



GENERAL STUDIES COURSE PROPOSAL COVER FORM

Course information:

Copy and paste current course information from Class Search/Course Catalog.

College/School Ira A. Fulton Schools of Engineering Department The Polytechnic School / Human Systems Engineering
Prefix HSE Number 323 Title Perception and Human Systems Units: 3
Is this a cross-listed course? No If yes, please identify course(s)

Is this a shared course? No If so, list all academic units offering this course

Note- For courses that are crosslisted and/or shared, a letter of support from the chair/director of each department that offers the course is required for each designation requested. By submitting this letter of support, the chair/director agrees to ensure that all faculty teaching the course are aware of the General Studies designation(s) and will teach the course in a manner that meets the criteria for each approved designation.

Is this a permanent numbered course with topics? Yes

If yes, all topics under this permanent numbered course must be taught in a manner that meets the criteria for the approved designation(s). It is the responsibility of the chair/director to ensure that all faculty teaching the course are aware of the General Studies designation(s) and adhere to the above guidelines. (Required)

Course description: In-depth exploration of methods by which humans receive and interpret information from the world through vision, audition, taste, smell, touch, and movement. Emphasizes the integration of behavioral research with applications to engineering practice. Topics will cover a wide range from the biological basis of sensory information processing, to the behavioral aspects of perception, and to the applications of perceptual theories to disciplines like computer vision, and graphic design. Students will gain a solid foundation for further study and research in psychology, sociology, human development, neuroscience, and other related fields.s

Requested designation:

Social-Behavioral Sciences-SB

Note- a separate proposal is required for each designation.

Mandatory Review: No

Eligibility:

Permanent numbered courses must have completed the university's review and approval process. For the rules governing approval of omnibus courses, contact Phyllis.Lucie@asu.edu.

Submission deadlines dates are as follow:

For Fall 2016 Effective Date: October 1, 2015

For Spring 2017 Effective Date: March 10, 2016

Area(s) proposed course will serve:

A single course may be proposed for more than one core or awareness area. A course may satisfy a core area requirement and more than one awareness area requirements concurrently, but may not satisfy requirements in two core areas simultaneously, even if approved for those areas. With departmental consent, an approved General Studies course may be counted toward both the General Studies requirement and the major program of study.

Checklists for general studies designations:

- Complete and attach the appropriate checklist
Literacy and Critical Inquiry core courses (L)
Mathematics core courses (MA)
Computer/statistics/quantitative applications core courses (CS)
Humanities, Arts and Design core courses (HU)
Social-Behavioral Sciences core courses (SB)
Natural Sciences core courses (SQ/SG)
Cultural Diversity in the United States courses (C)
Global Awareness courses (G)
Historical Awareness courses (H)

A complete proposal should include:

- Signed course proposal cover form
Criteria checklist for General Studies designation(s) being requested
Course catalog description
Sample syllabus for the course
Copy of table of contents from the textbook and list of required readings/books

It is respectfully requested that proposals are submitted electronically with all files compiled into one PDF.

Contact information:

Name Nancy J. Cooke E-mail ncooke@asu.edu Phone 480-727-5158



ARIZONA STATE UNIVERSITY

Department Chair/Director approval: (Required)

Chair/Director name (Typed): Ann McKenna

Date: 3/10/16

Chair/Director (Signature):

A handwritten signature in red ink, appearing to be 'Ann McKenna', written over a horizontal line.

Arizona State University Criteria Checklist for
SOCIAL-BEHAVIORAL SCIENCES [SB]

Rationale and Objectives

Social-behavioral sciences use distinctive scientific methods of inquiry and generate empirical knowledge about human behavior, within society and across cultural groups. Courses in this area address the challenge of understanding the diverse natures of individuals and cultural groups who live together in a complex and evolving world.

In both private and public sectors, people rely on social scientific findings to consider and assess the social consequences of both large-scale and group economic, technological, scientific, political, ecological and cultural change. Social scientists' observations about human interactions with the broader society and their unique perspectives on human events make an important contribution to civic dialogue.

Courses proposed for a General Studies designation in the Social-Behavioral Sciences area must demonstrate emphases on: (1) social scientific theories, perspectives and principles, (2) the use of social-behavioral methods to acquire knowledge about cultural or social events and processes, and (3) the impact of social scientific understanding on the world.

Revised April 2014

Proposer: Please complete the following section and attach appropriate documentation.

ASU--[SB] CRITERIA					
A SOCIAL-BEHAVIORAL SCIENCES [SB] course should meet all of the following criteria. If not, a rationale for exclusion should be provided.					
YES	NO		Identify Documentation Submitted		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	1. Course is designed to advance basic understanding and knowledge about human interaction.	Course description, syllabus, & table of Contents from the textbook		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	2. Course content emphasizes the study of social behavior such as that found in: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top;"> <ul style="list-style-type: none"> • ANTHROPOLOGY • ECONOMICS • CULTURAL GEOGRAPHY • HISTORY </td> <td style="width: 50%; vertical-align: top; text-align: center;">Psychology</td> </tr> </table>	<ul style="list-style-type: none"> • ANTHROPOLOGY • ECONOMICS • CULTURAL GEOGRAPHY • HISTORY 	Psychology	Course description, syllabus, & table of Contents from the textbook
<ul style="list-style-type: none"> • ANTHROPOLOGY • ECONOMICS • CULTURAL GEOGRAPHY • HISTORY 	Psychology				
<input checked="" type="checkbox"/>	<input type="checkbox"/>	3. Course emphasizes: a. the distinct knowledge base of the social and behavioral sciences (e.g., sociological anthropological). OR b. the distinct methods of inquiry of the social and behavioral sciences (e.g., ethnography, historical analysis).	Course description, syllabus, & table of Contents from the textbook		
<input checked="" type="checkbox"/>	<input type="checkbox"/>	4. Course illustrates use of social and behavioral science perspectives and data.	Course description, syllabus, & table of Contents from the textbook		
		THE FOLLOWING TYPES OF COURSES ARE EXCLUDED FROM THE [SB] AREA EVEN THOUGH THEY MIGHT GIVE SOME CONSIDERATION TO SOCIAL AND BEHAVIORAL SCIENCE CONCERNS:			
		• Courses with primarily arts, humanities, literary or philosophical content.			
		• Courses with primarily natural or physical science content.			
		• Courses with predominantly applied orientation for professional skills or training purposes.			
		• Courses emphasizing primarily oral, quantitative, or written skills.			

Course Prefix	Number	Title	General Studies Designation
HSE	323	Perception and Human Systems	SB

Explain in detail which student activities correspond to the **specific** designation criteria.
Please use the following organizer to explain how the criteria are being met.

Criteria (from checklist)	How course meets spirit (contextualize specific examples in next column)	Please provide detailed evidence of how course meets criteria (i.e., where in syllabus)
1	<p>This is a re-submission of the application of a SB general studies designation for HSE323. The last application did not get approved because “The course appears to focus largely on individual perspectives of perception. The application made a very strong case that this course emphasizes behavioral sciences in distinctive ways. However, the social-behavioral orientation was modest, at best.”</p> <p>We agree with the committee that this course emphasizes the “individual perspectives of perception”, because it is designed to provide students with a profound understanding of the concepts and facts of perceptual psychology. This course will be taught on the Polytechnic campus. Students will be from not only our Human Systems Engineering program but also other engineering or non-engineering programs. The course will let them gain a solid understanding of how our perceptual systems operate, what perceptual limitations exist, and how our perception can be improved using engineering and designing approaches. We believe that these goals match well with the purposes of SB general studies that “provide scientific methods of inquiry and empirical knowledge about human behavior, within society and INDIVIDUALLY.” (https://catalog.asu.edu/ug_gsr)</p> <p>We have revised the syllabus based on the reviewers’ feedback and added</p>	<p>The classes on 03/28/2017, 03/02/2017, 02/28/2017, & 04/06/2017 focus particularly on the perceptual processes involved in social interactions, for example, speech perception, understanding of other people's intention and action, perception of facial emotions and attractiveness, and pain perceived in social situations.</p>

	<p>more content on the perception from social environments. Topics specifically include perceiving faces & recognizing emotions and attractiveness (03/02/2017), perceiving other people's intention and action (02/28/2017), perceiving pain in social situations (04/06/2017).</p>	
2	<p>This course is designed to provide students with a profound understanding of how we receive and interpret information from the natural and social environments. One theme is the perception of information from social interactions. It will cover how we perceive speech, how we understand other people's intention and action, how we perceive facial emotions and attractiveness, and how we feel touch and pain in social situations. These topics will be beneficial not only for students in psychology and sociology, but also students in engineering programs who can apply perceptual theories and research to problems such as developing effective human-machine interaction, designing VR applications without perceptual discomfort.</p>	<p>See the course syllabus. The classes on 02/28/2017, 03/02/2017, 03/28/2017, 03/30/2017, & 04/06/2017 address the perceptual problems in the context of social interactions in real and virtual environments such as understanding of other people's intention and action, perception of emotions and attractiveness, speech perception, music perception, and feeling of pain in social situations.</p>
3	<p>This course aims to give students a solid knowledge base in the concepts and facts of perceptual psychology. It will extensively cover the behavioral aspects of perception and use many real-world illustrations and illusions to show how our perceptual systems work. It also teaches students the techniques and methods used to investigate human behavior (see Chap 1 & Appendix).</p>	<p>The class on 01/17/2017, for example, will address specifically the research methods used to study human perception. Signal detection theory will be covered, which has been used in a wide range of research areas in psychology, sociology, and neuroscience.</p>
4	<p>This course emphasizes the integration of behavioral research with potential applications to engineering practice. The covered topics will include the application of perceptual theories to real-world problems like computer vision, display technologies, graphic design, sound processing, etc. For example, classes on 02/21/2017, 03/30/2017, & 04/20/2017 discuss the perception in 3D displays, virtual-reality applications, and other human-machine interfaces.</p>	<p>Throughout this course we will discuss the application of perceptual theories to real-world problems, for example, the perception of depth in 3D displays (02/21/2017), perceptual issues/discomforts in virtual-reality applications (03/30/2017), and sensory substitution in the human-machine interfaces (04/20/2017).</p>

Course Catalog Description

HSE 323: Perception and Human Systems

In-depth exploration of methods by which humans receive and interpret information from the world through vision, audition, taste, smell, touch, and movement. Emphasizes the integration of behavioral research with applications to engineering practice. Topics will cover a wide range from the biological basis of sensory information processing, to the behavioral aspects of perception, and to the applications of perceptual theories to disciplines like computer vision, and graphic design. Students will gain a solid foundation for further study and research in psychology, sociology, human development, neuroscience, and other related fields.

HSE-323: Perception and Human Systems

Arizona State University
Spring semester 2017
Course line # 12345

Instructor Information:

Instructor: Bing Wu, Ph.D.
Human System Engineering Program
Email: Bing.Wu@asu.edu (*preferred contact method*)
Work Phone: 480-727-3716 (O)
Office Hours: Tues & Thurs, 4:30 – 5:30 or by appointments through email
Office Location: 150E, Santa Catalina Hall, Polytechnic campus

Course Information:

Pre-requisites: EGR 103 or PSY 101 and junior or senior standing

Course Format: Lectures. The class will meet on **Tuesdays and Thursdays from 12:00 to 1:15 pm at Room 310, Peralta Hall.**

Course description: Nothing that we experience in our life would be possible without the sensory systems: We use our five senses to see, hear, feel, smell and sometimes taste the world. This course is designed to give you an in-depth overview of how and why we perceive the world through our senses in the way we do. Particular emphasis will be placed on the integration of behavioral research with potential applications to engineering practice. Topics will cover a wide range from the behavioral aspects of perception, to the biology of sensory systems, and to the applications of perceptual theories to disciplines like computer vision, display technologies, graphic design, and sound processing. Upon successful completion of this course, you will have a solid understanding of how our perceptual systems work.

Required Course Texts, Materials and Resources:

The required textbook is as follows:

Goldstein, E.B. (2012). *Sensation and Perception* (9th Edition). Belmont, CA: Wadsworth Publishing. (It is okay to purchase a used book without the accompanying CD. The CD contains some nice demonstrations. But it is not required for this course.)

Other course materials like assigned readings, Powerpoint slides, and study guides for the exams will be available on the Blackboard system (<http://myasucourses.asu.edu>).

Student Objectives and Learning Outcomes

After completing this course, students should be able to:

- Have a solid understanding of how we sense and perceive the world around us and how these mechanisms affect our lives;
- Identify the classical and modern research techniques, and their roles in the science of perceptual systems;
- Recognize our perceptual limitations, learn from them, and apply perceptual principles and research to real-world problems (e.g., to develop human-machine interface for effective sensory communications; to reduce symptoms of perceptual distortions and discomfort when designing VR applications, ...);
- Critically analyze original research in perception.

Tentative Course Calendar

<i>Date</i>	<i>Class Topic & Required Reading</i>
01/10/2017	<i>Syllabus & class introduction</i>
01/12/2017	<i>Introduction to perceptual systems</i> Reading: <i>Chap 1 (pp. 3 - 12)</i>
01/17/2017	<i>Research methods & techniques</i> Reading: <i>Chap 1 (pp. 12 - 20), Appendix (401-406)</i>
01/19/2017	<i>Biological foundations of perception</i> Reading: <i>Chap 2 (pp. 23 - 39)</i>
01/24/2017	<i>The first steps in seeing</i> Reading: <i>Chap 3 (pp. 43 - 68)</i>
01/26/2017	<i>Visual perception: From eyes to brain</i> Reading: <i>Chap 4 (pp. 73 - 87)</i>
01/31/2017	<i>Visual perception: Information processing in the brain</i> Reading: <i>Chap 4 (pp. 88 - 95)</i>
02/02/2017	<i>Perception of color</i> Reading: <i>Chap 9 (pp. 201 - 225)</i> Reading: <i>King, T. (2005). Human color perception, cognition and culture: Why "red" is always red. Imaging Science & Technology Reporter, 20: 1-7.</i>
02/07/2017	<i>Review (1)</i>
02/09/2017	Exam 1
02/14/2017	<i>Perceiving objects and scenes</i> Reading: <i>Chap 5 (pp. 99 - 127)</i>
02/16/2017	<i>Seeing motion</i> Reading: <i>Chap 8 (pp. 177 - 196)</i>
02/21/2017	<i>Space perception & 3D-display technologies</i> Reading: <i>Chap 10 (pp. 229 - 255)</i> Reading: <i>Geng, J. (2013). Three-dimensional display technologies. Advances in Optics and Photonics, 5(4), pp. 456-535</i>
02/23/2017	<i>Visual attention & awareness</i> Reading: <i>Chap 6 (pp. 133 - 150)</i>
02/28/2017	<i>Perceiving intention & action</i> Reading: <i>Chap 7 (pp. 155 - 172)</i>
03/02/2017	<i>Perceiving faces & recognizing emotions and attractiveness</i> Reading: <i>"Chap 12. Recognising faces" & "Chap 13. Perceiving emotions and attractiveness" in Harris, J (2014). Sensation and Perception. Sage.</i>
03/07/2017 03/09/2017	Spring Break – Classes Excused
03/14/2017	<i>The first steps in hearing</i> Reading: <i>Chap 11 (pp. 259 - 287)</i>
03/16/2017	<i>Localizing sounds</i> Reading: <i>Chap 12 (pp. 291 - 307)</i>
03/21/2017	<i>Review (2)</i>
03/23/2017	Exam 2
03/28/2017	<i>Perceiving speech & Music</i> Reading: <i>Chap 13 (pp. 311 - 325)</i>

03/30/2017	<p><i>Perception in virtual realities</i></p> <p>Reading: “Chap 1. Introduction to Virtual Reality” in Craig, A. B., Sherman, W. R., & Will, J. D. (2009). <i>Developing virtual reality applications: Foundations of effective design</i>. Burlington, MA: Morgan Kaufmann.</p> <p>Reading: Armbrüster, C. et al. (2008). <i>Depth perception in virtual reality: distance estimations in peri- and extrapersonal space</i>. <i>Cyberpsychology & Behavior</i>, 11(1), 9–15.</p> <p>Reading: Rosenberg, R.S., et al. (2013) <i>Virtual superheroes: Using superpowers in virtual reality to encourage prosocial behavior</i>. <i>PLoS ONE</i>. 8(1): e55003.</p>
04/04/2017	<p><i>Senses of touch</i></p> <p>Reading: Chap 14 (pp. 329 - 349)</p>
04/06/2017	<p><i>Pain perception</i></p> <p>Reading: Chap 14 (pp. 343 - 351)</p> <p>Reading: Callister, L.C. (2003). <i>Cultural influences on pain perceptions and behaviors</i>. <i>Home Health Care Management & Practice</i>, 15(3), 207 - 211.</p> <p>Reading: Kross, E. et al. (2011). <i>Social rejection shares somatosensory representations with physical pain</i>. <i>Proceedings of the National Academy of Sciences</i>, 108, 6270–6275 (2011).</p>
04/11/2017	<p><i>Smelling</i></p> <p>Reading: Chap 15 (pp. 355 - 366)</p>
04/13/2017	<p><i>Tasting</i></p> <p>Reading: Chap 15 (pp. 366 - 375)</p>
04/18/2017	<p><i>Vestibular & proprioceptive systems</i></p> <p>Reading: “Chap 9. Vestibular and proprioceptive systems” in Harris, J (2014). <i>Sensation and Perception</i>. Sage.</p>
04/20/2017	<p><i>Multisensory perception & Sensory substitution</i></p> <p>Reading: Beeli, G., et al. (2005). <i>Synaesthesia: When coloured sounds taste sweet</i>. <i>Nature</i>, 434, 38.</p> <p>Reading: Tanaka, A. et al. (2010). <i>I feel your voice: Cultural differences in the multisensory perception of emotion</i>. <i>Psychological Science</i>, 21, 1259–1262.</p> <p>Reading: Bach-Y-Rita, P. & Kercel S.W. (2003). <i>Sensory substitution and the human-machine interface</i>. <i>Trends in Cognitive Sciences</i> 7(12):541-546.</p>
04/25/2017	<p><i>Changes in perception through the life-span</i></p> <p>Reading: Chap 16 (pp. 379 - 397)</p>
04/27/2017	<i>Review (3)</i>
05/04/2017	Exam 3

Syllabus disclaimer:

Efforts will be made to follow the syllabus as outlined above. However, the possibility exists that unforeseen events will make syllabus changes necessary. I reserve the right to make changes to this syllabus and/or course schedule. If changes are made, you will be notified in a timely manner by e-mail or by an announcement in class.

Course Assignments

For each topic, there will be lectures and assigned readings. The course requirements are (1) participation in class; (2) homework; (3) quizzes, and (4) three exams.

Readings: Reading assignments will be posted on the Blackboard or come from the textbooks. You should do the assigned reading before class.

Homework: Homework assignments will be posted on the Blackboard.

Quizzes: Quizzes will be given at the beginning of each class (excluding the review and exam days). They are designed to test your understanding of the reading assignment and ensure that you come prepared. Each quiz will account for 1% of the total grade. The quizzes also serve as an attendance record. NO make-up quizzes will be given. If a student misses a quiz, he or she will receive NO point for that quiz.

Exams: There will be three exams based on the materials covered in the classroom. The exams will be closed-book, closed-notes, closed-homework, and taken in class. The format is a combination of multiple-choice, short answer, and short essay. There will be NO make-up exam unless there is a documented emergency. Anyone missing an exam without a ASU sanctioned excuse will receive a zero score.

The course grade will be based as follows:

Exam 1	20 pts
Exam 2	20 pts
Exam 3	20 pts
Quizzes	20 pts
Homework	20 pts
TOTAL	100 pts

Grading Scale

Final grades will be assigned as follows:

A+	>=96%	A	93-95%	A-	90-92%
B+	86-89%	B	83-85%	B-	80-82%
C+	76-79%	C	70-75%	D	60-69%
E	<60%				
XE	Failure due to Academic Dishonesty				

NO incomplete grades will be given except in cases of serious medical emergencies as evidenced by a documented report.

Grade Appeals

ASU has formal and informal channels to appeal a grade. If you wish to appeal any grading decisions, please see <http://catalog.asu.edu/appeal>.

Classroom behavior:

- **Attendance and Participation**

Your presence for the entire class period is mandatory and critical to academic success. The following penalties will be imposed for missing class without a valid and verifiable excuse: Every unexcused absence causes a deduction of 5 points from the

final grade. Absences will be excused ONLY if the student has a ASU sanctioned excuse. The excused absences include those resulting from: (1) illness, death in the family or other emergency, or other reasons beyond the student's control; (2) a student's religious beliefs, observances, and practices that are in accord with ACD 304-04 (<http://www.asu.edu/aad/manuals/acd/acd304-04.html>), "Accommodation for Religious Practices", and (3) those university sanctioned events/activities that are in accord with ACD 304-02 (<http://www.asu.edu/aad/manuals/acd/acd304-02.html>), "Missed Classes Due to University-Sanctioned Activities".

- **Late and Missing Assignments**

Make-up exams will NOT be given unless the student provides documentation of the illness or emergency. Anyone missing an exam without a university sanctioned excuse will receive a zero score.

- **Cell Phone and Recording Devices**

Always turn off your cellular phone before you enter our classroom. You are not allowed to receive and make phone calls during class meetings. Other communication devices and recording devices are also strictly prohibited from the classroom.

- **Electronic Communication**

Acceptable use of university computers, internet and electronic communications can be found in the Student Code of Conduct (<http://www.asu.edu/aad/manuals/usi/usi104-01.html>) and in the University's Computer, Internet, and Electronic Communications Policy (<http://www.asu.edu/aad/manuals/acd/acd125.html>).

University policies:

- **Academic Integrity**

All students at ASU are expected to follow the Student Code of Conduct. Each student must act with honesty and integrity, and must respect the rights of others in carrying out all academic assignments. Plagiarism, and any other form of academic dishonesty that is in violation with the Student Code of Conduct, will not be tolerated. All necessary and appropriate sanctions will be issued to all parties involved with plagiarizing any and all course work. For more information, please see the ASU Student Academic Integrity Policy: <http://provost.asu.edu/academicintegrity>.

- **Nondiscrimination, Anti-Harassment, and Nonretaliation**

Arizona State University is committed to providing the university community, including students, faculty, staff, and guests, with an environment that is free of harassment, discrimination, or retaliation. ASU expressly prohibits harassment, discrimination, and retaliation by employees, students, contractors, or agents of the university based on protected status, including race, color, religion, sex, national origin, age, disability, veteran status, sexual orientation, and gender identity. If you believe that you have been subjected to any discrimination, harassment, or retaliation in violation of this policy, or you believe that this policy has been violated, you should report the matter immediately to the Office of Equity and Inclusion (<https://cfo.asu.edu/hr-equityandinclusion>; Phone: (480) 965-5057; Fax: (480) 237-7998; Email: EqualityandInclusion@mainex1.asu.edu).

- **Policy against Threatening Behavior**

Any kind of abusive, disruptive, threatening, or violent behaviour will NOT be tolerated. Students are expected to comply with the ASU policy against threatening behavior, per the *Student Services Manual*, SSM 104–02

(<http://www.asu.edu/aad/manuals/ssm/ssm104-02.html>), “Handling Disruptive, Threatening, or Violent Individuals on Campus”. Any violent or threatening conduct by an ASU student in this class will be reported to the ASU Police Department and the Office of the Dean of Students.

- **Disability Accommodations**

To request academic accommodations due to a disability, please contact the ASU Disability Resource Center (<https://eoss.asu.edu/drc>; Phone: (480) 965-1234; Fax: (480) 965-0441; Email: DRC@asu.edu). This is a very important step as accommodations may be difficult to make retroactively. If you have a letter from their office indicating that you have a disability which requires academic accommodations, in order to assure that you receive your accommodations in a timely manner, please present this documentation to me no later than the end of the first week of the semester so that your needs can be addressed effectively.

- **Religious Accommodations**

Students will not be penalized for missing class due to religious obligations, holidays, observances, and practices that are in accord with ACD 304–04

(<http://www.asu.edu/aad/manuals/acd/acd304-04.html>). Students who need to be absent from class due to the observance of a religious holiday or participate in required religious functions must notify me in writing as far in advance of the holiday/obligation as possible. Students will need to identify the specific holiday or obligatory function to me. The student should contact me to make arrangements for making up tests/assignments within a reasonable time.

- **Military Personnel Statement**

A student who is a member of the National Guard, Reserve, or other U.S. Armed Forces branch and is unable to complete classes because of military activation may request complete or partial administrative unrestricted withdrawals or incompletes depending on the timing of the activation. For information, please see <http://www.asu.edu/aad/manuals/usi/usi201-18.html>.

Textbook

Goldstein, E.B. (2009). *Sensation and Perception (8th Edition)*. Belmont, CA: Wadsworth Publishing.

List of additional course materials (Will be available on Blackboard)

Book chapters:

J. Harris, (2014). *Sensation & perception*. Sage.

Chapter 9. Vestibular and proprioceptive systems

Chapter 12. Recognising faces.

Chapter 13. Perceiving emotions and attractiveness.

Craig, A. B., et al. (2009). *Developing virtual reality applications: Foundations of effective design*.

Morgan Kaufmann.

Chapter 1. Introduction to Virtual Reality

Research articles:

Armbrüster, C., et al. (2008). Depth perception in virtual reality: distance estimations in peri- and extrapersonal space. *Cyberpsychology & Behavior*, 11(1), 9–15.

Bach-Y-Rita, P. & Kercel S.W. (2003). Sensory substitution and the human-machine interface. *Trends in Cognitive Sciences*. 7(12):541-546.

Beeli, G., et al. (2005). Synaesthesia: When coloured sounds taste sweet. *Nature*, 434, 38.

Callister, L.C. (2003). Cultural influences on pain perceptions and behaviors. *Home Health Care Management & Practice*, 15(3), 207 - 211.

Geng, J. (2013). Three-dimensional display technologies. *Advances in Optics and Photonics*, 5(4), pp. 456-535.

King, T. (2005). Human color perception, cognition and culture: Why "red" is always red. *Imaging Science & Technology Reporter*, 20: 1-7.

Rosenberg, R.S., et al. (2013) Virtual superheroes: Using superpowers in virtual reality to encourage prosocial behavior. *PLoS ONE*. 8(1): e55003.

Tanaka, A. et al. (2010). I feel your voice: Cultural differences in the multisensory perception of emotion. *Psychological Science*, 21, 1259–1262.

Kross, E. et al. (2011). Social rejection shares somatosensory representations with physical pain. *Proceedings of the National Academy of Sciences*, 108, 6270–6275 (2011).

SENSATION AND PERCEPTION



E. BRUCE GOLDSTEIN

Eighth Edition

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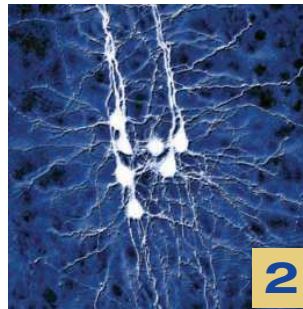
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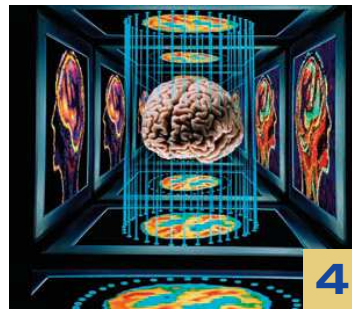
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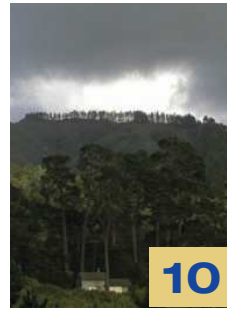
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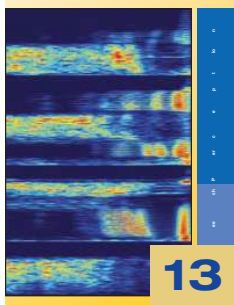
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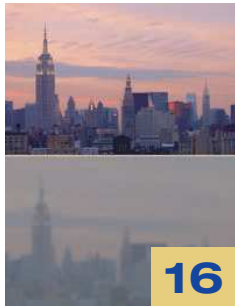
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