

250. Topics in Applied and Computational Statistics (4)

Lecture—3 hours; lecture/discussion—1 hour. Prerequisite: course 131A; course 232A recommended, not required. Resampling, nonparametric and semiparametric methods, incomplete data analysis, diagnostics, multivariate and time series analysis, applied Bayesian methods, sequential analysis and quality control, categorical data analysis, spatial and image analysis, computational biology, functional data analysis, models for correlated data, learning theory. May be repeated for credit with consent of graduate advisor. Not offered every year.—I, II, III.

251. Topics in Statistical Methods and Models (4)

Lecture—3 hours; discussion—1 hour. Prerequisite: course 231B or the equivalent. Topics may include Bayesian analysis, nonparametric and semiparametric regression, sequential analysis, bootstrap, statistical methods in high dimensions, reliability, spatial processes, inference for stochastic process, stochastic methods in finance, empirical processes, change-point problems, asymptotics for parametric, nonparametric and semiparametric models, nonlinear time series, robustness. May be repeated for credit with consent of instructor. Not offered every year.—II, (III.)

252. Advanced Topics in Biostatistics (4)

Lecture—3 hours; discussion/laboratory—1 hour. Prerequisite: course 222, 223. Biostatistical methods and models selected from the following: genetics, bioinformatics and genomics; longitudinal or functional data; clinical trials and experimental design; analysis of environmental data; dose-response, nutrition and toxicology; survival analysis; observational studies and epidemiology; computer-intensive or Bayesian methods in biostatistics. May be repeated for credit with consent of advisor when topic differs. (Same course as Biostatistics 252.) Offered in alternate years.—III.

280. Orientation to Statistical Research (2)

Seminar—2 hours. Prerequisite: consent of instructor. Guided orientation to original statistical research papers, and oral presentations in class of such papers by students under the supervision of a faculty member. May be repeated once for credit. (S/U grading only.)—III, (III.)

290. Seminar in Statistics (1-6)

Prerequisite: consent of instructor. Seminar on advanced topics in probability and statistics. (S/U grading only.)—I, II, III, (I, II, III.)

292. Graduate Group in Statistics Seminar (1-2)

Seminar—1-2 hours. Prerequisite: graduate standing. Advanced study in various fields of statistics with emphasis in applied topics, presented by members of the Graduate Group in Statistics and other guest speakers. (S/U grading only.)—III, (III.)

298. Directed Group Study (1-5)

Prerequisite: graduate standing, consent of instructor.

299. Individual Study (1-12)

Prerequisite: consent of instructor. (S/U grading only.)

299D. Dissertation Research (1-12)

Prerequisite: advancement to candidacy for Ph.D., consent of instructor. (S/U grading only.)

Professional Courses**390. Methods of Teaching Statistics (2)**

Lecture/discussion—1 hour; laboratory—1 hour. Prerequisite: graduate standing. Practical experience in methods/problems of teaching statistics at university undergraduate level. Lecturing techniques, analysis of tests and supporting material, preparation and grading of examinations, and use of statistical software. Emphasis on practical training. May be repeated for credit. (S/U grading only.)—I, (I.)

396. Teaching Assistant Training Practicum (1-4)

Prerequisite: consent of instructor; graduate standing. (S/U grading only.)—I, II, III, (I, II, III.)

Professional Course**401. Methods in Statistical Consulting (3)**

Lecture—3 hours; discussion—1 hour. Introduction to consulting, in-class consulting as a group, statistical consulting with clients, and in-class discussion of consulting problems. Clients are drawn from a pool of University clients. Students must be enrolled in the graduate program in Statistics or Biostatistics. May be repeated for credit with consent of graduate advisor. Not offered every year. (S/U grading only.)—I, II, III, (I, II, III.)

Statistics (A Graduate Program)

Wolfgang Polonik, Ph.D., Chairperson of the Program

Program Office. 4118 Mathematical Sciences Building (530) 752-2362; <http://www-stat.ucdavis.edu>

Faculty

Alexander Ave, Assistant Professor (*Statistics*)
 Laurel Beckett, Ph.D., Professor (*Public Health Sciences*)
 Rudolph Beran, Ph.D., Professor (*Statistics*)
 Prabir Burman, Ph.D., Professor (*Statistics*)
 Colin Cameron, Ph.D., Professor (*Economics*)
 Christiana Drake, Ph.D., Professor (*Statistics*)
 Thomas B. Farver, Ph.D., Professor (*Population Health and Reproduction*)
 Peter Hall, Ph.D., Professor (*Statistics*)
 Fushing Hsieh, Ph.D., Professor (*Statistics*)
 Jiming Jiang, Ph.D., Professor (*Statistics*)
 Oscar Jorda, Ph.D., Associate Professor (*Economics*)
 Hans-Georg Müller, M.D., Ph.D., Professor (*Statistics*)
 Debashis Paul, Ph.D. Assistant Professor (*Statistics*)
 Jie Peng, Ph.D., Assistant Professor (*Statistics*)
 Katherine Pollard, Ph.D., Professor (*Statistics*)
 Wolfgang Polonik, Ph.D., Associate Professor (*Statistics*)
 David Rocke, Ph.D., Professor (*Graduate School of Management*)
 George G. Roussas, Ph.D., Professor (*Statistics*)
 Naoki Saito, Ph.D., Professor (*Mathematics*)
 Francisco J. Samaniego, Ph.D., Professor (*Statistics*)
 Rituparna Sen, Ph.D., Assistant Professor (*Statistics*)
 Duncan Temple Lang, Ph.D., Associate Professor (*Statistics*)
 Chih-Ling Tsai, Ph.D., Professor (*Graduate School of Management*)
 Jessica M. Utts, Ph.D., Professor (*Statistics*)
 Jane-Ling Wang, Ph.D., Professor (*Statistics*)

Emeriti Faculty

P.K. Bhattacharya, Ph.D., Professor Emeritus
 Alan P. Fenech, Ph.D., Professor Emeritus
 Yue-Pok (Ed) Mack, Ph.D., Professor Emeritus
 Robert H. Shumway, Ph.D., Professor Emeritus
 Alvin D. Wiggins, Ph.D., Professor Emeritus

Affiliated Faculty

Rahman Azari, Ph.D., Lecturer (*Statistics*)

Graduate Study. The Graduate Program in Statistics offers programs of study and research leading to the M.S. and Ph.D. degrees. The M.S. gives students a strong foundation in the theory of statistics as well as substantial familiarity with the most widely used statistical methods. Facility in computer programming is essential for some of the course work. The supervised statistical consulting required of all M.S. students has proven to be a valuable educational experience. The Ph.D. program combines advanced course work in statistics and probability with the opportunity for in-depth concurrent study in an applied field. For detailed information contact the Chairperson of the Program or the Graduate Adviser.

Preparation. For admission to the Ph.D. program, course work requirements for the master's degree, and at least one semester/two quarters of advanced calculus must be completed.

Graduate Adviser. P. Burman

Subject A

See **University Requirements, on page 90.**

Surgery

See **Surgery (SUR), on page 397; and Surgical and Radiological Sciences (VSR), on page 511.**

Surgical and Radiological Sciences

See **Veterinary Medicine, School of, on page 502.**

Technocultural Studies

(College of Letters and Science)

Jesse Drew, Ph.D., Program Director

Program Office. Art Building, Room 316 (530) 752-0105; <http://technoculture.ucdavis.edu>

Committee in Charge

Elizabeth Constable, Ph.D. (Film Studies)
 Jesse Drew, Ph.D. (*Technocultural Studies*)
 Frances Dyson, Ph.D. (*Technocultural Studies*)
 Andy Jones, Ph.D. (*English*)
 Douglas Kahn, Ph.D. (*Technocultural Studies*)
 Darrin Martin, M.F.A. (*Art*)
 Bob Ostertag, Ph.D. (*Technocultural Studies*)
 Simon Sadler, Ph.D. (*Art History*)
 Laurie San Martin, M.F.A. (*Music*)
 Oliver Staadt, Ph.D. (*Computer Science*)
 Kathryn Sylva, M.F.A. (*Design*)
 Carl Whithaus, Ph.D. (*Writing Program*)

Faculty

Jesse Drew, Ph.D., Associate Professor
 Frances Dyson, Ph.D., Associate Professor
 Douglas Kahn, Ph.D., Professor
 Michael Neff, Ph.D., Assistant Professor (*Computer Science, Technocultural Studies*)
 Bob Ostertag, Ph.D., Professor
 Julie Wyman, MFA, Assistant Professor

Emeriti Faculty

Lynn Hershman, M.A., Professor Emerita

The Major Program

The major is an interdisciplinary integration of current research in cultural history and theory with innovative hands-on production in digital media and "low-tech." It focuses on the fine and performing arts, media arts, community media, literature and cultural studies as they relate to technology and science. Backed by critical perspectives and the latest forms of research and production skills, students enjoy the mobility to explore individual research and expression, project-based collaboration and community engagement.

The Program

Preparatory course work involves a solid introduction to the history, ideas and current activities of technocultural studies, along with technical skill courses enabling individuals to get up to speed on digital imaging, sound, digital video and Web production, among other skills. For depth subject matter, students in the major select to concentrate on either critical studies or creative production emphases, and work toward a final project. All majors are required to take at least one course from another department or program relevant to their area of study, upon approval from TCS, and may take more courses with approval. The final project for the critical studies emphasis consists of a substantial research paper. The final project for the creative production emphasis will be a major individual or collaborative work. Plans for final projects must be approved in advance.

Career Paths. Technocultural Studies is designed to prepare graduates to be highly adaptable, collaborative, multi-skilled and current with the latest developments. Perhaps most importantly is self-motivation: students do best when fueled by their own passions and plot their own directions, while held to very high standards. We feel this is the best education for living and working in a complex, rapidly changing world. Final research papers and creative production portfolios will provide graduate school admissions committees, employers or clients with tangible evidence of TCS graduates' track records and talents.

A.B. Major Requirements:

	UNITS
Preparatory Subject Matter.....	28
Technocultural Studies 1, 2, 4, 5, 6, 7A-E	24
American Studies 1A or 5	4
Depth Subject Matter	44
Technocultural Studies 190, 191	8
<i>Production emphasis</i>	32
Choose five from production based Technocultural Studies 100, 101, 103, 104, 110, 111, 112, 113, 121, 122, 123, 192, plus two from Technocultural Studies 120, 150, 151, 152, 153, 154, 155, 158, 159, plus a four-unit class from another department or program relevant to the student's area of concentration, as approved by Technocultural Studies.	32
<i>Studies emphasis</i>	4
Choose two from production based Technocultural Studies 100, 101, 103, 104, 110, 111, 112, 113, 121, 122, 123, 192, plus five from Technocultural Studies 120, 150, 151, 152, 153, 154, 155, 158, 159, plus a four-unit class from another department or program relevant to student's area of concentration, as approved by Technocultural Studies.	4
Technocultural Studies 198	4
Total Units for the Major	72
Major Adviser. See Program office.	

Courses in Technocultural Studies (TCS)

Lower Division Courses

1. Introduction to Technocultural Studies (4)

Lecture—3 hours; extensive writing. Contemporary developments in the fine and performing arts, media arts, digital arts, and literature as they relate to technological and scientific practices. GE credit: ArtHum.—Ostertag

2. Critiques of Media (4)

Lecture/discussion—3 hours; term paper. Introduction to different forms of critical analysis of media, with focus on creative responses to the media within visual arts, media arts, and net culture. Response of artists to the power of mass media, from early forms

of photomontage through contemporary "culture-jamming" and alternative media networks. GE credit: ArtHum.—Wyman

4. Parallels in Art and Science (4)

Lecture—3 hours; term paper. Issues arising from historical and contemporary encounters between the arts and sciences, with emphasis on comparative notions of research, experimentation, and progress. GE credit: ArtHum.

5. Media Archaeology (4)

Lecture/discussion—3 hours; term paper. Evolution of media technologies and practices beginning in the 19th Century as they relate to contemporary digital arts practices. Special focus on the reconstruction of the social and artistic possibilities of lost and obsolete media technologies. GE credit: ArtHum. Drew

6. Technoculture and the Popular Imagination (4)

Lecture—3 hours; extensive writing. Issues of technological and scientific developments as conveyed through mass media and popular culture with special attention to public spectacle, exhibitions, broadcasts, performances, demonstrations and literary fictions and journalistic accounts. GE credit: ArtHum.—Kahn

7A-E. Technocultural Workshop (1)

Seminar—1 hour. Workshops in technocultural digital skills: (A) Digital Imaging; (B) Digital Video; (C) Digital Sound; (D) Web Design; (E) Topics in Digital Production.—I. (I.)

Upper Division Courses

100. Experimental Digital Cinema I (4)

Lecture/discussion—3 hours; laboratory—3 hours. Experimental approaches to the making of film and video in the age of digital technologies. Opportunities for independent producers arising from new media. Instruction in technical, conceptual and creative skills for taking a project from idea to fruition.—Wyman

101. Experimental Digital Cinema II (4)

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 100. Continuation of course 100 with further exploration of digital cinema creation. Additional topics include new modes of distribution, streaming, installation and exhibition.—Wyman

103. Interactivity and Animation (4)

Lecture/discussion—3 hours; laboratory—3 hours. Fundamentals of creating interactive screen-based work. Theories of interactivity, linear versus non-linear structures, and audience involvement and participation. Use of digital production tools to produce class projects.—Drew

104. Documentary Production (4)

Lecture/discussion—3 hours; project. Prerequisite: course 7B or the equivalent, course 155. Traditional and new forms of documentary, with focus on technocultural issues. Skills and strategies for producing work in various media. Progression through all stages of production, from conception through post-production to critique.—Drew, Wyman

110. Object-Oriented Programming for Artists (4)

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 1. Introduction to object-oriented programming for artists. Focus on understanding the metaphors and potential of object-oriented programming for sound, video, performance, and interactive installations.—III. Ostertag

111. Community Media Production (4)

Lecture/discussion—3 hours; laboratory—3 hours. Use of video and new media tools to address social issues among neighborhood and community groups. Students will use basic video, sound, and lighting techniques as they work with local groups in a group video project.—III. (III.)

112. New Radio Features and Documentary (4)

Lecture/discussion—3 hours; laboratory—3 hours. New feature and documentary production for radio and other audiophonic media, including audio streaming Web sites and installation. Emphasis on new and experimental approaches to audio production for broadcast on community radio and in international arts programming.

113. Community Networks (4)

Lecture/discussion—3 hours; laboratory—3 hours. Impact and implications of computer-based networks in community, civic, and social life. Subjects may include community-access computer sites, neighborhood wireless networks, the digital divide, open-source software, and citizen action.

120. History of Sound in the Arts (4)

Lecture—3 hours; term paper. Prerequisite: course 1. A survey of the use of sound, voice, noise, and modes of listening in the modernist, avant-garde, and experimental arts, from the late 19th Century to the present. Focus on audiophonic and audiovisual technologies.—Kahn

121. Introduction to Sonic Arts (4)

Lecture/discussion—3 hours; lecture/laboratory—3 hours. Prerequisite: course 7C. Introduction to the use of sound within the arts. Techniques and aesthetics of experimental contemporary practices. Creation of original sound works.—Ostertag

122. Intermediate Sonic Arts (4)

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: course 121, 170C. Techniques of recording, editing, mixing, and synthesis to combine voice, field recordings, and electronic signals. Incorporating live, recorded, and found sounds to create multidimensional stories. Presentation of live performances, audio recordings, and sound installations.—Ostertag

123. Sight and Soundtrack (4)

Lecture/discussion—3 hours; laboratory—3 hours. Prerequisite: courses 7C, 170C. The use of sound to articulate, lend mood or subconsciously underscore visual, environmental or performative situations, combining music, voice, sound effects and other noises to create sound designs that enhance, alter or support action and movement.—Ostertag

150. Introduction to Theories of the Technoculture (4)

Lecture/discussion—3 hours; extensive writing. Major cultural theories of technology with emphasis on media, communications, and the arts. Changing relationships between technologies, humans, and culture. Focus on the evolution of modern technologies and their reception within popular and applied contexts. GE credit: ArtHum—Dyson

151. Topics in Virtuality (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 1. Social, political, economic, and aesthetic factors in virtual reality. Artificial environments, telepresence, and simulated experience. Focus on contemporary artists' work and writing.—Dyson

152. New Trends in Technocultural Arts (4)

Lecture/discussion—3 hours; term paper. Current work at the intersection of the arts, culture, science, and technology including biological and medical sciences, computer science and communications, and artificial intelligence and digital media.—Dyson

153. Concepts of Innovative Soundtracks (4)

Lecture/discussion—3 hours; term paper. Innovative and unconventional soundtracks in cinema, media arts, and fine arts. Introduction to basic analytical skills for understanding sound-image relationships.—Kahn

154. Outsider Machines (4)

Lecture/discussion—3 hours; term paper. Invention, adaptation and use of technologies outside the mainstream, commonsense, and the possible. Topics include machines as metaphor and embodied thought, eccentric customizing and fictional technologies.

155. Introduction to Documentary Studies (4)

Lecture/discussion—3 hours; term paper. Recent evolution of the documentary. The personal essay film; found-footage/appropriation work; non-linear, multi-media forms; spoken word; storytelling; oral history recordings; and other examples of documentary expression.—I. (I.) Drew

158. Technology and the Modern American Body (4)

Lecture/discussion—3 hours; term paper. Prerequisite: course 1 and either American Studies 1 or 5. The history and analysis of the relationships between human bodies and technologies in modern society. Dominant and eccentric examples of how human bodies and technologies influence one another and reveal underlying cultural assumptions. (Same course as American Studies 158.) GE credit: ArtHum.—de la Pena

159. Media Subcultures (4)

Lecture/discussion—3 hours; term paper. Relationships between subcultural groups and media technologies. Media as the cohesive and persuasive force of subcultural activities. List-servs, Web sites, free radio, fan 'zines, and hip-hop culture. GE credit: Div.—II. (II.) Drew

170A-E. Advanced Technocultural Workshop (1)

Seminar—1 hour. Prerequisite: course 7A or the equivalent. Workshops in advanced technocultural digital skills: (A) Digital Imaging; (B) Digital Video; (C) Digital Sound; (D) Web Design; (E) Topics in Digital Production.

190. Research Methods in Technocultural Studies (4)

Lecture/discussion—3 hours; project. Introduction to basic research methods for Technocultural Studies: electronic and archived images, sounds and data, satellite downlinking, radiowave scanning, and oral histories.—Drew

191. Writing Across Media (4)

Lecture/discussion—3 hours; extensive writing. Introduction to experimental approaches to writing for different media and artistic practices. How written texts relate to the images, sounds, and performances in digital and media production.—Jones

192. Internship (1-4)

Internship—3-12 hours. Supervised internship on or off campus in area relevant to Technocultural Studies. May be repeated twice for credit. (P/NP grading only.)

197T. Tutoring in Technocultural Studies (1-5)

Tutorial—3-15 hours. Prerequisite: consent of instructor. Undergraduates assist the instructor by tutoring students in one of the department's regularly scheduled courses. May be repeated for credit up to eight units. (P/NP grading only.)—I, II, III. (I, II, III.)

198. Directed Group Study (1-5)

Prerequisite: consent of instructor. (P/NP grading only.)

199. Special Study for Advanced Undergraduates (1-5)

Prerequisite: consent of instructor. Guided study with faculty member in independent scholarly activity. May be repeated for credit up to eight units. (P/NP grading only.)

Textile Arts and Costume Design

See **Design**, on page 200.

Textile Science

See **Fiber and Polymer Science**, on page 292.

Textiles (A Graduate Group)

Gang Sun, Ph.D., Chairperson of the Group

Group Office. 129 Everson Hall
(530) 752-6650;
<http://textiles.ucdavis.edu>

Faculty

Colin A. Carter, Ph.D., Professor
(*Agricultural and Resource Economics*)
You-Lo Hsieh, Ph.D., Professor
(*Textiles and Clothing*)
Susan B. Kaiser, Ph.D., Professor (*Textiles and Clothing, Women and Gender Studies*)
Zuhair A. Munir, Ph.D., Professor
(*Chemical Engineering and Materials Science*)
Ning Pan, Ph.D., Professor (*Textiles and Clothing, Biological and Agricultural Engineering*)
Victoria Z. Rivers, M.A., Professor (*Design*)
Margaret H. Rucker, Ph.D., Professor
(*Textiles and Clothing*)
James F. Schackelford, Ph.D., Professor
(*Chemical Engineering and Materials Science*)
Charles F. Shoemaker, Ph.D., Professor
(*Food Science and Technology*)
Gang Sun, Ph.D., Professor
(*Textiles and Clothing*)

Emeriti Faculty

Gyongy Laky, M.A., Professor Emeritus
(*Textiles and Clothing*)
Dean MacCannell, Ph.D., Professor Emeritus
(*Landscape Architecture*)
Howard G. Schutz, Ph.D., Professor Emeritus
(*Consumer Science*)
Jo Ann C. Stabb, M.A., Senior Lecturer Emeritus
(*Design*)
S. Haig Zeronian, Ph.D., Professor Emeritus
(*Textiles and Clothing*)

Graduate Study. The Graduate Group in Textiles offers a program of study and research leading to the M.S. degree. Students in the program use an interdisciplinary approach emphasizing the physical and behavioral science aspects of textiles. Research areas include chemical, physical, biochemical, and mechanical properties of fibers and polymers as well as fibrous assemblies, including composites, paper, and nonwovens; and psychological and sociological factors relating to perception and consumption of textiles and apparel. Extensive specialized fiber, polymer, and textiles research facilities and a behavioral research laboratory are available. For detailed information regarding the program, address the Chairperson of the Group.

Graduate Adviser. G. Sun (*Textiles and Clothing*)

Textiles and Clothing

(College of Agricultural and Environmental Sciences)

You-Lo Hsieh, Ph.D., Chairperson of the Division

Division Office. 129 Everson Hall
(530) 752-6650; <http://textiles.ucdavis.edu>

Faculty

You-Lo Hsieh, Ph.D., Professor
Susan B. Kaiser, Ph.D., Professor
Ning Pan, Ph.D., Professor
Margaret H. Rucker, Ph.D., Professor
Gang Sun, Ph.D., Professor

Emeriti Faculty

Stephen C. Jett, Ph.D., Professor Emeritus
Mary Ann Morris, Ph.D., Professor Emeritus
S. Haig Zeronian, Ph.D., D.Sc., Professor Emeritus

Affiliated Faculty

Joan Chandler, M.S., Lecturer

The Major Program

The textiles and clothing major emphasizes the connections among (a) the physical characteristics of textile products, (b) human perceptions of and behavior toward these products, and (c) global economic trends affecting the textile/apparel marketplace. An integrative knowledge base links textile products with people and processes, to focus on the production, distribution, and consumer use of textiles and apparel; see also **Fiber and Polymer Science**, on page 292.

The Program. The textiles and clothing major offers two options: textile science and marketing/economics. The Textile Science option provides students with a broad knowledge base in both the social and physical sciences. This base includes production, end-use applications and care of textiles and apparel, physical and chemical properties of textiles, and social-psychological and economic aspects of textiles and clothing. The Marketing/Economics option emphasizes social science and business course work, while also providing students with an awareness of the physical nature of textile products.

Internships and Career Alternatives. Textiles and clothing majors can pursue internships and careers in apparel production and merchandising, retail management, international marketing, textile testing and conservation, and textiles journalism. The majority of textiles and clothing graduates accept entry-level management and technical positions within the textile and apparel industry or in related fields, (e.g., merchandising and marketing, production, research and development, technical service and design). Students may also pursue graduate studies in textiles, business, and other areas depending on their specific selections of restricted elective course work.

B.S. Major Requirements:

UNITS

English Composition Requirement 4-12

See College Requirement 0-8
Communication 1 4

Preparatory Subject Matter..... 43-45

Plant Sciences 21 or Computer Science
Engineering 15 or 30 3-4
Economics 1A-1B 10
Anthropology 2, Science and Society 1,
Art History 1A, 1B, 1C, or 1D 4
Physics 1A or 10 3-4
Psychology 1 4
Sociology 2 4
Statistics 13 4
Textiles and Clothing 6, 7, 8 12

Breadth/General Education..... 6-24

Satisfaction of General Education requirement.

Select one of the following two options:

Marketing/Economics Option

Additional Preparatory Subject Matter for the option..... 18-19

Management 11A-11B 8
Chemistry 10 or 2A 4-5
Mathematics 16A-16B 6

Depth Subject Matter 57-58

Agricultural and Resource Economics 100A-100B, 106, 136 16
Statistics 103 4
Psychology 151 or Consumer
Science 100 3-4
Fiber and Polymer Science 110, Textiles and
Clothing 107, 162, 162L, 163, 163L, 164,
165, 171, 173, 174 31