credit for GE courses and even some major courses. Such a student could quite readily complete the Biology BS major requirements (along with the pre-dental requirements) and GE in three years.

We propose that a conversion of the quarter-system BS/DDS combination program to the semester system demands the options of BS/DDS and BA/DDS combination programs. In order to serve those students who enter the university with college credit and who prefer a BS undergraduate degree, the BS/DDS program would be welcome. For other students whose high schools did not provide college-credit options, the BA/DDS would be welcome.

Admission to the DDS program is based on completion of prerequisite course work, the cumulative grade point average, the score on the Dental Admission Test (DAT), participation in non-academic activities (i.e. volunteering, community service, work history, research, military service or sports) and a personal interview. In addition, applicants are required to complete a minimum of 40 hours of unpaid observation in a general practice dental or specialist office. In the selection of students, preference is given to students who are residents of Ohio. Nonresidents and residents are all considered on a competitive basis.

Pre-dentistry students at Ohio State are encouraged to participate in student organizations that engage in community service, advocacy and oral health care instruction, such as the Pre-Dental Club, American Student Dental Association and the Undergraduate Student National Dental Association (USNDA). This involvement enables prospective students to take advantage of a variety of educational activities to help familiarize them with the profession. Involvement in community service activities and social functions also helps students to get to know one another outside the academic setting or during the application process to graduate school or professional school.

**Assessment**

* CLSE regularly assesses the Biology undergraduate programs and DDS Curriculum Committee regularly assesses the DDS program.

**Undergraduate Student Support**

* All College- and University-level student support that is available to Biology BA and BS students will be available to the Biology BA and BS students pursuing this program.

**Expected Enrollment**

* No more than 3 students are expected to enroll in this program in any given year.

**Appendices**

* Appendix A: Required Courses and Course Descriptions
* Appendix B: Curriculum Map
* Appendix C: 4-Year Undergraduate Sample BS or BA/DDS Plan

**Attachments**

* Dentistry Letter of Support
	+ Darryl Hamamoto, Associate Dean for Academic Affairs
* ASC Letter of Support
	+ Steven Fink, Associate Executive Dean

**ASC BS or BA/DDS Undergraduate Course Descriptions**

**Appendix A**

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| **Biology BS Pre-Dent Major Courses** | **Biology Courses** |  |
| **Course (Credit Hours)** | **Description** | **Prerequisites\*** |
| ***Biochemistry 4511*:** Introduction to Biological Chemistry (4) | An introductory course in biochemistry dealing with the molecular basis of structure, metabolism, genetic replication, transcription, and translation in plants, animals, and microorganisms. | Chem 1220 or 1250, and 2510 or 2310, and one semester of Biological Sciences; or permission of instructor. |
| ***Biology 1113*:** Biological Sciences: Energy Transfer & Development (4) | Exploration of biology and biological principles; evolution and the origin of life, cellular structure and function, bioenergetics, and genetics. | Math 1130, 1148, 1150, or above, or Math Placement Level L or M. Prereq or concur: Chem 1110, 1210, 1610, or 1910H, or permission of course coordinator. |
| ***Biology 1114*:** Biological Sciences: Form, Function, Diversity & Ecology (4) | Exploration of biology and biological principles; evolution and speciation, diversity in structure, function, behavior, and ecology among prokaryotes and eukaryotes. | Math 1130, 1148, 1150, or above, or Math Placement Level L or M. Prereq or concur: Chem 1110, 1210, 1610, or 1910H, or permission of course coordinator. |
| ***Biology 3401*:** Integrated Biology (4) | A case studies approach is used to gain a better understanding of biological concepts and principles. This course is designed for biology majors. | 1113, 1114, Chem 1220, and Math 1150, or permission of instructor. |
| ***Chemistry 2510*:** Organic Chemistry I (4) | Introduction to structure, nomenclature, physical properties, preparation and reactions of alkanes, alkenes, alkynes, alcohols, ethers, epoxides, aldehydes and ketones. Other topics include stereochemistry, acids, bases, and reaction mechanisms. | 1220, 1620 or 1920H. |
| ***Chemistry 2520*:** Organic Chemistry II (4) | Continuation from 2510, including aromatic systems, carboxylic acids, carboxylic acid derivatives, amines, carbon-carbon bond-forming reactions, polymers, carbohydrates and amino acids. | 2510, 2610 or 2910H. |
| ***Chemistry 2540:*** Organic Chemistry Lab I | Introduction to spectroscopic characterization, scientific writing, computational chemistry, and the laboratory techniques of organic chemistry, including synthesis, isolation, purification, and identification of organic compounds. | Prereq or concur: 2510, 2610 or 2910H. |
| ***Chemistry 2550:*** Organic Chemistry Lab II | Introduction to spectroscopic characterization, scientific writing, computational chemistry, and the laboratory techniques of organic chemistry, including synthesis, isolation, purification, and identification of organic compounds. | Prereq: 2540 or 2540H.Prereq or concur: 2520, 2620 or 2920H. |
| ***EEOB 2510*:** Human Anatomy (3) | An introduction to human anatomy; small mammal dissection. | 3 sem cr hrs in Biological Sciences. |
| ***EEOB 2520*:** Human Physiology (3) | A survey of the human nervous system, sense organs, muscle function, circulation, respiration, digestion, metabolism, kidney function, and reproduction. | 3 sem cr hrs in Biological Sciences. |
| ***Microbiology 4000*:** Basic & Practical Microbiology (4) | Provides an understanding of microorganisms and their interaction with the human experience. | 3 cr hrs in Biology. |
| ***Molecular Genetics 4500*:** General Genetics (3) | The principles of genetics, including molecular genetics, transmission genetics of prokaryotes and eukaryotes, developmental and non-chromosomal genetics, recombinant DNA and genomics, and the genetics and evolution of populations. | Biology 1101, 1113, or 1113H, and 3 additional sem cr hrs in Biological Sciences. |
| ***Physics 1200*:** Mechanics, Kinematics, Fluids, Waves (5) | Algebra-based introduction to classical physics: Newton’s laws, fluids, waves. | A grade of C- or above in Math 1148, or Math Placement Level M. |
| ***Physics 1201:*** E&M, Optics, Modern Physics | Algebra-based introduction to electricity and magnetism, simple optics, overview of modern physics including special relativity and quantum mechanics. | Prereq: 1200. |
| ***Statistics 2480:*** Statistics for the Life Sciences | Calculus-based introduction to the statistical analysis of biological data, including probability, common discrete and continuous distributions, experimental design, hypothesis testing, linear regression and correlation. | Math 1131, 1151 (152), 1156, 1161.XX, or 1181H, or equiv, or permission of instructor. |

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| **1st-Year Dentistry****am Courses** | **1st-Year Dentistry Program Courses** |  |
| **Course (Credit Hours)** | **Description** | **Prerequisites** |
| ***Dentistry 6200*:** Molecular & Cellular Biochemistry (5) | Basic principles of biochemistry, molecular and cellular biology with special emphasis on biochemical processes important in dentistry. | Enrollment in Dentistry. |
| ***Dentistry 6400*:** Microbiology & Immunology (4) | Major components of the human immune system, and the immune response to medically important pathogens including bacteria, viruses, fungi and parasites. | Enrollment in Dentistry. |
| ***Dentistry 6415*:** Clinical Evaluative Sciences I (1) | Evidence-Based Dentistry. | Enrollment in Dentistry. |
| ***Anatomy 6511***: Human Anatomy for Dental Students I (7) | Introduces dental students to the basic concepts of human gross anatomy, histology, neuroscience and embryology. | Enrollment in Dentistry, or permission of instructor. |
| ***Anatomy 6512*:** Human Anatomy for Dental Students II (8) | Continues the introduction of dental students to the basic concepts of human gross anatomy, histology, neuroscience and embryology. | Enrollment in Dentistry, or permission of instructor. |

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| **Biology BS Pre-Dent Program****Required Credit Hours** |
| BS Major ………………………………….……. 69 hoursASC GE Courses …………………….………. 38 hours1st-Year Dentistry Courses …..…………..….. 25 hours**Total Minimum Hours …………..…………. 132 hours** |

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| **Biology BA Pre-Dent Program****Required Credit Hours** |
| BS Major ………………………………….……. 60 hoursASC GE Courses …………………….………. 45 hours1st-Year Dentistry Courses …..…………..….. 25 hours**Total Minimum Hours …………..…………. 123 hours** |

**Biology B.S. Health Professions Curriculum Map**

**Appendix B**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Course** | **Cr Hr** | **Course Title** | **Comments** | **1.1** | **1.2** | **1.3** | **1.4** | **1.5** | **1.6** | **1.7** | **2.1** | **2.2** | **2.3** | **2.4** | **2.5** | **3.1** |
| **Required Prereq Courses (offered by the unit)** | Biol 1113 | 4 | Biological Sciences: Energy Transfer and Development | Prerequisite; some additional content | B | B | B | B | B |  |  | B | B | B | B | B | B |
| Biol 1114 | 4 | Biological Sciences: Form, Function, Diversity, and Ecology | Prerequisite; some additional content |  | B |  |  | B | B | B | B | B | B | B | B | I |
| **Required Prerequisite Courses****(offered outside the unit)** | Chem 1210 | 5 | General Chemistry |  | B |  | B |  |  |  |  | B | B |  | B |  |  |
| Chem 1220 | 5 | General Chemistry |  | B |  | B |  |  |  |  | B | B |  | B |  |  |
| Chem 2510 | 4 | Organic Chemistry |  | B |  | B |  |  |  |  |  |  |  |  |  |  |
| Chem 2520 | 4 | Organic Chemistry |  | B |  | I |  |  |  |  |  |  |  |  |  |  |
| Chem 2540 | 2 | Organic ChemistryLaboratory |  | B |  | B |  |  |  |  | B | B |  | B |  |  |
| Chem 2550 | 2 | Organic ChemistryLaboratory |  | B |  | B |  |  |  |  | B | B |  | B |  |  |
| Math 1157 **OR**Stat 2480 | 5 | Mathematical Modeling forthe Biological Sciences | Math/Stat requirement |  |  |  | B | B | B | B |  |  | B |  | B | B |
| 3 | Statistics for the BiologicalSciences | Math/Stat requirement |  |  |  | B | B | B | B | B | B | B |  | B | B |
| Physics 1200 | 5 | Introductory Physics |  | B |  | B |  |  |  |  | B | B |  | B |  |  |
| Physics 1201 | 5 | Introductory Physics |  | B |  | B |  |  |  |  | B | B |  | B |  |  |
| **Core Course (offered by the unit)** | Biol 3401 | 4 | Integrated Biology | Core course; because of additional coverage in prerequisites, 2 Q courses combined into one S | I | I | I | I | I | I | I | I | B | I | I | I | A |
| **Health Professions Specialization** | MolGen4500 | 3 | General Genetics |  | A | I | A | A | I | I |  |  |  | I |  | I | I |
|  | 25 | Additional coursework, including lab requirement |  | A | A | A | A | A | A | A | A | A | A | A | A | A |

 B = Beginning; I = Intermediate; A = Advanced

**Learning Goals**

* 1. Describe the hierarchical relationship between structure and function at all levels: molecular, cellular, and organismic.
	2. Diagram, explain, and contrast the major cellular processes in Archaea, bacteria, and eukaryotes.
	3. Differentiate types of biological macromolecules and compare their contributions to cellular structure and function.
	4. Apply the principles of genetics and describe the flow of genetic information.
	5. Explain changes in organisms through time by applying the principles of evolutionary biology.
	6. Demonstrate how relationships among living things are understood through taxonomy and phylogenetic analysis.
	7. Describe ecological relationships between organisms and their environment.
	8. Apply the scientific process, including designing and conducting experiments and testing hypotheses.

Use laboratory equipment, employ safe laboratory practices, and adapt tools such as laboratory notebooks and spreadsheets to organize.

* 1. Analyze data associated with scientific processes in **2.1**.
	2. Retrieve information from the life sciences literature; read, understand, and critically review scientific papers.
	3. Prepare oral and written reports following a recognized scientific format.
	4. Develop an awareness of the careers and professions that rely on knowledge of biological sciences.

**3.1** Integrate biological knowledge in discussions of society and everyday life

**4-Year Undergraduate Sample BS or BA/DDS Plan**

**Appendix C**

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|  | **Biology BS/DDS Sample 4-Year Plan** |  |
|  | **Autumn Semester** | **Cr Hrs** | **Spring Semester** | **Cr Hrs** |  |
| **Year 1** | Chemistry 1210 | 5 | GE- Social Science | 3 |
| Math 1151 | 5 | Chemistry 1220 | 5 |
| Biology 1113 | 4 | Biology 1114 | 4 |
| English 1110.01 | 3 | GE - Foreign Language | 4 |
| College Survey | 1 | GE – 2nd Writing | 3 |  |  |
| **Semester Total Hours** | **18** | **Semester Total Hours** | **19** | **1st Year** | **37** |
| **Year 2** | Physics 1200 | 5 | Physics 1201 | 5 |  |
| Chemistry 2510 | 4 | Chemistry 2520 | 4 |
| Chemistry 2540 | 2 | Chemistry 2550 | 2 |
| Stat 2480 | 3 | GE - Literature | 3 |
| GE – Foreign Language | 4 | GE – Foreign Language | 4 |  |  |
| **Semester Total Hours** | **18** | **Semester Total Hours** | **18** | **2nd Year** | **36** |
| **Year 3** | GE – Social Science | 3 | EEOB 2510 | 3 |  |
| Biology 3401 | 4 | GE - Visual/Performing Arts | 3 |
| Molecular Genetics 4500 | 3 | GE- Historical Study or Cultures & Ideas | 4 |
| GE - Historical Study | 3 | EEOB 2520 | 3 |
| Microbiology 4000 | 4 | Biochemistry 4511 | 4 |  |
| **Semester Total Hours** | **17** | **Semester Total Hours** | **17** | **3rd Year** | **34** |
| **Year 4** | Dentistry 6200 | 5 | Dentistry 6400 | 4 |  |
| Dentistry 6415 | 1 | Anatomy 6512 | 8 |
| Anatomy 6511 | 7 |  |  |
| **Semester Total Hours** | **13** | **Semester Total Hours** | **12** | **4th Year** | **25** |
|  |  |  |  |  |  |  |
|  |  |  | **Total Hours** | **132** |

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|  | **Biology BA/DDS Sample 4-Year Plan** |  |
|  | **Autumn Semester** | **Cr Hrs** | **Spring Semester** | **Cr Hrs** |  |
| **Year 1** | Chemistry 1210 | 5 | English 1110.01 | 3 |
| Math 1150 | 5 | Chemistry 1220 | 5 |
| Biology 1113 | 4 | Biology 1114 | 4 |
| College Survey | 1 | GE - Foreign Language | 4 |
| **Semester Total Hours** | **15** | **Semester Total Hours** | **16** | **1st Year** | **31** |
| **Year 2** | Physics 1200 | 5 | Chemistry 2520 | 4 |  |
| Chemistry 2510 | 4 | Biochemistry 4511 | 4 |
| GE - Data Analysis | 3 | GE - 2nd Writing | 3 |
| GE - Foreign Language | 4 | GE - Social Science | 3 |
|   |   | GE - Foreign Language | 4 |  |  |
| **Semester Total Hours** | **16** | **Semester Total Hours** | **18** | **2nd Year** | **34** |
| **Year 3** | GE - Social Science | 3 | EEOB 2510 | 3 |  |
| GE - Literature | 3 | GE - Visual/Performing Arts | 3 |
| Molecular Genetics 4500 | 3 | GE - Historical Study or Cultures & Ideas | 4 |
| GE - Historical Study | 3 | EEOB 2520 | 3 |
| Microbiology 4000 | 4 | Biology 3401 | 4 |  |
| **Semester Total Hours** | **16** | **Semester Total Hours** | **17** | **3rd Year** | **33** |
| **Year 4** | Dentistry 6200 | 5 | Dentistry 6400 | 4 |  |
| Dentistry 6415 | 1 | Anatomy 6512 | 8 |
| Anatomy 6511 | 7 |  |  |
| **Semester Total Hours** | **13** | **Semester Total Hours** | **12** | **4th Year** | **25** |
|  |  |  |  |  |  |  |
|  |  |  | **Total Hours** | **123** |

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October 4, 2018

W. Randy Smith

Vice Provost for Academic Programs

Council on Academic Affairs

203 Bricker Hall 190 North Oval Mall

Columbus, OH 43210

RE: BA-BS/DDS Conversion Proposal

Vice Provost Smith,

Over the last few years, the College of Dentistry’s Office of Admissions has been approached by Ohio State University undergraduate students who are interested in beginning our predoctoral dental program after their third year of college. These students are highly motivated and accomplished and have asked if we have a program in which they could earn their undergraduate degree while in the dental program.

Although a BS/DDS dual degree program had been established as early as 1923, this program was not converted from the quarter to semester system in 2012.

Although we anticipate only 3-4 students each year will participate in this program, these are often the most academically prepared students who might go to other universities and dental schools that offer such a program. There are several dental programs that have this Bachelor’s degree/dental degree option, including Case Western Reserve School of Dental Medicine, Kornberg School of Dentistry at Temple University, and University of Detroit Mercy School of Dental Medicine. These dental schools are direct competitors for our applicants. Among the Big 10 universities, Rutgers School of Dental Medicine and University of Maryland School of Dentistry have this option. Offering an opportunity for student to earn BA/DDS or BS/DDS degrees in seven years increases the competitiveness of our predoctoral dental program and adds to our range of programs that include our post-baccalaureate DentPath program for educationally disadvantaged students and our CARE program for dental students with a passion for returning to underserved rural and urban communities.

Thus, the College of Dentistry strongly supports this proposal to convert the BS/DDS program in the College of Arts and Sciences from the quarter to semester system and add the opportunity for a BA/DDS option.

If you have questions, please contact me.

Sincerely,

Darryl Hamamoto, DDS, PhD Associate Dean for Academic Affairs hamamoto.4@osu.edu