Course Outline

OPTM3201

Ocular Imaging and Applied Vision Science

Optometry and Vision Science

Faculty of Science

Term 3, 2019

1. Staff

Position	Name	Email	Consultation times and locations	Contact Details
Course Convenor/ Senior Lecturer	Juno Kim	juno.kim@unsw.edu.au	Room 3.006 Rupert Myers Building (RMB)	+61 2 9385 7474
Professor	Arthur Ho	a.ho@unsw.edu.au	Email for appointment	By email
Senior Lecturer	Maitreyee Roy	maitreyee.roy@unsw.edu.au	Room 3.025 RMB	+61 2 9385 7874
Lecturer	Nayuta Yoshioka	n.yoshioka@unsw.edu.au	Room 3.055 RMB	+61 2 9385 9230
Instructor	Grant Hannaford	g.hannaford@unsw.edu.au	Email for appointment	By email
Instructor	Wilson Luu	wluu@cfeh.com.au	Room 2.028 RMB	+61 2 9385 4859

2. Course information

Units of credit: 6

Pre-requisite(s): VISN2111 – Ocular anatomy and physiology (undergraduate)

Teaching times and locations: Lecture 1: Monday 12-1pm (Weeks 1,2,3,5-11 in Electrical Engineering G23); Lecture 2: Wednesday 1-2pm (Weeks 1-6 face to face in Electrical Engineering G23, Weeks 7-10 online); Computer labs (2 hours per week as per student allocated time in Old Main Building LG21).

The online timetable for this course can be found here: *http://www.timetable.unsw.edu.au*

2.1 Course summary

The first two years of the vision science course provided students with a strong foundation in optics, perceptual systems and the psychophysical principles of vision science. In this course, students will learn to apply their foundation knowledge for solving real-world problems important to optometry, ophthalmology and vision science. Students will learn to undertake lighting evaluation supported by the resources of a fully functioning lighting measurement laboratory. Principles of lens design will be introduced to students who will learn ways of minimising common optical aberrations of importance in optical dispensing. In the ocular imaging component of this course, foundation knowledge in anatomy, physiology and optical imaging skills will be applied to strengthen understanding of how ophthalmic structure can be imaged to infer visual function. Students will also learn how image analysis routines can be implemented in software to enhance image structure for the objective and subjective assessment of visual function. These skills are important for understanding the research and development lifecycle of ophthalmic imaging which is of benefit to technicians and clinicians such as optometrists and orthoptists.

2.2 Course aims

This course aims to provide vision science and optometry students with the necessary opportunities to gain experience in applying their foundation knowledge to solve real-world problems. The course takes a holistic approach for students to better understand how concepts in lighting design, optics, imaging and analysis can be used to generate systems to optimise inferences we make about physical structures.

Students will learn to understand how illumination, reflectance, transmittance and the optical systems used to focus light all have consequences on image formation, and in turn, influence the visual assessment of physical structures found in the eye or natural environment. An initial assessment task on lighting will aim to provide students with practical experience in acquiring measurements of scene illumination to understand how lighting systems can be designed to optimise human performance in real-world scenarios.

Students will be given practical examples and experience with the optics of computer-aided lens design, which aims for students to understand how lenses can be configured to compensate for potential artefacts in the imaging process. An assessment task on lens design will seek to provide feedback to students on their understanding of how software tools can be used to design lenses for controlling light and improving the quality of images acquired.

Given that images are not always able to be acquired with the best possible quality due to potential hardware and methodological limitations, it is often important to apply image processing routines to enhance the quality and appearance of image structure. Students will learn about common image processing routines used to enhance image content for visualisation and analysis. Students will undertake an assignment in the form of a written report to learn how image analysis can be tailored to enhance image content to obtain valuable subjective and objective information for making informed assessments of physical structures imaged.

Finally, the course will provide students with an overview of different imaging technologies and how they can be used to visualise and quantify different ophthalmic structures for assessing visual function and monitoring changes in eye health. The final exam will test student understanding on all the concepts covered within the scope of the course.

2.3 Course learning outcomes (CLO)

At the successful completion of this course you (the student) should be able to:

1. Demonstrate knowledge of lighting, surface reflectance and the measurement of illuminance and luminance for real-world applications.
2. Be able to describe processes involved in lens design, from design input and computer-aided design optimisation to design verification.
3. Demonstrate knowledge of common image processing and analysis routines used to enhance image content for the improved visualisation and objective assessment of different ophthalmic structures.
4. Effectively communicate theoretical knowledge of ophthalmic imaging technologies and their uses for understanding visual function.

2.4 Relationship between course and program learning outcomes and assessments

The following table shows how each of the aforementioned learning outcome statements (each LO Statement) relates to program learning outcomes (PLOs) for the Bachelor of Vision Science (3181) and the Bachelor of Clinical Optometry (3182).

Course Learning Outcome (CLO)	**LO Statement**	**Program Learning Outcome (PLO)***	**Related Tasks & Assessment**
CLO 1	Demonstrate knowledge of lighting, surface reflectance and the measurement of illuminance and luminance for real-world applications.	3181: [1, 2, 7] 3182: [6, 7]	● Lighting evaluation assessment sheet ● Final exam
CLO 2	Be able to describe processes involved in lens design, from design input and computer-aided design optimisation to design verification.	3181: [2, 3, 4, 5] 3182: [1, 6]	● Lens design computer lab assignment ● Final exam
CLO 3	Demonstrate knowledge of common image processing and analysis routines used to enhance image content for the improved visualisation and objective assessment of different ophthalmic structures.	3181: [3, 4, 7] 3182: [1, 6, 7]	● Report on image analysis and perception ● Final exam
CLO 4	Effectively communicate theoretical knowledge of ophthalmic imaging technologies and their uses for understanding visual function.	3181: [5] 3182: [1, 6]	● Report on image analysis and perception ● Final exam

* Numbers for Program Learning Outcomes (PLOs) correspond to the specific PLOs of each degree as shown in **Appendix A**.

3. Strategies and approaches to learning

3.1 Learning and teaching activities

Each week, students will receive two lecture hours of content that have been designed to motivate and engage student interest in the problems of lighting, optics and lens design, image formation, image analysis and some imaging devices available to acquire ophthalmic images for diagnostic assessment. For the first five weeks, both lectures will be face-to-face. In Weeks 5 to 7, at least one lecture will be available online to promote flexible learning (both lectures will be online in Week 6). These online lectures will be available for viewing as Moodle videos. The online lectures will cover different imaging technologies used in optometry/ophthalmology and will be delivered by an appropriate lecturer who has expertise on the device(s) covered.

Computer lab classes are two hours in length and will generally run on subsequent weeks to the lecture(s) of most relevance. Each of the computer lab classes will give students hands-on-experience with the processes and concepts discussed in lectures. Tasks will include small field-work experiments on lighting and its measurement, computer-aided design of optical systems, and an introduction to image processing and analysis tools for image enhancement and data visualisation. The computer labs ensure that students are not just engaged learners, but also are actively involved in their learning during and outside of class time. Group work will also provide the opportunity for students to build connections with their peers in an inclusive but diverse and immersive environment. The computer labs provide the opportunity for students to ask questions and will provide students with research-integrated and research-oriented learning to hone students' problem-solving abilities in real-world applications.

3.2 Expectations of students

Expectations of Students	Students are required to attend all face-to-face lectures and computer lab classes to maximise their opportunity to engage with lecturers, tutors and other students. Ongoing attendance in lectures will best enable students to acquire necessary knowledge to supplement computer labs. Attendance in computer lab classes is mandatory as it will ensure students take advantage of the valuable opportunities necessary to hone their skills through hands-on-experiments in lighting, optics, and image processing/analysis. Attendance in computer labs classes will also give students the opportunity to ask questions and engage with their mentor(s) who will be able to most effectively guide their learning and provide direct feedback to a student about their progress. For each of the relevant weeks, students are expected to view the online lectures. Students will have the opportunity to raise questions for brief discussion online in Moodle and in a relevant class. Optional online lectures or tasks may be provided on Moodle for students to learn key concepts in optics for engaging more effectively with the course. All other components of this course are compulsory, and you are expected to attend. Attendance at compulsory face-to-face course components may be monitored by taking a roll or asking attendees to sign an attendance register.

The compulsory course components, and the justification for their compulsory nature, are as follows:

- All face-to-face lectures in Weeks 1-11, which will provide information not easily accessible from other sources.
  All computer lab classes in this course must be attended because they act to reinforce theoretical components of the course.

Attendance registers:

In courses where signature on an attendance register is used to monitor attendance, all enrolled students must provide a specimen signature on a central School register by the end of the first week of semester. The central register will be overseen by Dr Dale Larden or Paul Zytnik. Please bring your student card with you when providing your specimen signature. Only one variant of your signature may be used on the central register and on all attendance registers.

If your signature does not appear on an attendance register for a compulsory course component, or if the signature on the attendance register does not match the signature on the central register, it will be assumed that you were absent from the compulsory course component.

Attempts to falsify the central register or attendance registers will be managed under UNSW Student Misconduct Procedures:

https://www.gs.unsw.edu.au/policy/documents/studentmisconductprocedures.pdf

Email

The University uses email as an official form of communication for students. All UNSW students have their own email account. The School of Optometry and Vision Science will also make use of this form of communication.

It is extremely important that you know how to use your Zmail and ensure that you check it regularly. You are advised to link your official UNSW email address to your habitual email address (e.g. hotmail). You will miss out on vital information from the School and University if you do not check your Zmail.

For more information or if you are having connection or access problems, see:

IT Service Centre

www.it.unsw.edu.au/

Telephone: 02 9385 1333

Email: itservicecentre@unsw.edu.au

4. Course schedule and structure

This course consists of 4 hours of class contact hours per week. You are expected to take an additional hour of non-class contact per week to complete assessments, readings and exam preparation.

Week [Date/Session]	Topic [Module]	Activity [Learning opportunity]	Related CLO
Week 1	L1: Introduction to the course (JKim);	Learn about challenges for the subject matter and assessment requirements	1,2,3,4
	L2: Lighting evaluation (NYoshioka);	Concepts of lighting, luminance, illuminance and lighting evaluation	1
	P1: Optics refresher (optional online through Moodle)	Revision of basic concepts on optics	NA
Week 2	L1: Perceiving surface properties from images (JKim)	Concepts of forward/inverse optics	3
	L2: Lens design A (AHo)	Introduction to the fundamentals of lens design	2
	P1: Lighting practical	Group project on measurement of lighting and illuminance	1
Week 3	L1: Perceptually-based approaches to image analysis (JKim)	Understand how image constraints determine our perception.	3
	L2: Lens design B (AHo)	Practical approaches to lens design	2
	P1: Psychophysical experimentation	Designing and running a psychophysical experiment	2
Week 4	L1: No lecture (public holiday)		
	L2: Lens design C (AHo)	Overview of Synopsys software	2
	P1: Feature enhancement	Image enhancement and pattern recognition	2
Week 5	L1: Applications of image analysis in optometry and ophthalmology (JKim)	Overview of current projects on image analysis in optometry and vision science	3
	L2: Interpretation of corneal imaging (Online by CFEH, contacts: WLuu / NYoshioka)	Learn to interpret corneal imaging data	4
	P1: Lens design practical 1	Computer aided lens design (Part 1)	2

Week 6	L1: Interpreting OCT imaging (Online by CFEH, contacts: WLuu / NYoshioka)	Interpreting Optical Coherent Tomography	3
	L2: Angiography (Online by CFEH, contacts: WLuu / NYoshioka)	Established and emerging technologies in angiography	4
	P1: Lens design practical 2	Computer aided lens design (Part 2)	3
Week 7	L1: Machine learning and image analysis (JKim)	Understand how computer science approaches image analysis	3
	L2: Latest developments in eye imaging (Online by CFEH, contacts: WLuu / NYoshioka)	Latest developments in ocular imaging	4
	P1: Research report writing	“General” assistance with report writing	3
Week 8	L1: Data visualisation and 3D reconstruction (JKim)	Graphical rendering approaches to visualising patterns in image data	3
	L2: Optical Coherence Tomography A (MRoy)	Innovations in Optical Coherence Tomography (OCT) Part 1	4
	P1: Computerised 3D Reconstruction	Use 3D graphical reconstruction for data visualisation	3
Week 9	L1: Multisensory interactions in vision science (JKim)	Understand how multiple senses contribute to visual awareness	3
	L2: Optical Coherence Tomography B (MRoy)	Innovations in Optical Coherence Tomography (OCT) Part 2	4
	P1: Virtual reality and its variants	Practical demonstrations using technology to understand multisensory interactions	3
Week 10	L1: Ethics in imaging (JKim)	Ethical considerations in imaging science	3,4
	L2: Confocal microscopy (MRoy)	Approaches to confocal microscopy	4
	P1: Ethics and Careers in vision science	Writing ethics applications. Where to now with your career?	4
Week 11	L1: Revision of course (JKim / WLuu)		1,2,3,4

5. Assessment

5.1 Assessment tasks

Assessment task	Length	Weight	Mark	Due date *(normally midnight on due date)*
Assessment 1: Practical assessment sheet	-	10%	10	Week 2 during computer lab
Assessment 2: Lens design practical assignment	-	10%	10	Weeks 6 during computer lab
Assessment 3: Image analysis and perception report	800 words	20%	20	End of Week 8 (Friday)
Assessment 4: Final exam	TBA	60%	60	Exam period

Further information

UNSW grading system: student.unsw.edu.au/grades

UNSW assessment policy: student.unsw.edu.au/assessment

5.2 Assessment criteria and standards

The following criteria will be used to grade student responses to assessment tasks.

Assessment task	Grading criteria
Assessment 1: Practical assessment sheet	Accuracy in interpretation of measurements and/or responses to written questions.
Assessment 2: Lens design practical assignment	Degree to which the student's lens design satisfies the set of target requirements for the assessment task.
Assessment 3: Image analysis and perception report	Writing style, referencing style (where appropriate), choice of data to present, accuracy in reporting data and interpreting findings. A detailed rubric will be made available prior to students undertaking this assignment.
Assessment 4: Final exam	Accuracy of responses to examination questions.

5.3 Submission of assessment tasks

Assignment Submissions	The assignment on lighting evaluation will be submittable electronically during the practical class in Week 2. The lens design practical assignment and the image analysis and perception report will be submitted via Moodle (electronic submission). The research report will be submittable via Turnitin on Moodle. Electronically submitted assignments will receive feedback through Moodle. The School Policy on Submission of Assignments (including penalties for late assignments) and the Assignment Attachment Sheet are available from the School office (RMB3.003) and the School website at: https://www.optometry.unsw.edu.au/current/policies-and-procedures

Assessment Procedures **UNSW Assessment Policy[1]**	SCHOOL OF OPTOMETRY AND VISION SCIENCE, UNSW SUPPLEMENTARY EXAMINATION INFORMATION, 2019 There are two circumstances whereby a supplementary examination may be granted: COMPETENCY IN DOUBT Students whose competency level is in doubt after the final examination(s) may be eligible to sit a supplementary examination in the course(s) concerned. Please check the School website for this information. SPECIAL CONSIDERATION On some occasions, sickness, misadventure or other circumstances beyond your control may prevent you from completing a course requirement, such as attending a formal end of semester examination. In these cases you may apply for Special Consideration. To do this you must make formal application for Special Consideration for the course/s affected as soon as practicable after the problem occurs and within three working days of the assessment to which it refers. The application must be made via Online Services in myUNSW. Log into myUNSW and go to My Student Profile tab > My Student Services > Online Services > Special Consideration. Submit the application (including supporting documentation) to UNSW Student Central. Special Consideration - Pre-Existing Conditions Many conditions that are the subject of special consideration applications are pre-existing and could be used repeatedly to gain examinations at a later date. These include conditions aggravated or triggered by the stress of the assessment. With the help of your doctor and/or other health care practitioners, steps can be taken ahead of the assessment time to minimise or avoid the consequences of these conditions. When applying for special consideration on the basis of a condition that was already known to be a problem for you and which you have already used as the basis for a special consideration application, the School will require you to provide a certificate that details the preventative measures taken and why they were not successful. This will then be taken into account when considering the application.

Absence from a final examination is a serious matter, normally resulting in a Fail (FL) grade. If you are medically unfit to attend an examination, YOU MUST CONTACT THE SCHOOL DIRECTLY ON THE DAY OF THE EXAMINATION TO ADVISE OF THIS (telephone 02 9385 4639, email: optometry@unsw.edu.au). You must also submit a Request for Special Consideration application as detailed above.

You are reminded that supplementary examinations are not granted lightly or automatically. Eligibility for supplementary examinations, for both of the above situations, is determined by the School Examination Committee, which meets soon after the formal examination period has ended. You cannot "apply" for a supplementary examination, so please do not contact the School or Course Controllers to request a supplementary examination.

It is the responsibility of the student to consult the web site or noticeboard to ascertain whether they have supplementary examinations. This information WILL NOT be conveyed in ANY other manner. Interstate, overseas or any other absence cannot be used as an excuse.

This information will be available on the School web site at https://www.optometry.unsw.edu.au/files/supplementary_examination_information_2019_final_14_03_19.pdf (do not confuse the School website with the myUNSW website) and posted on the notice board on Level 3. This information will be available as soon as possible after the School Examination Committee meeting.

SUPPLEMENTARY EXAMINATIONS FOR 2019 WILL BE HELD AS FOLLOWS:

FOR TERM 1:

- STAGE 1-4* COURSES: Friday 24th May 2019 to Saturday 25th May 2019
- THERE WILL BE NO SUPPLEMENTARY EXAMINATIONS FOR STAGE 5 STUDENTS IN TERM 1 2019

FOR TERM 2:

- STAGE 1-3 COURSES: Friday 6th September 2019 to Saturday 7th September 2019
- STAGE 4* COURSES: Friday 6th September 2019
- THERE WILL BE NO SUPPLEMENTARY EXAMINATIONS FOR STAGE 5 STUDENTS IN TERM 2 2019

FOR TERM 3:

- STAGE 1-4* COURSES: Thursday 19th December 2019, Friday 20th December 2019 and Saturday 21st December 2019.
- STAGE 5 COURSES ONLY: During the week of Monday 9th December 2019 to Friday 13th December 2019

Supplementary examinations will be held at the scheduled time only. If students who are granted supplementary examinations do not attend, a failure will be recorded for that course. Students should not make travel arrangements, or any other commitments, before establishing whether or not they have supplementary examinations. Ignorance of these procedures, interstate, overseas or any other absence will not be accepted as an excuse. But usual Special Consideration for illness still applies.

	If additional assessment is not scheduled, this does NOT indicate whether or not a student has passed or failed the course. Results will be received in the usual way. Please do not contact the School in this regard. Please note the above applies to OPTM and VISN courses only. Any information on supplementary examinations for servicing courses (e.g. CHEM****) is the responsibility of the School conducting the course. * Stage 4 includes courses in the first year of the MClinOptom program.

[1] UNSW Assessment Policy

5.4. Feedback on assessment

Feedback on all assessment tasks will be provided in practical classes. Dates provided in the table below.

Assessment task	Feedback date
Assessment 1: Lighting assessment sheet	Week 3 during computer lab class
Assessment 2: Lens design practical assignment	Week 8 during practical classes
Assessment 3: Image analysis and perception report	Week 11 during lecture
Assessment 4: Final exam	Group feedback at the completion of term

6. Academic integrity, referencing and plagiarism

Referencing is a way of acknowledging the sources of information that you use to research your assignments. You need to provide a reference whenever you draw on someone else's words, ideas or research. Not referencing other people's work can constitute plagiarism.

Further information about referencing styles can be located at student.unsw.edu.au/referencing

Academic integrity is fundamental to success at university. Academic integrity can be defined as a commitment to six fundamental values in academic pursuits**:** honesty, trust, fairness, respect, responsibility and courage.[2] At UNSW, this means that your work must be your own, and others' ideas should be appropriately acknowledged. If you don't follow these rules, plagiarism may be detected in your work.

Further information about academic integrity and **plagiarism** can be located at:

- The *Current Students* site student.unsw.edu.au/plagiarism**,** and
- The *ELISE* training site subjectguides.library.unsw.edu.au/elise

The *Conduct and Integrity Unit* provides further resources to assist you to understand your conduct obligations as a student: student.unsw.edu.au/conduct.

[2]International Center for Academic Integrity, 'The Fundamental Values of Academic Integrity', T. Fishman (ed), Clemson University, 2013.

7. Readings and resources

Lighting and illuminance evaluation

Resources to be provided in class.

Lens design

[1*] Born, M. and E. Wolf, Principles of optics. Electromagnetic theory of propagation, interference and diffraction of light. 1999.

[2*] Emsley, H., Aberrations of thin lenses. 1956.

[3*] Synopsys Tutorial: http://www.osdoptics.com/online-tutorial.html

[4*] Welford, W., Aberrations of optical systems. 1986

Optics and Imaging (acquisition, image processing and analysis)

[5*] "Handbook of Optical Coherence Tomography", Edited by Brett Bouma and Tearney, Taylor & Francis.

[6] Russ, J.C. (2011). *The Image Processing Handbook* (6th Edition), Taylor & Francis Group: FL

[7] Gonzalez, R.C., Woods, R.E., Eddins, S.L. (2010) Digital Image Processing using MATLAB (2nd Edition). McGraw Hill (India).

Note: [*] Indicates required/essential readings or resources. All others are references for further reading only. Additional suggestions for essential/further reading may be provided by the teaching staff as required. References on lens design [1-4] relate to chapters on Geometrical Optics and Third-Order Aberrations).

8. Administrative matters

Required Equipment, Training and Enabling Skills

Equipment Required	This course won't require any specialist equipment. However, it would be very useful for students to have access to their own personal computer that can run Microsoft Windows 10 in their own time. Computers available in laboratories can be accessed throughout the week when not in use by teaching staff for other classes.
Enabling Skills Training Required to Complete this Course	The UNSW Student Support website (https://student.unsw.edu.au/support) provides useful resources on a variety of topics, including time management, examination preparation, and oral presentations. For this course, students will have the opportunity to hone their writing skills when completing assessments. Useful information on writing can be found on the UNSW Student Support website: https://student.unsw.edu.au/writing The Learning Centre also offers academic skills support to all students enrolled at UNSW (http://www.lc.unsw.edu.au).

	All commencing UNSW undergraduate students are expected to have completed the ELISE quiz accessible via Moodle. More information on ELISE is available at: http://subjectguides.library.unsw.edu.au/elise/home

Course Evaluation and Development

Student feedback is gathered periodically by various means. Such feedback is considered carefully with a view to acting on it constructively wherever possible. This course is new and has not been formally evaluated. However, student feedback will be used to help shape and develop this course in future.

Mechanisms of Review	Last Review Date	Comments or Changes Resulting from Reviews
Major Course Review	NA	This is a new course offered to students in 2019 and has not yet undergone any formal review.
myExperience[1]	NA	This is a new course offered to students in 2019 and has not yet undergone formal evaluation through myExperience.
Other	2017	Teaching staff scheduled for this course have received positive student feedback for their teaching of related material in other courses that students undertook earlier in the vision science program. The understanding gained from feedback received during the running of those courses has been used to shape the initial format and content of this course.

Work Health and Safety[2]	Information on relevant Occupational Health and Safety policies and expectations both at UNSW and if there are any school specific requirements. Information on relevant policies and expectations is provided during General Safety Induction training. A copy of the Induction booklet distributed at this training is available from the School of Optometry and Vision Science office (RMB3.003) and the School website at: https://www.optometry.unsw.edu.au/whs/work-health-and-safety
Equity and Diversity	Those students who have a disability or are dealing with personal circumstances that affect their study that requires some adjustment in their teaching or learning environment are encouraged to discuss their study needs with the course Convenor prior to, or at the commencement of, their course, or with the Equity

	Officer (Disability) in the Equity and Diversity Unit (9385 4734 or http://www.studentequity.unsw.edu.au/). Issues to be discussed may include access to materials, signers or note-takers, the provision of services and additional exam and assessment arrangements. Early notification is essential to enable any necessary adjustments to be made.		
Student Complaint Procedure[3]	**School Contact**	**Faculty Contact**	**University Contact**
	Prof. Helen Swarbrick h.swarbrick@unsw.edu.au Tel: 9385 4373	Prof Simon Killcross Acting Deputy Dean (Education) s.killcross@unsw.edu.au Tel: 9385 3034 Or Dr Gavin Edwards Associate Dean (Academic Programs) g.edwards@unsw.edu.au Tel: 9385 4652	Student Integrity Unit (SIU) Telephone 02 9385 8515, email studentcomplaints@unsw.edu.au
University Counselling and Psychological Services[4]	Information on Counselling and Psychological Services [CAPS] is available at: https://www.counselling.unsw.edu.au/ Tel: 9385 5418		

[1]myExperience process: https://teaching.unsw.edu.au/myexperience

[2]UNSW OHS Home page

[3]Student Complaint Procedure

[4]University Counselling and Psychological Services

9. Additional support for students

- The Current Students Gateway: student.unsw.edu.au
- Academic Skills and Support: student.unsw.edu.au/skills
- Student Wellbeing, Health and Safety: student.unsw.edu.au/wellbeing
- Disability Support Services: student.unsw.edu.au/disability
- UNSW IT Service Centre: www.it.unsw.edu.au/students

Appendix A

PROGRAM LEARNING OUTCOMES (BACHELOR OF VISION SCIENCE - 3181)

1

Effectively communicate information in both oral and written formats.

Leaders | Professionals | Global Citizens

2

Work effectively with others.

Leaders | Professionals | Global Citizens

3

Apply knowledge and principles in Vision Science and Optometry to work in Ophthalmic Industry.

Scholars | Leaders | Professionals | Global Citizens

4

Apply enquiry-based learning and analytical skills to adapt knowledge and skills in Vision Science and Optometry.

Scholars | Leaders | Professionals

5

Articulate broad and coherent disciplinary theoretical and technical knowledge in Vision Science and Optometry and their areas of practice.

Scholars | Leaders | Professionals

6

Demonstrate an awareness of national and international issues relevant to Vision Science and the Optometry profession.

Global Citizens

7

Use enquiry-based learning and demonstrate analytical skills in the review, consolidation and synthesis of knowledge in Vision Science and Optometry.

Scholars

PROGRAM LEARNING OUTCOMES (BACHELOR OF CLINICAL OPTOMETRY - 3182)

1

Apply knowledge and skills in Optometry to work in ophthalmic industry and or as an autonomous practitioner.

Scholars | Leaders | Professionals | Global Citizens

2

Demonstrate effective and professional skills in communicating information and judgements to patients and other health care providers.

Leaders | Professionals

3

Articulate advanced and integrated understanding of a complex body of knowledge in Vision Science and Optometry, and their areas of professional practice.

Scholars | Leaders | Professionals

4

Demonstrate an awareness of national and international issues within the disciplines of Vision Science and Optometry, and the impact they may have on the delivery of eye care to the community.

Scholars | Global Citizens

5

Apply expert knowledge of ocular diseases and ocular therapeutics to the treatment and management of anterior eye diseases, foreign body removal and glaucoma co-management.

Scholars | Leaders | Professionals

6

Use expert, specialised cognitive and technical skills in Optometry to independently and critically analyse and synthesise complex information, problems, concepts and theories.

Scholars | Leaders | Professionals

7

Understand the scientific research process and ability to undertake independent research in Vision Science and Optometry. Apply established theories and concepts to a body of knowledge, and the interpretation and communication of knowledge and ideas to specialist and non-specialist audiences.

Scholars | Leaders | Professionals