

**Fiscal Unit/Academic Org** Chemistry - D0628  
**Administering College/Academic Group** Arts and Sciences  
**Co-administering College/Academic Group**  
**Semester Conversion Designation** New Program/Plan  
**Proposed Program/Plan Name** Vision Science  
**Type of Program/Plan** Undergraduate bachelors degree program or major  
**Program/Plan Code Abbreviation** VISSCI  
**Proposed Degree Title** Bachelor of Science

**Credit Hour Explanation**

Program credit hour requirements		A) Number of credit hours in current program (Quarter credit hours)	B) Calculated result for 2/3rds of current (Semester credit hours)	C) Number of credit hours required for proposed program (Semester credit hours)	D) Change in credit hours
Total minimum credit hours required for completion of program				132	
Required credit hours offered by the unit	Minimum			18	
	Maximum			18	
Required credit hours offered outside of the unit	Minimum			114	
	Maximum			114	
Required prerequisite credit hours not included above	Minimum				
	Maximum				

**Program Learning Goals**

Note: these are required for all undergraduate degree programs and majors now, and will be required for all graduate and professional degree programs in 2012. Nonetheless, all programs are encouraged to complete these now.

**Program Learning Goals**

- Students have the biological, mathematical, and physical sciences knowledge to pursue research in the field of Vision Science.
- Students marshal the conceptual and methodological tools needed to solve problems in the field of Vision Science.
- Students demonstrate an understanding of the ethical implications of their chosen methodologies and conduct research responsibly.

**Assessment**

Assessment plan includes student learning goals, how those goals are evaluated, and how the information collected is used to improve student learning. An assessment plan is required for undergraduate majors and degrees. Graduate and professional degree programs are encouraged to complete this now, but will not be required to do so until 2012.

**Is this a degree program (undergraduate, graduate, or professional) or major proposal? Yes**

**Does the degree program or major have an assessment plan on file with the university Office of Academic Affairs? No**

**DIRECT MEASURES (means of assessment that measure performance directly, are authentic and minimize mitigating or intervening factors)**

**Standardized tests**

- National standardized examination

**Classroom assignments**

- Other classroom assessment methods (e.g., writing assignments, oral presentations, oral exams)

#### **Direct assessment methods specifically applicable to graduate programs**

- Candidacy exams

#### **INDIRECT MEASURES (means of assessment that are related to direct measures but are steps removed from those measures)**

##### **Surveys and Interviews**

- Student survey

##### **Additional types of indirect evidence**

- Job or post-baccalaureate education placement
- Comparison or benchmarking

#### **USE OF DATA (how the program uses or will use the evaluation data to make evidence-based improvements to the program periodically)**

- Analyze and discuss trends with the unit's faculty
- Analyze and report to college/school
- Make improvements in curricular requirements (e.g., add, subtract courses)
- Make improvements in course content
- Periodically confirm that current curriculum and courses are facilitating student attainment of program goals

## **Program Specializations/Sub-Plans**

If you do not specify a program specialization/sub-plan it will be assumed you are submitting this program for all program specializations/sub-plans.

## **Pre-Major**

Does this Program have a Pre-Major? No

## **Attachments**

- BSVS Admission to OPT.docx: Response to NMS Panel Questions  
*(Other Supporting Documentation. Owner: Haddad,Deborah Moore)*
- BSVS support from college.docx: Support from College of Optometry  
*(Support/Concurrence Letters. Owner: Vankeerbergen,Bernadette Chantal)*
- ASC Support Letter for BSVS.pdf: Letter Executive Dean ASC  
*(Letter from the College to OAA. Owner: Vankeerbergen,Bernadette Chantal)*
- BSVS Sample Curriculum rev 12-13-16.xlsx: Sample 4-Year Plan  
*(Other Supporting Documentation. Owner: Haddad,Deborah Moore)*
- Appendix Submission Template.docx: Required Courses  
*(List of Semester Courses. Owner: Haddad,Deborah Moore)*

## **Comments**

- Sent back to D. Haddad to make changes suggested by NMS Panel on 11-30-16. *(by Vankeerbergen,Bernadette Chantal on 12/05/2016 11:36 AM)*
- This is not a new program.

The VISSCI-BS had been an ASC program under the quarter system that had been overlooked during semester conversion. This submission is a direct conversion of the quarter-system program to the current semester system.  
*(by Haddad,Deborah Moore on 10/20/2015 01:45 PM)*

**Workflow Information**

Status	User(s)	Date/Time	Step
Submitted	Haddad,Deborah Moore	10/20/2015 01:56 PM	Submitted for Approval
Approved	Gustafson,Terry Lee	10/20/2015 02:42 PM	Unit Approval
Approved	Haddad,Deborah Moore	10/20/2015 03:44 PM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	01/21/2016 11:11 AM	ASCCAO Approval
Submitted	Haddad,Deborah Moore	11/14/2016 08:06 PM	Submitted for Approval
Approved	Haddad,Deborah Moore	11/14/2016 08:07 PM	Unit Approval
Approved	Haddad,Deborah Moore	11/14/2016 08:07 PM	College Approval
Revision Requested	Vankeerbergen,Bernadette Chantal	12/05/2016 11:36 AM	ASCCAO Approval
Submitted	Haddad,Deborah Moore	12/13/2016 02:09 PM	Submitted for Approval
Approved	Haddad,Deborah Moore	12/13/2016 02:10 PM	Unit Approval
Approved	Haddad,Deborah Moore	12/16/2016 01:33 PM	College Approval
Pending Approval	Nolen,Dawn Vankeerbergen,Bernadette Chantal Hanlin,Deborah Kay Jenkins,Mary Ellen Bigler Hogle,Danielle Nicole	12/16/2016 01:33 PM	ASCCAO Approval



November 21, 2016

W. Randy Smith  
Vice Provost for Academic Affairs  
203 Bricker Hall  
190 North Oval Mall  
CAMPUS

Dear Randy,

I am pleased to submit for your consideration a proposal to convert the quarter-system program, Bachelor of Science in Vision Science, to a semester-system program. This converted program retains the combination curriculum of the quarter-system program. Arts and Sciences students will complete all undergraduate major and general education courses in the first three years, and complete the fourth year of the undergraduate degree enrolled in the first year of the Doctor of Optometry (O.D.) program in the College of Optometry.

Through the continued collaboration between the Colleges of Arts and Sciences and of Optometry, the Vision Science program provides an opportunity for students to complete the O.D. program in six, rather than seven, years. I appreciate your consideration of the proposal, which I strongly endorse.

Sincerely,

David Manderscheid  
Executive Dean and Vice Provost  
College of Arts and Sciences



Bernadette Vankeerbergen, PhD.  
Program Director, Curriculum and Assessment  
Arts and Science  
The Ohio State University  
154 D Denny Hall  
164 W 17<sup>th</sup> Avenue  
Columbus OH 43210

Dr. Vankeerbergen:

Recently, the profession of optometry has seen a significant increase in the number of optometry programs that have opened across the country. This is NOT accompanied by an increase in the number of applicants nationally. In addition, our profession suffers from the same burden of increasing financial debt for our graduates. A recent article in the New England Journal of Medicine points out a relatively unfavorable debt to potential income analysis for most health profession positions other than surgical subspecialties.

In response to both increased competition to recruit the best applicants to our program and to the escalating costs of professional education, The Ohio State University College of Optometry is currently increasing our efforts recruit applicants after successful completion of three years of undergraduate education and completion of our prerequisites. Therefore we expect the number of students who matriculate into our program who would be both interested and eligible to participate in the Bachelor of Science in Vision Science (B.S.V.S.) program to increase in the coming years

The B.S.V.S. program is a competitive advantage that the OSU College of Optometry can offer applicants over all other optometry programs. It also offers a way to keep the BEST applicants from Ohio to stay in Ohio. Therefore the college's administration is **strongly** in favor of continuing to offer this opportunity to our first year students.

Please let me know if you require any further information or documentation. Thank you for efforts in continuing this program.

Sincerely,

Michael J. Earley, OD, PhD, FAAO



**THE OHIO STATE UNIVERSITY**

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Associate Dean of Academic Affairs

Professor of Clinical Optometry

VSP Chair for Advancement of Professional Practice

### Vision Science, B.S. Sample 4-Year Plan

Autumn Semester		Spring Semester		
<b>1st Year B.S.</b>	Chemistry 1210	5	English 1110.01	3
	Math 1151	5	Chemistry 1220	5
	Biology 1113	4	Biology 1114	4
	College Survey	1	Psychology 1100	3
		15	15	

Autumn Semester		Spring Semester		
<b>2nd Year B.S.</b>	Physics 1200	5	Physics 1201	5
	Chemistry 2510	4	Biochemistry 4511	4
	GE - Data Analysis	3	GE - Foreign Language	4
	GE - Historical Study	3	GE - Historical Study or Cultures and Ideas	3
		15	16	

Autumn Semester		Spring Semester		
<b>3rd Year B.S.</b>	GE - 2nd Writing	3	GE - Social Science	3
	GE - Literature	3	GE - Visual Arts	3
	GE - Social Science	3	GE - Foreign Language	4
	GE - Foreign Language	4	Physiology 3200	5
	Microbiology 4000	4		
		17	15	

Autumn Semester		Spring Semester		
<b>4th Year B.S. + 1st Year O.D.</b>	Vision Science 6700	4	Vision Science 6720	3
	Vision Science 6500	5	Vision Science 6540	3
	Vision Science 6100	4	Vision Science 6520	4
	Vision Science 6130	5	Vision Science 6140	5
	Vision Science 6160	1	Vision Science 6110	4
				Vision Science 6170
		19	20	

**Total Upper Division Hours (min 39):** 59

**Total Degree Hours (min 121):** 132

The courses in yellow fulfill GE requirements and the courses in blue are the professional program/major. Courses with no background color are required for admission to the College of Optometry but do not fulfill GE or major requirements. The sample includes PSYCH 1100 + 2 GE social sciences...this is because the College of Optometry specifically requires PSYCH 1100 plus 2 semesters of social science coursework.

**PROPOSED SEMESTER CONVERSION OF VISION SCIENCE, BS  
PREREQUISITES AND DESCRIPTIONS OF REQUIRED COURSES**

Course	Description	Cr. Hrs.	Prereq(s)
<b>BIOCHEM 4511:</b> <i>Introduction to Biological Chemistry</i>	An introductory course in biochemistry dealing with the molecular basis of structure, metabolism, genetic replication, transcription, and translation in plants, animals, and microorganisms.	4	Chem 1220 (123) or 1250 (125), and 2510 (252) or 2310 (231), and one semester of Biological Sciences; or permission of instructor.
<b>BIOLOGY 1113:</b> <i>Biological Sciences: Energy Transfer and Development</i>	Exploration of biology and biological principles; evolution and the origin of life, cellular structure and function, bioenergetics, and genetics.	4	Math 1130 (130), 1148, 1150, or above, or Math Placement Level L or M. Prereq or concur: Chem 1110 (101), 1210 (121), 1610, or 1910H (201H)
<b>BIOLOGY 1114:</b> <i>Biological Sciences: Form, Function, Diversity, and Ecology</i>	Exploration of biology and biological principles; evolution and speciation, diversity in structure, function, behavior, and ecology among prokaryotes and eukaryotes.	4	Math 1130 (130), 1148, or 1150 or above, or Math Placement Level L or M. Prereq or concur: Chem 1110 (101), 1210 (121), 1610, or 1910H (201H)
<b>CHEM 1210:</b> <i>General Chemistry I</i>	First course for science majors, covering dimensional analysis, atomic structure, the mole, stoichiometry, chemical reactions, thermochemistry, electron configuration, bonding, molecular structure, gases, liquids, and solids.	5	One unit of high school chemistry, and Math Placement Level L or M; or a grade of C- or above in Math 1130 (130), 1131 (131), 1148 (148), 1150 (150), or above.
<b>CHEM 1220:</b> <i>General Chemistry II</i>	Continuation of 1210 for science majors, covering solutions, kinetics, chemical equilibrium, solubility and ionic equilibria, qualitative analysis, thermodynamics, electrochemistry, descriptive chemistry, coordination compounds, and nuclear chemistry.	5	1210, 1215, 1250, 1610 (162), 1910H (202H), or 122, and Math Placement Level L or M; or a grade of C- or above in Math 1130 (130), 1131 (131), 1148 (148), or 1150 (150), or above.
<b>CHEM 2510:</b> <i>Organic Chemistry I</i>	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.	4	1220 (123), 1620 or 1920H (203H).
<b>MATH 1151:</b> <i>Calculus I</i>	Differential and integral calculus of one real variable.	5	A grade of C- or above in 1148 and 1149, or in 1144, 1150, or 150, or Math Placement Level L.
<b>MICRBIO 4000:</b> <i>Basic and Practical Microbiology</i>	Provides an understanding of microorganisms and their interaction with the human experience.	4	3 cr hrs in Biology.
<b>PHYSICS 1200:</b> <i>Mechanics, Kinematics, Fluids, Waves</i>	Algebra-based introduction to classical physics: Newtons laws, fluids, waves.	5	A grade of C- or above in Math 1148 (148), or Math Placement Level M.
<b>PHYSICS 1201:</b> <i>E&amp;M, Optics, Modern Physics</i>	Algebra-based introduction to electricity and magnetism, simple optics, overview of modern physics including special	5	1200 (111).



	relativity and quantum mechanics.		
<b>PHYSIO 3200: Human Physiology</b>	Teaches the physiology of human organ systems, including the following: nervous system, muscle, gastrointestinal, cardiovascular, respiratory, renal, endocrine, and reproductive systems.	5	6 sem cr hrs in the biological sciences.
<b>PSYCH 1100: Introduction to Psychology</b>	A broad survey of psychological science. Application of the scientific method to the empirical study of behavior with emphasis on individual and cultural differences.	3	N/A
<b>VISSCI 6100: General and Histological Anatomy</b>	Gross and microscopic anatomy of the body with emphasis on head and neck anatomy and organ systems.	4	1st yr standing in Optometry.
<b>VISSCI 6110: General and Visual Neuroanatomy</b>	Anatomy of the central and peripheral nervous system with special emphasis on autonomic system and anatomy of the visual system.	4	1st yr standing in Optometry.
<b>VISSCI 6130: Pathophysiology I</b>	Provides a comprehensive introduction to pathology, including: inflammation, genetic disease, and neoplasia. Pathophysiology of blood, GI, endocrine, and respiratory systems will be examined in detail.	5	1st yr standing in Optometry.
<b>VISSCI 6140: Pathophysiology II</b>	The pathophysiology of the nervous system, muscle systems, cardiovascular, renal, and immune systems. Students will integrate information from VisSci 6130.	5	1st yr standing in Optometry.
<b>VISSCI 6160: Biochemistry for Optometry</b>	This course is designed to help optometry students integrate biochemistry with concepts related to ocular pathology, and therapeutic treatment.	1	1st yr standing in Optometry.
<b>VISSCI 6170: Microbiology for Optometry</b>	This course is designed to help optometry students integrate microbiology with concepts related to ocular pathology, and therapeutic treatment.	1	1st yr standing in Optometry.
<b>VISSCI 6500: Geometric Optics</b>	Vergence, ray tracing and image formation. Refracting and reflecting surfaces, lenses, prisms, model eyes. Magnification, apertures and stops, astigmatism, prismatic effects of lenses, aberrations.	5	1st yr standing in Optometry.
<b>VISSCI 6520: Optics of the Eye</b>	Optics of ametropias and their correction, classification and etiology of refractive errors, schematic eyes, retinal image size, optics of clinical instruments, optics of accommodation, aberrations of the eye.	4	1st yr standing in Optometry.
<b>VISSCI 6540: Physical Optics and Photometry</b>	Principles of photometry and colorimetry; light sources; diffraction, polarization, interference, electromagnetic waves, quantum optics, lasers.	3	1st yr standing in Optometry.
<b>VISSCI 6700: Ocular Anatomy</b>	Human gross anatomy of the head and neck with special emphasis on the eye and orbit; histology and embryology of the eye and associated structures.	4	1st yr standing in Optometry.
<b>VISSCI 6720: Ocular Physiology</b>	Functions and organic processes of the components of the eye and surrounding structures.	3	1st yr standing in Optometry.

<b>BSVS PROGRAM REQUIRED CREDIT HOURS</b>	
BSVS Major Courses .....	25 hours
ASC GE Courses .....	68 hours
Optometry Courses .....	39 hours
<b>Total Minimum Hours .....</b>	<b>132 Hours</b>

## RESPONSES TO ASCC NMS PANEL 01/21/2016 REVISION REQUEST

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### ➤ INFORMATION ABOUT THE REQUIREMENTS TO ENTER THE PROGRAM AND TO COMPLETE IT.

#### Requirements for Admission to the College of Optometry

- Completion of three or more years of undergraduate work, with preference given to those with an earned bachelor's degree.
- Complete all stated prerequisite courses with a grade of C- or better.
- Complete at least 10 hours of observation at a minimum of two different optometric practice setting.
- Submit OptomCAS application between July 1 and March 31.
- Submit official transcripts from all post-secondary institutions attended, via OptomCAS.
- Submit a minimum of three letters of recommendation via OptomCAS. One must be from an optometrist, one must be from a professor, and the third letter is from someone of your choice.
- Complete the Optometry Admission Test (OAT) by March 31. Be sure to notify our office if you have retaken the test.
- After we receive your submitted OptomCAS application, you will be invited via email to file The Ohio State Optometry Supplemental Application.
- Complete an in person interview with the College of Optometry Admissions Committee.
- To ensure that you have satisfactory functional skills to provide optometric care, you must meet functional guidelines established by the Association of Schools and Colleges of Optometry (ASCO).

#### Prerequisite Courses for The Ohio State University College of Optometry

Admission to the OSU College of Optometry requires completion of the prerequisites listed below or their equivalents from any accredited college or university. At least one year of this preparatory work should be completed at a baccalaureate degree-granting institution. Applicants must have completed three or more years of undergraduate work, and preference will be given to those with an earned bachelor's degree. The number of courses is provided as a guideline. In assessing course content for equivalency, actual numbers of courses may vary for your institution. In some cases multiple courses may be needed to fulfill prerequisite coursework.

Courses Prerequisite to Admission to the Vision Science Program, College of Optometry	# of OSU Courses	Current OSU Course Numbers
English Composition	1	1110
Inorganic Chemistry, with laboratory	2	1210 & 1220
Organic Chemistry, no laboratory required	1	2510
Biochemistry If your institution divides biochemistry into a two series course, you need to take both courses to meet our course content requirements.	1 or 2	4511
Physics, with laboratory Physics course work should cover mechanics, heat, light, sound, electricity, magnetism and modern physics.	2	1200 & 1201
Mathematics - Calculus	1	1151
Biology, with laboratory	2	1113 & 1114
Physiology Physiology course work must cover all of the systems of the body. <b>Unless you took physiology at Ohio State, you must send your physiology course syllabus materials to our office for evaluation at <a href="mailto:syllabus@optometry.osu.edu">syllabus@optometry.osu.edu</a></b>	1 or 2	3200

Microbiology, with laboratory	1	4000
Introductory Psychology	1	1100
Humanities	2-3	
Social Sciences	2-3	

## Additional Recommended Courses

Additional courses in physiology and anatomy are highly recommended. Other beneficial electives may include: introductory statistics, ethics, histology, sociology, scientific terminology, and small business management.

## Optometry Admission Test

The Optometry Admissions Test (OAT) is an assessment of your academic ability and knowledge in six sections: biology, chemistry, organic chemistry, physics, math (quantitative), and reading comprehension.

The OAT is offered throughout the year at Prometric Testing Centers. You should plan ahead for taking the OAT and schedule a testing date several weeks in advance. Information about registering for the test can be found at: <http://www.opted.org/>. Please note that you must register with OAT before you can contact a Prometric Testing Center for a testing date. You must have your official scores sent to OSU College of Optometry directly from OAT as we cannot accept copies of your score report from Prometric. Scores are good for two years and are generally sent to the college within two weeks of your test date. You must submit your OAT scores by the March 31st preceding the autumn term for which you are applying.

The OAT can be retaken once every 90 days. In addition to registration instructions and materials, the OAT website (<http://www.opted.org/>) also provides a tutorial, test preparation materials, and a sample test. You will receive an individual score for each of the sections as well as an Academic Average score (the average score for all six sections) and a Total Science score (a recalculation of the science sections only). The test is scored from 200 (minimum score) to 400 (maximum score).

## Knowledge of the Profession

In order to gain valuable information about the practice of optometry, applicants must complete a minimum of 10 hours of observation in at least two different types of optometric settings. Email Admissions for contact information on optometrists in your local area.

- **WEBSITE SAYS THAT STUDENTS “MAY CHOOSE TO WORK TOWARD THEIR BACCALAUREATE DEGREE WITH DISTINCTION.” D. HADDAD TO CHECK WITH ASC HONORS TO SEE WHAT THAT MEANS UNDER CURRENT REQUIREMENTS.**

Students may choose to complete the baccalaureate *with honors* in the Arts and Sciences, or *with research distinction*.

- **VALID PROGRAM GOALS**

## Program Learning Goals

*N.B.:* The Vision Science program is a graduate program and is not the professional program to educate optometrists..

- Students have the biological, mathematical, and physical sciences knowledge to pursue research in the field of Vision Science.
- Students marshal the conceptual and methodological tools needed to solve problems in the field of Vision Science.

- Students demonstrate an understanding of the ethical implications of their chosen methodologies and conduct research responsibly.
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➤ **LETTER OF SUPPORT FROM ASC EXECUTIVE DEAN**