

REGULAR MEETING OF THE RIVERSIDE DIVISION

TUESDAY, FEBRUARY 22, 2022

Zoom
1:00 p.m.

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†Reports received and placed on file "are received as presented and require no further action" [bylaw 4.1.3]. Only the reporting committee can change or withdraw these reports; however, at the request of any member of the Division, a report will be moved into its regular order on the agenda (Item 10. Reports of Standing Committees and Faculties) where it may be discussed, and motions relating to the report may be offered.

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February 16, 2022

F. Xu, Secretary-Parliamentarian
Riverside Division of the Academic Senate

**MINUTES OF THE REGULAR MEETING
OF THE RIVERSIDE DIVISION**

MEETING

The Riverside Division of the Academic Senate met on Tuesday, November 30, 2021 at 1:01 p.m. via Zoom. Chair J. Stajich presided. The meeting was attended by 40 members of the Riverside Division of the Academic Senate. Chair Stajich outlined Zoom protocol to ensure that attendees could participate during the meeting.

MINUTES

The Minutes of the Regular Meeting of May 25, 2021 were approved as presented.

ANNOUNCEMENTS BY THE PRESIDENT

There were no announcements by the President.

ANNOUNCEMENTS BY THE CHANCELLOR AT RIVERSIDE

Chancellor Kim A. Wilcox addressed the Division.

Chancellor Wilcox addressed the enduring impacts of the COVID-19 pandemic on UCR. When the pandemic began in March 2020, campus leaders had to quickly react to changing circumstances. Back in Spring 2020, working groups were spearheaded to address various topics such as course instruction, research, and student issues. These working groups were disbanded in January 2021, though there is currently a COVID-19 coordination group that continues to address these issues. Currently, 80 percent of classes are in person, and it is anticipated that it will increase to approximately 95 percent in Winter 2022.

Chancellor Wilcox also discussed Giving Tuesday, a global day of giving and fundraising. Last January, UCR closed a fundraiser that raised \$313 million, exceeding its \$300 million goal. Of those funds, 80 percent went toward research and department support, including endowed chairs. There is currently a mini campaign called "Beyond Brilliant" that has a goal of raising \$50 million for student success. Furthermore, the UCR Board of Trustees is serious about financial campaign for the university, including providing support through matching funds.

There were no questions from the floor.

ANNOUNCEMENTS BY THE VICE CHANCELLORS

There were no announcements by the Vice Chancellors.

ANNOUNCEMENTS BY THE DEANS OR OTHER EXECUTIVE OFFICERS

Chair Stajich called upon the Secretary Parliamentarian to provide the report on election results. The Secretary Parliamentarian informed the Division that the results of the 2021-2022 recent elections for the Division, Colleges and Schools could be found on page 10 of the meeting agenda.

There were several positions that had no more nominees than vacancies and there were no nominations received from the floor. The Division authorized the Secretary-Parliamentarian to cast a single ballot for all open positions.

The results of the 2021-22 recent elections are reported on page 10 of the agenda.

ANNOUNCEMENTS BY THE CHAIR

Chair Stajich shared that the Academic Senate, through the Senate Chair and Planning and Budget Chair, is part of the Provost's Campus Finance Committee. Senate Chair Stajich and Planning and Budget Chair Dana Simmons are working together to translate that financial information to faculty. In particular, they hope to share budget updates from our campus, as well as systemwide updates.

Chair Stajich also shared that Robert Horowitz, the current systemwide Academic Senate Chair, has made the climate crisis a key part of his activities. Each campus is addressing the climate crisis differently; some campuses are mitigating travel while others are looking at infrastructure. UCR administration has its own sustainability committee, and the Academic Senate plans to spearhead its own ad hoc sustainability committee in the near future.

The Senate Chair also discussed campus reopening and balancing remote and in-person interaction. The Senate Chair reminded faculty of the Provost's compassionate clause regarding remote teaching and also reminded faculty that any course can be taught online if it goes through the Committee on Courses process. There are also resources through XCITE for online teaching.

Additionally, the Senate Chair discussed campus growth, particularly the need to approach growth thoughtfully. Due to various constraints, not all majors can grow the same way. Furthermore, when the undergraduate population grows, the graduate population needs to grow as well to support student teaching and research.

Lastly, the Senate Chair also reminded faculty about Giving Tuesday and shared that those who donate receive a phone call from an undergraduate student thanking them for their donation.

There were no questions/comments from the floor.

SPECIAL ORDERS

The Consent calendar was unanimously approved.

The annual reports of standing committees, annual reports of the faculties, degree reports and regular reports of standing committees and faculties were received and placed on file.

REPORT OF THE REPRESENTATIVE TO THE ASSEMBLY

Riverside Assembly Representative Professor Peter Chung provided the Division with a written report from the Assembly meeting on June 9, 2021. This report can be found on page 163 of the full agenda. There were no questions from the Division.

REPORTS OF SPECIAL COMMITTEES

There were no reports of Special Committees.

REPORTS OF STANDING COMMITTEES AND FACULTIES

Professor Victor Ortego-Martí, Vice Chair of the Committee on Committees, introduced and moved for adoption of the Committee on Committees proposed changes to the Charge of the Committee on Bylaw 6.4.4.1, found on page 165 of the full agenda. The motion was approved unanimously.

Professor Manuela Martins Green, former Chair of the Molecular, Cell and Systems Biology Department, introduced and moved for adoption of the proposed transfer of the Cell, Molecular, and Developmental Biology (CMDB) Graduate Program and the CMDB Undergraduate Program to the Department of Molecular, Cell and Systems Biology (MCSB), found on page 168 of the full agenda. The motion was approved unanimously.

Professor Don Collins, Chair of the Graduate Council, introduced and moved for adoption of the Graduate Council proposed changes to Graduate Council Bylaw 8.14.02., found on page 231 of the full agenda. The motion was approved with 46 in favor, 1 against and 4 abstentions.

PETITIONS OF STUDENTS

There were no petitions from the students.

UNFINISHED BUSINESS

There was no unfinished business.

UNIVERSITY AND FACULTY WELFARE

There was significant discussion about COVID-19 testing on campus, particularly the need to communicate to faculty when students test positive for COVID-19. Many faculty members shared that they find out about students testing positive from the students themselves, not from the administration. Some faculty shared that our sister campuses are conducting more regular testing and urged the administration to develop clear testing protocol for students. Others expressed the need for an updated data dashboard with our COVID-19 numbers.

Vice Chancellor for Student Affairs Brian Haynes shared that the university has taken a serious approach to ensuring that students comply with the vaccine mandate. He also shared that the university tests unvaccinated students on a weekly basis and there is random testing for vaccinated students and students who live off-campus. Students are also accountable through the student conduct process.

Chancellor Wilcox thanked faculty members for their feedback and stated these processes are still changing.

NEW BUSINESS

There being no further business, the meeting was adjourned at 1:50 p.m.

ATTEST:

F. Xu, Secretary-Parliamentarian
Riverside Division of the Academic Senate

Rosana Franco
Recording Secretary

**SECRETARY-PARLIAMENTARIAN
REPORT TO THE RIVERSIDE DIVISION
FEBRUARY 22, 2022**

2021-2022 RESULTS FROM THE CALL FOR NOMINATIONS

To be received and placed on file:

1. SCHOOL OF PUBLIC POLICY

A call for Nominations was issued for the following positions:

Four Members, SPP Executive Committee (3-year term)
Elected from the faculty at large

Four valid nominations received:

- Paul D'Anieri
- Sharon Oselin
- Sergio Joseph Rey
- Qingfang Wang

In Memoriam

Francis M. Carney **Founding Professor and Professor Emeritus of Political Science** **UC Riverside** **1921-2011**



Francis M. Carney, founding UCR faculty member and political strategist, died on May 9, 2011 at his home in Riverside.

Dr. Carney was born in the Bronx in 1921, but was raised in Los Angeles. In 1943, while an undergraduate student at Stanford, he enlisted in the Army Air Corps, training as a radio operator for C-47 troop transport planes. During his service, he dropped relief to American soldiers in the Battle of the Bulge, flew in the crossing of the Rhine, and helped fly survivors of the Buchenwald concentration camp.

After returning home from the war, Dr. Carney completed his Bachelor of Arts degree at USC, then returned to Stanford, where he completed a Master's Degree. In 1954, while he was writing his dissertation in political science at UCLA, he accepted a position at the newly established University of California, Riverside campus. It would become his academic home for the rest of his career, though he lectured briefly at other UC campuses as well.

At UC Riverside, Dr. Carney taught and researched history, political science, Constitutional law, civil rights, and other related topics. Known for his analysis of California politics, he wrote *The Rise of the Democratic Clubs in California* (1958) and co-authored with Frank Way Jr. *Politics 1960*, *Politics 1964*, *Politics 1968*, and *Politics 1972*. He was also a regular contributor to distinguished national publications such as the *New York Review of Books* and *The Nation*.

Outside campus, Dr. Carney was a sought-after political commentator and strategist. He contributed election coverage for ABC News, chaired the Robert F. Kennedy presidential

campaign in Riverside County, and led the fight for desegregated housing in Riverside, encouraging his daughters to picket against racist business practices. For 20 years, he also hosted “Jazz on Tuesday” at KUCR, sharing his love of the music with listeners.

Dr. Carney was devoted to service. After he retired from UCR in 1991, he continued to teach a constitutional law course as a volunteer lecturer from 1995 to 2003. He also volunteered for Highgrove Elementary School and was named a volunteer of the year by the Riverside Unified School District.

Colleagues, staff, and students remember Dr. Carney as a brilliant and service-minded professor. “He was a model professor who taught generation after generation about democracy and politics, and then practiced those principles in his own community,” former Chancellor Timothy White said.

Dr. Carney is survived by his wife Jane Carney, his children Susan and Robin Carney, Diane Rugg, Mike and Lynne Westafer, Laura McGowan, and grandchildren Joe Rugg, Prahlad Papper, Rebecca and Jack Westafer and Gavin McGowan.

Photo credit: *The Press-Enterprise*.

This memorial was adapted by Laila Lalami from the following sources:

1. *L.A. Times* obituary: <https://www.legacy.com/us/obituaries/latimes/name/francis-carney-obituary?id=8157762>
2. Faculty notification from Chancellor Tim White, May 13, 2011.
3. *The Press-Enterprise* obituary: <https://www.pe.com/2011/05/11/francis-m-carney-founding-uc-riverside-professor-dies-at-89/>

In Memoriam

Hal Bridges Professor of History, Emeritus UC Riverside 1919-2010



Hal Bridges, Professor *Emeritus* of History at UC Riverside (UCR), died peacefully from pneumonia on March 8, 2010, at the age of 91. Dr. Bridges was born into a family of journalists: his grandfather, father, and sister all worked as the editor-in-chief of the *Luling Signal* of his hometown, Luling, Texas. He was the son of Harold Bridges and Lyda Lois King. Dr. Bridges was the valedictorian of his high school class in 1936 and subsequently enrolled at the University of Texas. After completing his degree in journalism, he intended to join the Civil Service in Washington, DC, but with the start of the Second World War, he instead ended up enlisting in the US Army. He served in the Army for five years, spending three years in Egypt and various locations in the Mediterranean, and successfully completing Officers School and earning the rank of Major.

Upon completing his military service, Dr. Bridges enrolled at the Columbia School of Journalism, and ultimately received his Ph.D. from Columbia University with a specialization in American social and intellectual history. In 1950, he joined the faculty at the University of Arkansas, subsequently moved to the University of Colorado, where he remained for eleven years, and then became Professor in the Department of History at UCR.

Dr. Bridges was the author of three acclaimed scholarly books, *Iron Millionaire: The Life of Charlemagne Tower* (1952), *Lee's Maverick General: Daniel Harvey Hill* (1961), and *American Mysticism: From William James to Zen* (1977). Additionally, he wrote numerous scholarly articles and reviews dealing with the Civil War, including for the

New York Times Book Review, the *American Historical Review*, and the *Saturday Review*. Frank Vandiver, a leading Civil War writer and author of *Mighty Stonewall* and *Jubal's Raid* wrote of Dr. Bridges: "This is one of the most brilliant in the field and a man who writes with great clarity and charm." On his ninetieth birthday, he self-published his first novel, *Lincoln and the Single Eye: A Tale of Mysticism, the Presidency, Love and Murder in Wartime Washington*, a book he penned in hopes of inspiring others in searching for mystical truth, a lifelong interest of his.

At UCR, Dr. Bridges taught courses in American history and was especially eager to share his encyclopedic knowledge of the Civil War era and the social and intellectual currents of mid-to-late 19th-century America . He retired from UCR in 1979, and he and his wife Alice moved to Sedona, Arizona, and later to Cottonwood, Arizona. Dr. Bridges was survived by his wife Alice, two daughters, Lois and Stephanie, and three grandchildren.

Written by Katja M. Guenther with information provided in:

1. Wright, Phillip "Retired historian writes first novel at 90: World War II vet fictionalizes Civil War." January 6, 2009. *Valley Verde Independent and Camp Verde Bugle*. <https://www.verdenews.com/news/2009/jan/06/retired-historian-writes-first-novel-at-90/> Accessed on January 6, 2022.
2. Obituary published in the *Valley Verde Independent and Camp Verde Bugle*, March 11, 2010. Accessed on January 6, 2022 at <https://www.verdenews.com/news/2010/mar/11/hal-bridges-1919-2010/>

In Memoriam

John B. (Jack) Vickery
Professor of English, Emeritus
UC Riverside
1925- 2013



Dr. John B. (Jack) Vickery, Professor Emeritus of English at the University of California, Riverside, passed away February 7, 2013 at age 88. Dr. Vickery was born to Stanley Vickery and Mona Robinson, in Toronto, Canada on August 20, 1925. A member of the UCR Department of English for most of his career, he also served as UCR's Associate Executive Vice Chancellor from 1984 to 1988 and as Vice Chancellor of Faculty Relations and Academic Support from 1988 until his retirement in 1993.

After graduating from high school, Dr. Vickery received his Bachelor's degree in Toronto, his Master's degree at Colgate and two doctoral degrees from the University of Wisconsin, Madison in 1951 and, after teaching at the University of Tennessee, Northwestern University, Purdue, and Cal State Los Angeles, joined the UCR English Department as an Associate Professor in 1966. He became a highly productive and influential scholar, known especially for his work on myth and twentieth century literature. His published work before retirement included *Robert Graves and the White Goddess* (University of Nebraska Press, 1972), *The Literary Impact of The Golden Bough* (Princeton, 1973), *Myths and Texts: Strategies of Incorporation and Displacement* (Louisiana University Press, 1983) over fifty book chapters, journal articles, and review essays, and several edited essay collections, including *Myth and Literature* (1966), *The Scapegoat: Ritual and Literature* (1971), and – co-edited with his wife Olga—*Light in August* and *the Critical Spectrum* (1971). A winner of Guggenheim and ACLS fellowships, Professor Vickery also maintained an impressively active scholarly career after retirement, publishing two important studies of the modern elegy: *The Modern Elegiac Temper* (Louisiana State University Press, 2006) and *The Prose Elegy: An Exploration of Modern American and British Fiction* (Louisiana State University Press, 2009). These books compellingly explore how the twentieth-century prose elegy redefined the traditional elegy, shifting its focus to the

diversity of losses in human life and to a skeptical questioning of past sources of elegiac support.

In addition to his service as Vice Chancellor, Professor Vickery also served the university as chair of the English Department and as chair of several important campus committees. He was a passionate and effective advocate for UCR's writing program and respected by colleagues for combining tough-mindedness with fairness and integrity. He was praised in student evaluations for his lucid, knowledgeable, and interesting lectures and, in 2001, he generously agreed to return temporarily to teaching to help the department cover a course indispensable to the curriculum. He continued to have an office in the department and was a regular visitor to campus. He could often be seen at the Barn, carrying on spirited intellectual conversations with longtime friends and colleagues.

He is remembered warmly by many colleagues, staff, and students for his important contributions to the English Department and to the broader UCR community. Dr. Vickery is survived by his daughters, Anne E. Floto (William H.) and Elaine C. Shankar (Ashok); his grandchildren, Kimberly K. Ouellette (Andrew) and William J. Floto, Kavi Shankar and Elina Shankar; his great grandchildren, Ryan G. and Ethan J. Ouellette, along with other family, friends and colleagues.

Prepared by Kenichiro Tsukamoto.

Sources: Chancellor's email and <https://www.dignitymemorial.com/obituaries/riverside-ca/john-vickery-5416950>

In Memoriam

Jorge Mario Silva-Risso
Professor of Marketing, Emeritus
UC Riverside
1953-2021



Jorge Silvo-Risso, an Emeritus Professor of Marketing at UC Riverside, passed away on September 26, 2021, at the age of 68, after years of battling primary progressive aphasia, a neurological disease.

Jorge was born on August 3, 1953, in Montevideo, Uruguay, to Edelma Risso and Juan Antonio Silva. He graduated from the Universidad de la República in Uruguay, where he studied accounting and economics and began his career working in accounting and corporate finance while teaching at the Universidad de la República in the areas of finance, operations research, statistics, and organizational economics.

In 1989 Silva-Risso accepted an offer from the Fulbright Commission to go to UCLA as a Fulbright Scholar, earning an MBA (1991, Carter Fellow, Beta Gamma Sigma) and a Ph.D. in Management (1996). His dissertation received the prestigious Clayton Award from the Marketing Science Institute. After completing his Ph. D., he settled in California with his family and joined J.D. Power & Associates, where he started the Marketing Science group and became its Executive Director. The Marketing Science group led by Dr. Silva-Risso specialized in developing and implementing quantitative models of consumer-level response to marketing programs offered by the automobile industry. Those models were used by more than 80% of the firms in the US automobile industry to plan and optimize their pricing, promotion, and advertising programs.

Jorge Silva-Risso joined the UCR School of Business faculty in 2003 as an Assistant Professor of Marketing and stayed with UCR for fifteen years before his retirement as

a tenured full Professor of Marketing in 2018. He taught courses on marketing institutions, marketing channels, and behavioral economics.

Professor Silva-Risso's research interests were econometric models of consumer response, marketing effectiveness, pricing, and the effects of the Internet on marketing. His consulting practice focused on utilizing quantitative tools and models to help automobile manufacturers increase the effectiveness and efficiency of their pricing, promotion, and advertising programs. He also worked on models to assist the product planning process. Silva-Risso's modeling work for the automobile industry was awarded the 2006 Practice Prize by the INFORMS Society for Marketing Science and was a finalist for the 2007 INFORMS Edelman award. He also won the 2007 Paul E. Green best paper award from the *Journal of Marketing Research*.

Professor Silva-Risso served on the advisory board of the INFORMS Society of Marketing Science from 2002 to 2007 and was the vice president of practice of INFORMS Society of Marketing Science from 2006 to 2007.

In addition to the many accolades Professor Silva-Risso earned during his distinguished career, he is best remembered by his business school colleagues as a scholar, gentleman, and a positive force within the faculty.

Jorge Silva-Risso was exceptionally curious and undaunted by diverse challenges. He was tenacious—instead of feeling defeated when things did not work out, he adapted and sought out new solutions to achieve his goals. These traits enabled him to flourish in both the academic and business worlds, and to develop synergies between the two. A fitness enthusiast, he was very proud of twice completing the Los Angeles Marathon (each time under 4 hours!), though a knee injury kept him from running his third. Afterwards, he took up cycling, boxing, and loved staying active. Jorge loved the beach, music—seeing the Rolling Stones was a personal highlight—and travel. He enjoyed attending academic conferences where he could exchange ideas, see new places, meet new colleagues, and catch up with old friends. He took great pleasure in hosting friends and family and loved showing off his asado and mojitos. Most of all, he was a devoted husband, father, and son. He met his future wife Adriana at university when they were 19; they remained partners for nearly 47 years. He cherished their marriage, and loudly celebrated their anniversaries. He delighted in his children, joyfully marking every first day of school, every graduation, and every one of their awards.

Jorge Silva-Risso is survived by his wife, Adriana, his three children, Alejandro, Fabiana, and Mario, and three grandchildren, Lena, Dom, and Nico, his siblings Adriana and Nestor, his nephews Gustavo, Esteban and Gonzalo, and his niece Victoria. He is buried in Uruguay, his home country.

The memorial was prepared by Alexander Barinov, Assistant Professor of Finance at the UCR School of Business, using the information from the Dean's announcement and the publicly available obituary.

In Memoriam

Theda Shapiro
Professor Emerita, Department of Comparative Literature and
Foreign Languages
UC Riverside
1943-2015



Theda Shapiro, Professor Emerita of French and Comparative Literature at UC Riverside, died on March 17, 2015, in Riverside.

Dr. Shapiro was born in Gloversville, upstate New York, in 1943. Named after Theda Bara, the famous actress of the silent film era, she lost her father at a very young age. To support the family, Theda's mother went to work in a leather-tanning and glove-making factory. In the summer, when school was not in session, young Theda gathered her friends and went to the Gloversville Public Library, where she read encyclopedias all day.

After earning a Bachelor of Arts degree in French from Columbia University's Barnard College, Theda Shapiro completed a Master's thesis on French painters and politics. This is a topic she pursued in greater depth in her Ph.D. dissertation at Columbia, which she later adapted and published as *Painters and Politics: the European Avant-Garde and Society, 1900-1925* (Elsevier, 1976.)

Dr. Shapiro's career at the University of California, Riverside, began in 1969, when she was still a graduate student at Columbia, teaching French language and culture. Over the next forty years, she taught in the Departments of History, French, and eventually Comparative Literature, which she also chaired for a period of time. Dr. Shapiro was extremely active on campus, serving at one time or another as the director of the French and Italian programs and president of the Liberal Studies and Interdisciplinary Programs.

For twenty years, Dr. Shapiro worked closely with the Education Abroad Program of the University of California and served as Associate Dean on the UCEAP Staff. She spearheaded the creation of the History of World Literature by Women course, which is now part of the curriculum for the Gender & Sexuality Studies program as well as Comparative Literature. She offered independent studies to an untold number of undergraduate and graduate students who wanted to pursue interests that were not addressed in regular course offerings. In 2006, she was awarded the first UCR Senate Distinguished Service Award for her contributions to the university.

Dr. Shapiro's work was one of the first to investigate artworks as political documents, focusing especially on Italian futurists, French Fauves, Cubists, and German Expressionists, and connecting various historical materials to cultural artefacts. Her contributions also include articles on artists in the metropolis, Paris architecture and urban planning, the pedagogy of French civilization, and issues in international education.

Colleagues, staff, and students remember Dr. Shapiro as a brilliant intellectual, a generous educator, and a community-minded colleague. Following news of her death, her friends set up a memorial website, where they recalled how "persistent, persuasive, patient, and perceptive," she was and shared anecdotes and remembrances. "She was a friend, a good friend, to me, my family and many others. That is a big thing. Such friendship is hard to come by."

Photo credit: Theda Shapiro Memorial Page, Facebook

This memorial was adapted by Laila Lalami from the following sources:

1. Theda Shapiro, Dictionary of Art Historians, <https://arthistorians.info/shapiro>
2. Faculty notification from Shaun Bowler of Theda Shapiro's passing, March 17, 2015
3. The Thedapedia Project, maintained by friends of Theda Shapiro: <https://thedapedia.wordpress.com/>

In Memoriam

William L. Dunlop
Associate Professor of Psychology
UC Riverside
1985-2021



William (Will) L. Dunlop, Associate Professor of Psychology at UC Riverside (UCR), ended his life on September 3, 2021. Born in Ontario, Canada, on May 20, 1985 to Catherine and Robert Dunlop, Dr. Dunlop grew up in London, Ontario. He earned his Bachelor's degree at the University of Western Ontario, and then went on to complete doctoral study at the University of British Columbia, finishing his PhD in Psychology in 2013. He joined the faculty of the Department of Psychology at UCR as an Assistant Professor in the personality psychology specialization that same year, advancing to the rank of Associate Professor in 2019.

Dr. Dunlop's research focused on the way people use narratives to create their own life stories in which to situate their identities, and he was a leading figure among those using narrative approaches to understand personality. He identified the "redemptive sequence" in persons' life stories, a thematic element where a negative event is seen as the starting point for growth, development, and an eventual positive outcome. Professor Dunlop was also interested in how narrative identities changed over time, and in exploring the nature of volitional personality change—the conscious effort to change personal attributes. He was author or co-author of over 75 journal articles and book chapters, and was working on a co-authored textbook on personality psychology at the time of his passing. In 2017, he was recognized as a Rising Star by the Association for Psychological Science. At the time of his passing, Dr. Dunlop was on sabbatical from UCR and serving as Honorary Professor of Psychology at Aarhus University, Denmark, so that he and his wife could be together following the birth of their first child.

At UCR, Dr. Dunlop regularly taught undergraduate and graduate courses on personality psychology, self and identity, and narrative. He was a mentor to graduate and undergraduate students, especially those involved in his Personality and Identity Lab.

Dr. Dunlop was an avid surfer who lived near the Pacific Ocean during his time at UCR so that he could surf regularly. He also enjoyed playing guitar; during his college and graduate school years, he played bass guitar with a band.

Dr. Dunlop is survived by his wife, Majse Lind, their son Felix, his parents Catherine and Robert, and his brother, Trevor.

Written by Katja M. Guenther with the description of research interests adapted from an announcement by UCR's Department of Psychology posted at <https://psychology.ucr.edu/about-our-department/news/will-dunlop-passing/>

**THE GRADUATE DIVISION AND EXECUTIVE
COMMITTEES OF THE COLLEGES
REPORT TO THE DIVISION
FEBRUARY 22, 2022**

To be received and placed on file:

Reports of Degrees Awarded – Summer 2021

Bourns College of Engineering	
Bachelor of Science:	44
College of Humanities, Arts and Social Sciences	
Bachelor of Arts:	587
Bachelor of Science:	31
College of Natural and Agricultural Sciences	
Bachelor of Arts:	14
Bachelor of Science:	214
School of Business	
Bachelor of Science:	98
School of Medicine	
PhD:.....	5
Master of Science.....	1
School of Public Policy	
Bachelor of Arts:	20

Report of Degrees Awarded – Fall 2021

Graduate Division	
Master of Arts:	22
Master of Business Administration:	9
Master of Education:	12
Master of Finance:	23
Master of Fine Arts:.....	18
Master of Professional Accountancy:	26
Master of Public Policy:.....	0
Master of Science:	54
Doctor of Philosophy:.....	71

The names of the candidates are filed in the official records of the Office of the Registrar.

F. Xu, Secretary-Parliamentarian
Riverside Division of the Academic Senate

**COMMITTEE ON ACADEMIC PERSONNEL
ANNUAL REPORT TO THE RIVERSIDE DIVISION
February 22, 2022**

To be received and placed on file:

The Committee on Academic Personnel (CAP) is an important part of faculty governance and collegial responsibility in the University of California system. As a committee of the Riverside Division of the Academic Senate, CAP is appointed by the Senate’s Committee on Committees and charged with providing advice to the Chancellor on academic personnel matters and representing the Division in all matters relating to appointments and promotions. CAP consists of ten members, who represent a wide variety of academic disciplines from across campus. All members hold the rank of full professor and serve for offset periods of three years (with annual reappointment) so that there is continuity and memory on the committee. CAP reviews all academic personnel files for merit, appraisal, promotion, and appointment and makes recommendations to the Vice Provost for Academic Personnel, the Executive Vice Chancellor and Provost, and the Chancellor. CAP is also asked to provide feedback and recommendations about a variety of Senate matters and administrative directives.

CAP's goal is to assure that its recommendations are based on rigorous application of the academic personnel procedures in the CALL and the APM, and to assure that decisions are based on a fair and thorough evaluation of evidence in the file.

Effective Spring Quarter of 2020 through the Summer Quarter of 2021, UCR temporarily moved all in-person campus meetings to remote means, such as video conferencing and email. The Academic Senate temporary allowed flexibility for Senate committees to use Zoom in order to avoid significant interruption of business during the COVID-19 response. The Committee on Academic Personnel met 54 times during the 2020-2021 academic year and conducted business via Zoom and email.

Meetings were approximately 2.71 hours in length. By the final May 4th submission date in the CALL, there were 61 outstanding files campus wide to be routed to CAP for review. CAP notes an increase of this year’s number due to impacts of COVID-19. CAP again is appreciative of staff and faculty alike for their efforts in the academic personnel review process in light these impacts.

Summary of files received by CAP by action and due dates in the CALL

Due Date in CALL	Action	# of Files	Received by CAP
January 21	Promotion to tenure	31	17 of 31 received by Jan 21 due date
			13 of 31 received after Jan 21 & before May 4
			2 of 31 received after final May 4 th due date
	Advance to A/S	6	1 of 6 receive by Jan 21 due date
			2 of 6 received after Jan 21 & before May 4
			3 of 6 received after May 4 th due date
February 3	Promotion to Full	26	15 of 26 received by Feb 3 due date
			6 of 26 received after Feb 3 & before May 4
			5 of 26 received after final May 4 th due date
	Advance to VI	13	5 of 13 received by Feb 3 due date

			7 of 13 received after Feb 3 & before May 4
			1 of 13 received after final May 4 th due date
	Career Review	3	0 of 3 received by Feb 3 due date
			3 of 3 received after Feb 3 & before May 4
March 2	Reappointment	11	6 of 11 received by March 2 due date
			5 of 11 received after March 2 & before May 4
(1/3) November 18	Merits		
(2/3) April 7	Assistant Merits	82	13 of 82 received by Nov 18 due date
(3/3) May 4			50 of 82 received after Nov 18 & before April 7
			8 of 82 received after April 7 and before May 4
			11 of 82 received after final May 4 th due date
	Associate Merits	47	8 of 47 received by Nov 18 due date
			21 of 47 received after Nov 18 & before April 7
			11 of 47 received after April 7 & before May 4
			7 of 47 received after final May 4 th due date
	Professor Merits	79	5 of 79 received by Nov 18 due date
			26 of 79 received after Nov 18 & before April 7
			26 of 79 received after April 7 & before May 4
			22 received after final May 4 th due date
	Within A/S	10	3 of 10 received by Nov 18 due date
			3 of 10 received after Nov 18 & before April 7
			3 of 10 received after April 7 & before May 4
			1 of 10 received after final May 4 th due date
	Appraisals	28	1 of 28 received by Nov 18 due date
			21 of 28 received after Nov 18 & before April 7
			2 of 28 received after April 7 & before May 4
			4 of 28 received after final May 4 th due date
	Quinquennials	15	0 of 15 received by Nov 18 due date
			6 of 15 received after Nov 18 & before April 7
			4 of 15 received after April 7 & before May 4
			5 of 15 received after final May 4 th due date
No Due Date	Appointments	9	3 of 9 appointments received before May 4
			6 of 9 appointments received after May 4
	Total files reviewed:	360	

In addition to reaffirming its Conflict-of-Interest Statement and conducting a review of its bylaws, the Committee undertook the following actions:

I. Personnel Actions

a. Summary of Reviews

CAP reviewed 360 personnel actions during 2020-21 and sustained an average turn-around time of 36 days from the time a file is received at CAP from the Academic Personnel Office to the time the CAP recommendation is forwarded to the administration. Committee work during this period includes (a) receipt of the file in the Academic Senate Office by the CAP Analyst; (b) assigning of primary and secondary readers to each file, and the CAP Chair who serves as the third reader on all files; (c) announcement to all CAP members that the file is available for their review online; (d) thorough review of the file by the assigned readers in preparation for

discussion by the full committee at the next CAP meeting; (e) presentation of the file and discussion/vote by the full committee; (f) preparation of the draft CAP recommendation by the primary and secondary readers; (g) review and approval by the CAP Chair, who forwards the CAP report to the CAP Analyst to be finalized and forwarded to the Academic Personnel Office.

The Academic Senate office also maintains data reflecting the processing time (including the percentage of files that are forwarded according to due dates in the CALL) by department and school/college, as well as turn-around time for files reviewed by ad hoc committees. These data are available from the Academic Senate Office.

Below is a summary of the review criteria considered for each action (see 20-21 AY CALL for full text), CAP’s endorsement of total number of files received, the final decision of the Chancellor’s office, and the number of over-rules for each action. A decision of the Chancellor’s office is defined as an over-rule if it is contrary to the majority recommendation from CAP on rank, step, or the awarding of an off-scale. A detailed table summary of CAP’s personnel reviews merits, promotions, advancements, appraisals, appointments, career reviews, and quinquennial reviews, is appended.

<i>Promotion 20-21 AY Criteria:</i>							
<i>A promotion review examines the candidate's record with respect to the criteria as set forth in Section II.A.5 of the CALL. Clearly demonstrated evidence of high-quality teaching and mentoring activities. Evidence that the candidate is continuously and effectively engaged in creative activity of high quality and significance. Research and scholarship must be performed at the highest level. Demonstrate sustainability of the research program and have peer recognition. A level of involvement in Professional, University and Public service commensurate with stage of career.</i>							
<i>For promotions of the applicable series, CAP also referenced APM 220-Ladder Rank, APM 275-Clinical X, APM 285-L/PSOE and campus guidelines.</i>							
<i>CAP did not consider acceleration criteria nor off-scale recommendations with promotion actions since the purpose for placement at a higher step in the 20-21 AY was to correct misalignment in the rank/step system.</i>							
Action	# of Files	CAP Recommendation		Final Decision of Chancellor’s Office		Admin Over-rule of CAP Recommendation	
		Endorse	Did Not Endorse	Endorse	Did Not Endorse	Rank / Step	Off-Scale
Promotion to Tenure	31	31	0	31	0	3	1
- Of the 31 promotion to tenure files proposed, 16 came forward with recommendations for placement at a higher step and CAP recommended 1 file go back to the department for consideration of placement at a higher step.							
- Of these 17 files, 11 proposed placements at 1 step higher than promotion, 6 proposed placements at 2 steps higher than promotion.							
1 step higher	11	9	2	10	1	1	0
2 steps higher	6	3	3	4	2	2	1
Promotion to Full	26	26	0	26	0	4	2
- Of the 26 promotion to full files proposed, 10 came forward with recommendations for placement at a higher step and CAP recommended 2 files go back to the department for consideration of placement at a higher step.							

- Of these 12 files, 11 proposed placements at 1 step higher than promotion, 1 proposed placement at 2 steps higher than promotion.							
1 step higher	11	9	2	11	0	2	0
2 steps higher	1	0	1	0	1	1	0

<i>Career Review 20-21 AY Criteria:</i> <i>Teaching and Service must both be excellent and approaching the record of faculty at the proposed rank and step. Departments and Deans must use their professional judgment and experience (in the department/ college/ discipline) and what is written in the outside letters to justify the appropriate rank and step (in this case placement) being recommended.</i>							
<i>Purpose: To allow candidates to be placed at the appropriate level whose performance over a substantial period has been better than average, but whose performance at each merit may not have been sufficient for an acceleration. Any senate faculty member at Associate Professor or above who thinks that they may not be at the appropriate level on the rank/step scale has the right to be evaluated by the process of Career Review. Departments and Deans should also be alert to the possibility that on rare occasions a faculty member may be seriously out of place on the rank/step scale.</i>							
<i>CAP did not consider acceleration criteria nor off-scale recommendations with career review actions since the purpose for placement at a higher step in the 20-21 AY was to correct misalignment in the rank/step system. However, CAP did consider criteria in the CALL with regard to advancement to VI, advancement to Above Scale, and promotion for files that included recommendations to or above these steps.</i>							
Action	# of Files	CAP Recommendation		Final Decision of Chancellor's Office		Admin Over-rule of CAP Recommendation	
		Endorse	Did Not Endorse	Endorse	Did Not Endorse	Rank / Step	Off-Scale
Career Review	3	3	0	3	0	1	0
- Of the 3 career review files proposed, 1 included advancement to VI, 1 included advancement to Above Scale, and 1 included promotion to full professor.							
- Final Outcome: 1 cased resulted in a 2-step merit increase. 1 case resulted in an advancement to Above Scale. 1 case resulted in a promotion to full professor with placement at 1 step higher than promotion.							

<i>Advancement to VI 20-21 AY Criteria:</i> <i>Advancement usually will not occur after less than three years of service at Step V. Advancement will be granted on evidence of sustained and continuing excellence in each of the following three categories: 1) scholarship or creative achievement, 2) university teaching, and 3) service. Above and beyond that, great academic distinction, recognized nationally or internationally, will be required in scholarly or creative achievement or teaching.</i>							
<i>Acceleration Criteria:</i> <i>The minimum criterion for acceleration within rank is strength in all areas of review during the abbreviated review period. Exceptional strength in one area is not sufficient to offset a weakness in another area. In addition:</i>							
- A recommendation for acceleration to Step VI requires even greater accomplishment described as highly distinguished scholarship, highly meritorious service, and evidence of excellent University teaching at the standards noted in APM 220-18-b(4).							

- *The bar is set higher for acceleration to Step VII and above, as required in APM 220-18-b(4). A recommendation for acceleration to these steps requires exceptional performance in all areas.*

Off-Scale Criteria:
It may be appropriate to suggest an additional off-scale when one of the three categories of review demonstrates exceptional achievement, but the same level of accomplishment is not present in all three areas of review. Alternatively, an off-scale may be appropriate when all three areas of review are substantially above expectations.

Action	# of Files	CAP Recommendation		Final Decision of Chancellor's Office		Admin Over-rule of CAP Recommendation	
		Endorse	Did Not Endorse	Endorse	Did Not Endorse	Rank / Step	Off-Scale
Advancement to VI	13	12	1	12	1	0	0
- Of the 13 advancement to VI files proposed, 1 included a 1-year acceleration, 7 came forward as on-time, 1 included recommendations for additional off-scale, and 4 included 3-year acceleration to a higher step.							
1-yr accel	1	1	0	1	0	0	0
On-time	7	6	1	6	1	0	0
On-time + o/s	1	0	1	0	1	0	0
3-yr accel	4	1	3	1	3	0	0

Advancement to Above Scale 20-21 AY Criteria:
1) XM evaluation by very senior faculty familiar with UC rank/step system, 2) XM evaluation by national & international experts, 3) evidence of national & international research leadership & visibility, 4) compelling evidence that the candidate is considered by his/her peers to be amongst those at the top of the field of research (e.g. prestigious awards), 5) evidence of teaching excellence, 6) must show significant evidence of new achievement, and except in the rarest and compelling cases will not occur at intervals of less than four years at Step IX.

Acceleration Criteria:
The minimum criterion for acceleration within rank is strength in all areas of review during the abbreviated review period. Exceptional strength in one area is not sufficient to offset a weakness in another area. In addition:

- *Only in the most superior cases where there is strong and compelling evidence will increases at intervals shorter than four years be approved. A recommendation for acceleration must demonstrate a signal achievement or honor in one of the three areas of assessment in addition to exceptional performance at the standards noted in APM 220-18-b(4).*

Action	# of Files	CAP Recommendation		Final Decision of Chancellor's Office		Admin Over-rule of CAP Recommendation	
		Endorse	Did Not Endorse	Endorse	Did Not Endorse	Rank / Step	Off-Scale
Advancement to A/S	6	6	0	6	0	0	0
- Of the 6 advancement to A/S files proposed, 1 included a 1-year acceleration.							
1-yr accel	1	1	0	1	0	0	0

Merit 20-21 AY Criteria:
A merit review examines the candidate's record with respect to the criteria as set forth in Section II.A.5

of the CALL. Clearly demonstrated evidence of high-quality teaching and mentoring activities. Evidence that the candidate is continuously and effectively engaged in creative activity of high quality and significance. Research and scholarship must be performed at the highest level. Demonstrate sustainability of the research program and have peer recognition. A level of involvement in Professional, University and Public service commensurate with stage of career.

For merits of the applicable series, CAP also referenced sections of the APM: Ladder Rank APM 220, In-Residence APM 270, Clinical X APM 275, L/PSOE series APM 285 + campus guidelines.

COVID Off-Scale:

For AY20-21 an O/S salary increase of 0.5 the merit step salary increase can be proposed when an on-schedule merit file is judged insufficient for a merit advance solely due to covid-19 issues. In these cases, the judgement that should be rendered is that the file was on track for a merit advance until it was derailed by events pertaining to the covid-19 pandemic during the March 2020 thru September 2020 time period. This provision does not apply to accelerated merit advances, merit advances to Professor Step VI, merit advances to Professor Above-Scale, or promotions since those personnel actions occur at barrier steps that involve longer review periods.

Acceleration Criteria:

The minimum criterion for acceleration within rank is strength in all areas of review during the abbreviated review period. Exceptional strength in one area is not sufficient to offset a weakness in another area. In addition:

- *For one-year accelerations within rank, the record for the abbreviated review period must reflect a level of accomplishments commensurate with the normal on-time merit.*
- *For multiple year accelerations within rank, the records for the abbreviated review period must reflect excellence in all areas of review commensurate with the proposed step, in addition to performance in at least one area deemed to be outstanding and a driving force for the acceleration.*
- *The bar is set higher for acceleration to Professor Step VII and above. A recommendation for acceleration to these steps requires exceptional performance.*
- *Advancement within Professor Above-Scale usually requires four years of service at the current scale. Only in the most superior cases where there is strong and compelling evidence will increases at intervals shorter than four years be approved. A recommendation for acceleration must demonstrate a signal achievement or honor in one of the three areas of assessment in addition to exceptional performance.*

Off-Scale Criteria:

It may be appropriate to suggest an additional off-scale when one of the three categories of review demonstrates exceptional achievement, but the same level of accomplishment is not present in all three areas of review. Alternatively, an off-scale may be appropriate when all three areas of review are substantially above expectations.

Action	# of Files	CAP Recommendation		Final Decision of Chancellor's Office		Admin Over-rule of CAP Recommendation	
		Endorse	Did Not Endorse	Endorse	Did Not Endorse	Rank / Step	Off-Scale
Assistant Merits	82	72	8	77	5	4	3
		SPLIT on 2 Cases					

- Of the 82 assistant merit files proposed, 3 included a 1-year acceleration, 48 came forward as on-time, 23 included recommendations for additional off-scale, and 8 included 2-year acceleration to a higher step.
- Of the 8 total merits actions CAP did not endorse, CAP recommended COVID o/s in lieu of

merit for all 8 cases.							
1-yr accel	3	3	0	3	0	0	0
On-time	45	37	8	43	5	2	0
		SPLIT on 1 Case					
On-time + o/s	23	9	13	12	11	0	3
		SPLIT on 1 Case					
2-yr accel	8	5	3	7	1	2	0
Associate Merits	47	39	8	44	3	6	1
<ul style="list-style-type: none"> - Of the 47 associate merit files proposed, 4 included a 1-year acceleration, 29 came forward as on-time, 8 included recommendations for additional off-scale, 5 included 2-year acceleration to a higher step, and 1 included 3-year acceleration to a higher step. 							
<ul style="list-style-type: none"> - Of the 8 total merits actions CAP did not endorse, CAP recommended COVID o/s in lieu of merit for 3 cases. 							
1-yr accel	4	4	0	4	0	0	0
On-time	29	21	8	26	3	5	1
On-time + o/s	8	6	2	6	2	0	0
2-yr accel	5	3	2	4	1	1	0
3-yr accel	1	0	1	0	1	0	0
Professor Merits	79	69	7	75	4	3	4
		SPLIT on 3 Cases					
<ul style="list-style-type: none"> - Of the 79 professor merit files proposed, 15 included a 1-year acceleration, 30 came forward as on-time, 21 included recommendations for additional off-scale, 1 included 2-year acceleration to a higher step, 10 included 3-year acceleration to a higher step, and 2 included 4-year acceleration to a higher step. 							
1-yr accel	15	13	2	15	0	2	0
On-time	30	25	5	26	4	1	0
On-time + o/s	21	13	6	14	7	0	1
		SPLIT on 2 Cases					
2-yr accel	1	1	0	1	0	0	0
3-yr accel	10	3	7	3	7	0	3
4-yr accel	2	1	0	1	1	0	0
		SPLIT on 1 Case					
Within A/S Merits	10	7	3	7	3	0	1
<ul style="list-style-type: none"> - Since there is no opportunity for faculty to move beyond the rank/step of Distinguished Professor, Above Scale, CAP is given the courtesy of weighing in on salary adjustments for within a/s merit actions. The normal increment for cases that meet the expectations of advancement within above scale criteria is 6%. The increment for very strong cases that meet the criteria for additional off-scale at this high level is 8.5%. The increment reserved for the most exceptional cases that meet the expectations for a four-year acceleration at this high level is 11%. In all cases, the Chancellor may award whatever salary is deemed appropriate, subject to SMG approval and regental thresholds when relevant. 							
<ul style="list-style-type: none"> - All within a/s merit actions received were on-time. Of the 7 cases CAP endorsed, CAP recommended that all 7 receive the 8.5% increment meeting the criteria for additional off-scale. 							
On-time + o/s	7	7	0	6	1	0	1

Reappointment 20-21 AY Criteria:
Appointment of an Assistant Professor is typically made for a maximum term of two years with renewal occurring biennially at the conclusion of a positive merit evaluation. The purpose of a reappointment is to offer an alternative to a mandatory two-year review of Assistant Professors who may not have a documented record of sufficient research, teaching or service to justify a merit, but clearly is on track to warrant reappointment.

Reappointment requires suitable evidence of performance in the following areas since initial appointment: 1) documented record of quality teaching, commensurable with current rank/step, 2) documented record of service to University and to the public, commensurable with current rank/step, 3) documented record of an effort to engage in meaningful research and/or creative activity and professional service.

Evaluation should be based on careful review of the appointee's progress, promise, and achievement.

For reappointments of the applicable series, CAP also referenced APM 220-Ladder Rank, APM 285-L/PSOE and campus guidelines.

Action	# of Files	CAP Recommendation		Final Decision of Chancellor's Office		Admin Over-rule of CAP Recommendation	
		Endorse	Did Not Endorse	Endorse	Did Not Endorse	Rank / Step	Off-Scale
Reappointment	11	11	0	11	0	0	0

5th Year Appraisal 20-21 AY Criteria:
Purpose is to determine whether the candidate is making satisfactory progress toward promotion according to APM 220-82 & 220-83.

For appraisals of the applicable series, CAP also referenced APM 220-Ladder Rank, APM 285-L/PSOE and campus guidelines.

Action	# of Files	CAP Recommendation		Final Decision of Chancellor's Office		Admin Over-rule of CAP Recommendation	
		Positive	Qualified Positive	Positive	Qualified Positive	Positive	Qualified Positive
5th Year Appraisal	28	26	1	24	4	2	0
		SPLIT on 1 Case					

Quinquennial 20-21 AY Criteria:
1) Documented record of quality teaching, commensurable with rank and stature of a faculty member in UC system, 2) documented record of substantial & valuable service to the University & the public, commensurate with rank/step, 3) documented record of serious effort to engage in meaningful research and/or creative activity & professional service, commensurate with rank/step.

Focus should be to provide constructive feedback aimed at maximizing the candidate's effectiveness in the above-mentioned areas.

Quinquennial + Off-Scale Criteria:
For a faculty member at a barrier step (Assoc V, Prof V, Prof IX) where the outcome of the quinquennial review will be satisfactory, performance in all three areas of review should be considered sufficient for a normal merit at the current rank/step.

Action	# of Files	CAP Recommendation	Final Decision of Chancellor's Office	Admin Over-rule of CAP Recommendation

		Endorse	Did Not Endorse	Endorse	Did Not Endorse	Satisfactory/Unsatisfactory	Off-Scale
Quinquennial	15	13	2	14	1	1	1
- Of the 15 quinquennial files proposed, 5 included off-scale recommendations at a barrier step.							
Quin + o/s	5	3	2	4	1	0	1

<i>Appointment 20-21 AY Criteria:</i>							
<i>For appointments of the applicable series CAP referenced APM 210 Instructions to Review Committees: Ladder Rank APM 220, In-Residence APM 270, Clinical X APM 275, Acting Assistant Professor APM 235, L/PSOE series APM 285 + campus guidelines.</i>							
<i>Campus Off-Scale Policy - At appointment off-scale is awarded to meet competitive market conditions.</i>							
Action	# of Files	CAP Recommendation		Final Decision of Chancellor's Office		Admin Over-rule of CAP Recommendation	
		Endorse	Did Not Endorse	Endorse	Did Not Endorse	Rank / Step	Off-Scale
Appointment	9	8	1	9	0	1	0

b. Follow up to the cases listed as pending in the 19-20 CAP Report

Of the 19 promotion to full professor & professor of teaching (Sr. LSOE) files submitted for review in the 19-20 AY, one case was noted as pending a final decision. The case was sent back to the department for consideration as CAP recommended placement at a higher step. CAP reconsidered the file according to bylaw 55 in the 20-21 AY. The case was finalized and resulted in promotion with placement at the higher step approved by the Chancellor's office. Of the 3 career review files submitted in the 19-20 AY, one case was noted as pending a final decision. This case was finalized and resulted in a merit of 1 step approved by the Chancellor's office.

c. Ad hoc Committees

The Committee on Academic Personnel continued to act as its own ad hoc for promotion to tenure and Advancement to Above-Scale cases, a process which results in early decisions for the majority of these promotion cases. During the 2020-21 review year, CAP did not utilize an ad hoc committee.

d. Shadow CAP

To avoid conflict of interest, the personnel actions for current CAP members and their spouses/partners are reviewed by Shadow CAP, a 6-person committee appointed by the Committee on Committees from a pool of former CAP members from the previous five years. During 2020-21 AY, Shadow CAP reviewed 5 cases. The 2020-21 Shadow CAP members were the following:

- Jory Yarmoff, Chair
- Rajiv Gupta
- Julia Bailey-Serres
- Walter Clark
- Richard Smith
- Sherryl Vint

e. Assistant Professor Appointments

In January 2008, final decisions for appointments to Assistant Professor Step I-III were delegated to the deans, with the proviso that CAP would conduct a *post hoc* audit/review of the appointments and submit recommendations about continuing with the delegation.

In fall 2013, CAP reviewed 42 appointments made at this level for the 2011-12 and 2012-13 years. Noting a number of procedure irregularities, CAP rescinded its waiver of review for all appointments for Acting Assistant Professor, Step III and clarified the expectation that all reappointments for Assistant Professor Step I-III will continue to be reviewed by CAP. The Committee recommended that the delegation be continued for appointments to Assistant Professor Step I-III followed by another CAP review in one to two years.

In the 2015-16 AY CAP was asked to consider waiving its right to review appointment files for Assistant Professor in Residence and Assistant Professor of Clinical X (Step I to III) series which have been delegated to the deans for final decision authority. CAP considered this request and elected to continue reviewing these cases in advance of the final decision.

In the 2016-17 AY CAP was scheduled to conduct a post-appointment audit of all 2013-14 and 2014-15 dean's level hires. However, CAP was unable to complete the post-audit because a response to the request for files was not received. The 2017-18 AY CAP did not conduct a post-audit of dean's level hires. The 2018-19 AY CAP also did not conduct a post-audit as APO was focused on moving over to the new eFilePlus system. The issue of conducting post-audits and the continuance of CAP waiving its right to review files was to be considered in the 2019-20 AY.

Due to delays in processing normal merit and promotion files caused by the COVID-19 pandemic, the post-audit of assistant professor appointment files was rescheduled to take place in the Fall quarter of the 2020-21AY. In December 2020, CAP conducted a review of 10 appointments at the Assistant Professor I-III levels made during the 2018-19 and 2019-20 academic years. This included 3 appointments each in CHASS and CNAS; and 1 each in BCOE, GSOE, BUS and SOM.

CAP was very gratified with the overall UC-level quality of these appointments and did not identify any irregularities in the hiring processes. However, CAP recommended the following:

- (1) That the delegation of appointments of new faculty at Assistant Professor I-III continue to be the responsibility of the dean, where CAP will conduct review for these appointments once in every two years.
- (2) That deans and department chairs be reminded of the existing (and any modified) appointment procedures and implementation guidelines, along with an explanation of the need for consistency;
- (3) That the Academic Personnel Office conduct an administrative audit of procedures that go beyond the purview of CAP's responsibilities;

(4) That any consideration of delegating additional personnel decisions to the deans not be undertaken without senate consultation.

f. eFilePlus

CAP reviewed 351 of its 360 cases via the new eFilePlus system (97.5%) and 9 of its 360 cases via the Document Management System (2.5%).

g. Other Personnel Actions (not included in the total number of files reviewed by CAP)

- Professor of the Graduate Division appointments: CAP reviewed fourteen files for appointment/reappointment as Professor of the Graduate Division. All cases were approved.
- Request for Emeritus Status: CAP reviewed and endorsed six cases to confer the title of Emeritus to non-senate faculty. CAP reviewed and endorsed one case to confer the administrative title of Emeritus Dean to a senate faculty member.
- Full Time Equivalent (FTE) Appointments: CAP considered and provided recommendations on six requests to transfer an entire or a portion of a filled FTE appointment from one department to another. CAP considered and provided recommendations on one request to reduce a portion of a filled FTE appointment from one department.
- Pre-Emptive Retention Cases: CAP provided recommendations on two pre-emptive retention cases.

II. CAP Discussions with and Policy Recommendations to the Administration

In addition to regular CAP meetings to review personnel cases, CAP met on occasion with the Chancellor, the Executive Vice Chancellor & Provost, the Vice Provost for Academic Personnel, the College/School Deans, and with Departmental Chairs. CAP participation in these joint administrative sessions is especially helpful in assuring a shared understanding of the review process and guidelines, and of the expectations at every level of review. CAP is grateful for the spirit of cooperation of the campus administrators. CAP provided advice to and initiated or participated in discussions with the administration on the following issues:

a. Revisions to the CALL

CAP reviewed and provided feedback to the VPAP on the proposed changes received. CAP's comments and suggested changes are available from the Academic Senate Office.

APM 200 and career review

On several occasions administration has expressed the interpretation that APM-220 mandates a career review, independent of acceleration criteria, at the time of evaluation for advancement to Professor, Step VI. CAP believes that this interpretation is incorrect, because in context the phrase "career review" in APM-220 instructs reviewers to consider a candidate's entire career in deciding whether or not to support an advance to Professor VI. It does not appear to refer to the mechanism of "career review" in which a faculty member's overall placement in the series is re-evaluated without reference to acceleration criteria. Indeed, APM-220 (4), where the phrase "career review" appears, restates the expectation of three years of service at Step V in the immediately preceding sentence:

“Advancement to Step VI usually will not occur after less than three years of service at Step V. This involves an overall career review and will be granted on evidence of sustained and continuing excellence...”

Similarly, a few sentences later in APM-220 (4), the “career review” prescribed for advancement to above-scale is also contextualized, in the same paragraph, by the phrase “Except in rare and compelling cases, advancement will not occur after less than four years at Step IX.”

The two references above are the only places in APM-220 where the phrase “career review” appears.

CAP concludes, therefore, that APM-220 does not mandate a career review that is independent of acceleration criteria at the time of evaluation for advancement to Professor VI or above-scale. We reiterate our recommendation that career reviews independent of acceleration criteria be used sparingly, reserved for cases where a faculty member’s placement in the series is seriously off step with that of similarly accomplished colleagues.

b. CAP Review of Proposed Department Chair Appointments

CAP reviewed the proposed department chair appointments for the 2020-21 academic year and expressed no concern with the recommendations submitted. CAP provided additional feedback with respect to one reappointment submitted.

c. Endowed and Presidential Chair Appointments

CAP reviewed and provided comments on appointments/reappointments to the following Endowed and Presidential Chair positions:

BCOE

Winston Chung Endowed Term Professorship in Sustainability
KA Endowed Chair in Electrical & Computer Engineering

BUSSINESS

Anderson Presidential Endowed Chair in Business Administration
Albert O. Steffey Endowed Chair in Marketing

CHASS

Ronald H. Chilcote Endowed Chair in Latino & Latin American Studies Research
Teresa & Byron Pollitt Endowed Chair in Interdisciplinary Research & Learning
John Gleason Mc Sweeney Family Chair in Rhetoric & Teaching Excellence

CNAS

Hartland H. Schmidt Founder’s Chair in Chemistry
Singletary Family Endowed Chair in Agriculture
F. Burton Jones Chair in Pure Mathematics
Harry W. Johnson, Jr. Founder’s Chair in Chemistry
Endowed Term Chair for Inclusive Excellence
Wilber W. Mayhew Endowed Chair in Geo-Ecology

d. Administrative Appointments – other Appointment “pre-reads”

It is customary for CAP to provide preliminary input regarding the faculty appointment of any senior administrators, including: Chancellors, Vice Chancellors, Provosts, Deans, Institute Directors, Directors of ORUs, Laboratory Directors and other offices who are also faculty members. CAP provided a preliminary professorial assessment on the candidates for the CHASS Dean position, the Provost and Executive Vice Chancellor position, and the UC President. CAP completed a “pre-read” on two Target of Excellence candidates from CHASS and one potential appointment in SPP.

e. Additional Local Issues

CAP corresponded with administration to seek clarification and/or ask that advice be communicated to the campus regarding the following topics:

- Items on difference list that appear outside the period of review
- Notable deviations from the process without any explanation provided
- Ensuring a consistent and fair review of appointment files across campus

Concerning patterns with merit and promotion evaluations within the School of Business

CAP wishes to bring a troublesome pattern to the VPAP’s attention and recommends that the VPAP communicate with the Dean and School that publication in journals that appear on poorly-explained – or unexplained – lists of “premier” outlets should not be the basis of consequential decisions concerning merit advances or promotions.

Dean's Final Delegation

CAP considered the proposal to delegate to College and School Deans some or all of the decisions on certain merits – primarily those that involve a one-step advance without additional off-scale and are with unanimous positive votes at the departmental and college/school levels. CAP declined to waive its responsibilities as a review committee under APM 220-80-k and APM 220-82-a. It will therefore continue to evaluate all merit and promotion files and to offer its recommendations to the administration.

eFilePlus Change Request

CAP discussed the possibility of enhancing the functionality of eFilePlus so that the pdf is generated by default and therefore is immediately available each time one logs into the system to view the file.

Merit and Promotion Files of LPSOE/LSOE among Different Campus Units

The current treatment of the merit and promotions within the LPSOE and LSOE series is somewhat inequitable among different departments. This is probably the result of the 'swift' introduction of these titles, and an inadequate definition of what is expected for individuals appointed on them. This gives CAP some concerns when reviewing merit/promotion cases for candidates appointed on these titles.

The primary charges of these positions, as defined in APM-210-3, are supposed to be teaching, scholarly and professional activities, and university service. The issues mostly reside in scholarly activities. In particular, some departments/units interpret this as evidence of significant

pedagogical/educational research and/or field-specific research, whereas others choose to impose field-specific publication requirements that are expected for ladder-rank research faculty. We believe that the former is the spirit in which these job titles were introduced, and that the latter places undue constraints on candidates appointed under the LSOE/LPSOE title. CAP is concerned that this may lead to disparities in the merit/promotion of the LPSOEs and LSOEs appointed in different campus units. Some general campus guidelines in expectations for scholarly activities are needed to correct for this inequality.

Request for advice to be communicated to GSOE Dean

During its review of GSOE files this year, CAP has noted some inconsistencies in the Dean's letters that have come forward (e.g. some letters have contained comments on each proposed action, whereas others have not). In the interest of completing reviews in a timely manner, CAP has not returned files for which the Dean's letter was lacking comments on every proposed action but would remind the Dean that the CALL states (p. 38): "All ranks/steps proposed by the department should be evaluated and commented on by the Dean in the Dean's letter." CAP respectfully requests that the Dean provides a vote and assessment with comments on all proposed actions in order to maintain consistency for all future merit and promotion files from the college. CAP considers this to be an essential part of the AP process and will better inform the committee during its assessment.

Concerning patterns with recommendations for lateral promotions without justification

CAP wishes to bring a troublesome pattern to the VPAP's attention and recommends that the VPAP communicate with the campus about providing justification for recommendations for lateral promotions. CAP also requests that Colleges and Schools check whether the proposed recommendations are aligned with the CALL. A promotion is not considered an acceleration, regardless of years at rank or step when a candidate is advancing to the "normal" step in the next rank. In cases where movement to a lateral step is possible, the first step above the lateral step is considered the "normal" step. Regardless, departments may always elect to vote on the lateral step when advancement to the lateral step is deemed most appropriate. A vote on the lateral step would be particularly important if the vote on the "normal" step were less than unanimous.

III. CAP Advice to the Academic Senate

CAP is asked to provide feedback and recommendations about a variety of Senate matters and administrative directives. The Committee reviewed and provided comments on the following items:

Concerns about shared governance and the merit and promotion process

CAP noted some recent deviations from the VPAP about the principles of shared governance set by the Academic Senate. For instance, changes to merit and promotion practices were announced to the campus community without prior consultation and approval from the CAP. In addition, CAP also noted the VPAP's over-interpretation of the CALL and its COVID-19 addendum in terms of the weight given to diversity in merits and promotions. This raises the strong possibility of confusion in the campus community and inconsistency in the preparation of files and their evaluation by departments.

CAP is bound by the current CALL which contains no metrics to assess contributions to

diversity and inclusion. Without such metrics, the merit and promotion process could be subjected to some degree of imbalance as contributions to diversity and inclusion, by their nature, may be interpreted differently among different colleges and departments. These need discussion and agreement within the Academic Senate before they can be applied to the merit and promotion process.

a. CAP Review of Proposed Revisions to the Academic Personnel Manual and other personnel processes

The Committee's formal response to each issue is located on the Academic Senate website and can be found at: <https://senate.ucr.edu/issues/archive/2020>

Campus Review

- 2nd Round - Formalization of Division Status for Undergraduate Education
- Academic Planning. Draft Strategic Plan
- CNAS FTE Rebalancing Plan
- CNAS FTE Rebalancing Request for additional faculty member
- Endowed Chair Proposal. Reza Abbaschian Endowed Term Chair
- Final Report from the Ad Hoc Committee on Evaluation of Teaching
- New Department Pre-Proposal. Department of Black Study
- Proposal. 2nd Round-Transition of VPAR Role at UCR
- Proposal. 3rd Round-Transition of VPAR Role at UCR
- Proposal. Dean's Final Merit Delegation at UCR
- Proposal. Interim COVID-Related Dependent Care Modified Duties
- Proposal. Proposed Change to Search Approval Workflow for Academic Searches
- Proposal. Proposed Modification to the Merit and Review Process - Extenuating Circumstances
- Proposed Policy. UCR Anti-Bullying Policy
- Report of the Academic Council Teaching Evaluation Task Force
- Report Review. Campus Safety Task Force draft report & recommendations
- Report Review. Committee on Faculty Welfare - Campus Climate Survey Report
- Request for Recommendations. President's Job Protection Program
- Ronald H. Chilcote Endowed Chair in Latino and Latin American Studies – CHASS
- Transfer of CMDB Graduate Program and CMDB Undergraduate Program to the Department of MCSB

System-wide Review

- Proposal. 2020-21 Curtailment Program
- Proposed APM Revisions to 700 Series - Leave-Related Policies
- Report Review. Faculty Salary Scales Task Force Report and Recommendations
- Report Review. Innovative Learning Technology Initiative (ILTI) Review

b. CAP Representation at Systemwide Senate and the Executive Council

CAP continued its active participation on the systemwide University Committee on Academic Personnel. The 2020-21 CAP representative was Professor Srikanth Krishnamurthy. CAP Chair, Yinsheng Wang represented the committee on the UCR Academic Senate's Executive Council.

c. Bylaw 55 delegations

CAP continues to rely on each department to send its Bylaw-55 delegations and departmental voting procedures to the Senate. Departmental Bylaw-55 designations are collected each year through the end of October.

Finally, CAP thanks all who have contributed to the personnel process. The process works as well as it does only because of the hard work and dedication of all involved.

Respectfully submitted,

Yinsheng Wang, Chair
Srikanth Krishnamurthy, Vice Chair
Sean Cutler
Stephen Wimpenny
Mark Alber
Aman Ullah
David Funder
Deborah Wong
Jean Helwege
Susan Ossman – *Partial year member*
Georgia Warnke – *Partial year member*

Committee on Courses
Report to the Riverside Division
February 22, 2022

To be received and placed on file:

The Committee on Courses has approved the following courses.

<u>Action:</u>	<u>Course:</u>	<u>Cross-listed</u> <u>Course(s):</u>	<u>Title:</u>	<u>Units:</u>	<u>Course</u> <u>Renumbered:</u>
<i>Undergraduate Courses:</i>					
Change	ANTH 001W		CULTURAL ANTHROPOLOGY	4 Units	
Change	ANTH 100W		HISTORY OF ANTHROPOLOGICAL THEORY	4 Units	
Change	ANTH 103	MCS 103	INTRODUCTION TO VISUAL ANTHROPOLOGY	4 Units	
Change	BIOL 005A		INTRODUCTION TO CELL AND MOLECULAR BIOLOGY	4 Units	
Change	BIOL 005B		INTRODUCTION TO ORGANISMAL BIOLOGY	4 Units	
Change	BIOL 171A		HUMAN PHYSIOLOGY	4 Units	
Change	BUS 100W		MANAGEMENT WRITING AND COMMUNICATION	4 Units	
Change	BUS 104	STAT 104	DECISION ANALYSIS AND MANAGEMENT SCIENCE	4 Units	
Change	CHEM 001		PREPARATION FOR GENERAL CHEMISTRY	2 Units	
Change	CHEM 001A		GENERAL CHEMISTRY	4 Units	
Change	CHEM 001B		GENERAL CHEMISTRY	4 Units	
Change	CHEM 001C		GENERAL CHEMISTRY	4 Units	
Change	CHEM 001W		PREPARATION FOR GENERAL CHEMISTRY	3 Units	
Change	CHEM 005		QUANTITATIVE ANALYSIS	5 Units	
Change	CHEM 008A		ORGANIC CHEMISTRY	3 Units	
Change	CHEM 01HA		HONORS GENERAL CHEMISTRY	4 Units	
Change	CHEM 01HB		HONORS GENERAL CHEMISTRY	4 Units	
Change	CHEM 01HC		HONORS GENERAL CHEMISTRY	4 Units	
Change	CHEM 01LA		GENERAL CHEMISTRY LABORATORY	1 Unit	
Change	CHEM 01LB		GENERAL CHEMISTRY LABORATORY	1 Unit	
Change	CHEM 01LC		GENERAL CHEMISTRY LABORATORY	1 Unit	
Change	CHEM 08HA		HONORS ORGANIC CHEMISTRY	3 Units	
Change	CHEM 08HLA		HONORS ORGANIC CHEMISTRY LAB	1 Unit	
Change	CHEM 08LA		ORGANIC CHEMISTRY LABORATORY	1 Unit	
Change	CHEM 095		EXPLORATIONS IN MOLECULAR SCIENCE	1 Unit	
Change	CHEM 110A		PHYSICAL CHEMISTRY: CHEMICAL THERMODYNAMICS	4 Units	
Change	CHEM 113		PHYSICAL CHEMISTRY: INTRODUCTION TO QUANTUM CHEMISTRY	4 Units	
Change	CHEM 125W		INSTRUMENTAL METHODS	3 to 5 Units	
Change	CHEM 1HLA		HONORS GENERAL CHEMISTRY LABORATORY	1 Unit	
Change	CHEM 1HLB		HONORS GENERAL CHEMISTRY LABORATORY	1 Unit	
Change	CHEM 1HLC		HONORS GENERAL CHEMISTRY LABORATORY	1 Unit	
Change	CRWT 040		FICTION AND FILM	4 Units	
Change	CS 009A		DATA ORIENTED INTRODUCTION TO COMPUTING I	4 Units	
Change	CS 009C		C++ FOR PROGRAMMERS	2 Units	
Change	CS 010A		INTRODUCTION TO COMPUTER SCIENCE FOR SCIENCE, MATHEMATICS, AND ENGINEERING I	4 Units	
Change	CS 011	MATH 011	INTRODUCTION TO DISCRETE STRUCTURES	4 Units	
Change	CS 105		DATA ANALYSIS METHODS	4 Units	
Change	DNCE 007		DANCE: CULTURES AND CONTEXTS	4 Units	
Change	DNCE 007W		DANCE: CULTURES AND CONTEXTS	4 Units	
Change	DNCE 014		INTRODUCTION TO CHOREOGRAPHY	4 Units	
Change	DNCE 019		INTRODUCTION TO DANCE STUDIES	4 Units	
Change	EDUC 132		THE EXCEPTIONAL CHILD	4 Units	
Change	EDUC 147		EDUCATION IN A DIVERSE SOCIETY	4 Units	
Change	EDUC 162		LEARNING THEORY AND PSYCHOLOGY IN EDUCATION	4 Units	
Change	EDUC 171		READING AND LANGUAGE DEVELOPMENT	4 Units	
Change	EDUC 172		READING AND LANGUAGE DEVELOPMENT	4 Units	
Change	EDUC 177		READING AND WRITING IN THE CONTENT AREAS	4 Units	
Change	EDUC 178		READING AND WRITING IN THE CONTENT AREAS	4 Units	
Change	EDUC 179A		LANGUAGE DEVELOPMENT IN CONTENT AREAS	4 Units	
Change	EE 020B		LINEAR METHODS FOR ENGINEERING ANALYSIS AND DESIGN USING MATLAB	4 Units	
Change	EE 114		PROBABILITY, RANDOM VARIABLES, AND RANDOM PROCESSES IN ELECTRICAL ENGINEERING	4 Units	
Change	EE 123		POWER ELECTRONICS	4 Units	
Change	EE 175A		SENIOR DESIGN PROJECT	4 Units	
Change	ENGL 007		WORKSHOP IN WRITING ACROSS THE CURRICULUM	0.5 Units	
Change	ENGL 126A		THE AMERICAN NOVEL: NINETEENTH CENTURY	4 Units	
Change	ENGL 126B		THE AMERICAN NOVEL: SINCE 1900	4 Units	
Change	ENGL 136		LATINA AND LATINO LITERATURE	4 Units	
Change	ENGL 179A		HISTORY OF SCIENCE FICTION	4 Units	
Change	ENGR 180W		TECHNICAL COMMUNICATIONS	4 Units	
Change	ENGR 181W		TECHNICAL COMMUNICATIONS AND DOCUMENTATION	4 Units	
Change	ENTM 060W		SCICOMM: EXPLORING EFFECTIVE COMMUNICATION METHODS IN THE LIFE SCIENCES	4 Units	
Change	ETST 118		AMERICAN INDIAN IDENTITIES	4 Units	
Change	ETST 131		RACE, CLASS, AND GENDER	4 Units	
Change	ETST 143	SEAS 143	CRITICAL FILIPINO(A) STUDIES: HISTORIES AND LEGACIES OF UNITED STATES CONQUEST, COLONIALISM, & EMPIRE	4 Units	ETST 143A
Change	ETST 153		NATIVE AMERICAN LANGUAGE REVITALIZATION	4 Units	
Change	ETST 177		THE UNITED STATES PRISON INDUSTRIAL COMPLEX: RACE, GENDER, AND CITIZENSHIP	4 Units	
Change	ETST 186		POLICING AND THE HEGEMONY OF "LAW AND ORDER": RACE, GENDER, SEXUALITY, CITIZENSHIP, AND THE POLITICS	4 Units	
Change	GEO 115		GEOLOGIC MAPS AND LANDFORMS	5 Units	

**Committee on Courses
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February 22, 2022**

To be received and placed on file:

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Change	HIST 001		THE HISTORIAN AS DETECTIVE	4 Units	
Change	HIST 020W		WORLD HISTORY: THE LONG TWENTIETH CENTURY	4 Units	
Change	HIST 099W		THE HISTORIAN'S WORKSHOP	4 Units	
Change	HIST 108	ENGR 108	TECHNOLOGY IN THE PREMODERN WORLD	4 Units	
Change	HIST 197		RESEARCH FOR UNDERGRADUATES	4 Units	
Change	HIST 198G		PUBLIC HISTORY PRACTICUM	1 to 12 Unit	
Change	HIST 198I		INDIVIDUAL INTERNSHIP IN HISTORY	1 to 12 Unit	
Change	HNPG 002W		PRINCIPLES OF CIVIC ENGAGEMENT	4 Units	
Change	ITAL 020A		ELEMENTARY ITALIAN FOR SPANISH SPEAKERS	4 Units	
Change	ITAL 020B		ELEMENTARY ITALIAN FOR SPANISH SPEAKERS	4 Units	
Change	MATH 004		INTRODUCTION TO COLLEGE MATHEMATICS FOR BUSINESS AND THE SOCIAL SCIENCES	5 Units	
Change	MATH 005A		THE PRINCIPLES OF CALCULUS I	5 Units	MATH 005
Change	MATH 006A		INTRODUCTION TO COLLEGE MATHEMATICS FOR THE SCIENCES	4 Units	
Change	MATH 006B		INTRODUCTION TO COLLEGE MATHEMATICS FOR THE SCIENCES	4 Units	
Change	MATH 007A		CALCULUS FOR LIFE SCIENCES	4 Units	
Change	MATH 007B		CALCULUS FOR LIFE SCIENCES	4 Units	
Change	MATH 009A		FIRST-YEAR CALCULUS	4 Units	
Change	MATH 009B		FIRST YEAR CALCULUS	4 Units	
Change	MATH 009C		FIRST YEAR CALCULUS	4 Units	
Change	MATH 022		CALCULUS FOR BUSINESS	5 Units	
Change	MATH 09HA		FIRST-YEAR HONORS CALCULUS	4 Units	
Change	MATH 09HB		FIRST-YEAR HONORS CALCULUS	4 Units	
Change	MATH 09HC		FIRST-YEAR HONORS CALCULUS	4 Units	
Change	ME 002		INTRODUCTION TO MECHANICAL ENGINEERING	4 Units	
Change	ME 117		COMBUSTION AND ENERGY SYSTEMS	4 Units	
Change	ME 136		ENVIRONMENTAL IMPACTS OF ENERGY PRODUCTION AND CONVERSION	4 Units	
Change	MSE 175A		SENIOR DESIGN	4 Units	
Change	MUS 044		INTRODUCTION TO SONGWRITING	4 Units	MUS 144
Change	PHIL 003W		ETHICS AND THE MEANING OF LIFE	4 Units	
Change	PHYS 002A		GENERAL PHYSICS	4 Units	
Change	PHYS 016		PRINCIPLES OF PHYSICS	4 Units	
Change	PHYS 142L		ADVANCED PHYSICS LABORATORY	4 Units	
Change	PHYS 142W		ADVANCED PHYSICS LABORATORY	5 Units	
Change	POSC 005W		POLITICAL IDEOLOGIES	5 Units	
Change	POSC 007		INTRODUCTION TO POLITICAL THEORY	5 Units	
Change	POSC 007W		INTRODUCTION TO POLITICAL THEORY	5 Units	
Change	POSC 010W		AMERICAN POLITICS	5 Units	
Change	POSC 197		RESEARCH FOR UNDERGRADUATES	1 to 4 Units	
Change	PSYC 011		PSYCHOLOGICAL METHODS: STATISTICAL PROCEDURES	5 Units	
Change	PSYC 012		PSYCHOLOGICAL METHODS: RESEARCH PROCEDURES	6 Units	
Change	PSYC 178		HEALTH PSYCHOLOGY	4 Units	
Change	PSYC 179		HEALTH AND BEHAVIOR CHANGE	4 Units	
Change	SOC 144		INTERPERSONAL RELATIONSHIP VIOLENCE	4 Units	
Change	SOC 168		DEVELOPMENT OF SOCIOLOGICAL THEORY	5 Units	
Change	STAT 004		ELEMENTS OF DATA SCIENCE	4 Units	
Change	STAT 008		STATISTICS FOR BUSINESS	5 Units	
Change	STAT 010		INTRODUCTION TO STATISTICS	5 Units	
Change	STAT 011		INTRODUCTION TO STATISTICAL MODELING	5 Units	
Change	STAT 107		INTRODUCTION TO STATISTICAL COMPUTING WITH R	4 Units	
Change	STAT 155		PROBABILITY AND STATISTICS FOR SCIENCE AND ENGINEERING	4 Units	
Change	TFDP 117		DIRECTING FOR THE SCREEN	4 Units	
Change	TFDP 130A		PRODUCING SHORT EPISODIC CONTENT A	4 Units	
Change	TFDP 130B		PRODUCING SHORT EPISODIC CONTENT B	4 Units	
Change	TFDP 142		THE ART OF FILM	4 Units	
Change	TFDP 151		TRANSITION TO THE FILM INDUSTRY	4 Units	
Change	TFDP 152		ADVANCED PUBLIC SPEAKING	4 Units	TFDP 052
Change	TFDP 163		WRITING THE SHORT FILM	4 Units	
Change	TFDP 170		PERFORMANCE IN PRODUCTION	1 to 4 Units	
Change	TFDP 171		TECHNICAL PRODUCTION	1 to 4 Units	
Change	TFDP 172		DESIGN IN PRODUCTION	1 to 4 Units	
Change	TFDP 173		MANAGEMENT AND DIRECTING IN PRODUCTION	1 to 5 Units	
Change	TFDP 174		WRITING DRAMATURGY IN PRODUCTION	1 to 4 Units	
Change	TFDP 175		FABRICATION IN PRODUCTION	1 to 4 Units	
Discontinue	CHEM 092		INTRODUCTION TO UNDERGRADUATE RESEARCH IN CHEMISTRY	1 Unit	
Discontinue	CHEM 13HA		HONORS DISCUSSION FOR ORGANIC CHEMISTRY	1 Unit	
Discontinue	CHEM 13HB		HONORS DISCUSSION FOR ORGANIC CHEMISTRY	1 Unit	
Discontinue	CHEM 13HC		HONORS DISCUSSION FOR ORGANIC CHEMISTRY	1 Unit	
Discontinue	EDUC 133		ISSUES AND TRENDS IN SPECIAL EDUCATION	4 Units	
Discontinue	ETST 143B	SEAS 143B	CRITICAL FILIPINO(A) STUDIES: INTERROGATING THE FILIPINO AMERICAN PRESENT	4 Units	
Discontinue	HASS 189		MELLON MAYS UNDERGRADUATE FELLOWSHIP SEMINAR	1 to 2 Units	
Discontinue	HNPG 001A		TRANSITION TO UNIVERSITY CALIFORNIA RIVERSIDE AND SUCCESS IN HONORS	2 Units	
Discontinue	HNPG 001B		MOTIVATION OF A UNIVERSITY HONORS STUDENT	2 Units	

Committee on Courses
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Discontinue	HNPG 009		HONORS WORKSHOP	2 Units	
Discontinue	HNPG 012		GLOBAL HEALTH, AGRICULTURE, AND ECONOMIC DEVELOPMENT	4 Units	
Discontinue	HNPG 015		IGNITION SEMINAR IN HONORS	4 Units	
Discontinue	HNPG 025G		TESTAMENT OF TIME	4 Units	
Discontinue	HNPG 031E		ART HISTORY: ARTISTS IN TRADITIONAL CHINA	4 Units	
Discontinue	HNPG 031F		ART HISTORY: THE HOME IN MODERN ARCHITECTURE AND ART	4 Units	
Discontinue	HNPG 031J		ART HISTORY: HISTORY AND IDEOLOGY OF THE MUSEUM	4 Units	
Discontinue	HNPG 031M		MUSIC: MUSIC AND EVERYDAY LIFE	4 Units	
Discontinue	HNPG 031Q		THEATRE: WHO IS HAMLET, AND WHY SHOULD YOU CARE?	4 Units	
Discontinue	HNPG 036F		HISTORY: AFRICANS IN MEDIEVAL EUROPE--RULERS, SAINTS, WARRIORS, AND SERVANTS	4 Units	
Discontinue	HNPG 036I		HISTORY: THE SILK ROAD--COMMERCE IN CULTURE AND RELIGION	4 Units	
Discontinue	HNPG 036J		HISTORY: THE ARTS AND HISTORY--FROM SLAVERY TO THE JAZZ AGE	4 Units	
Discontinue	HNPG 036K		HISTORY: HISTORY AND THE GRAND CANYON	4 Units	
Discontinue	HNPG 036M		HONORS SEMINAR IN HISTORY	4 Units	
Discontinue	HNPG 036N		HISTORY: GENDER AND SEXUALITY IN ANCIENT ROME	4 Units	
Discontinue	HNPG 036P		HISTORY: THE BOSNIAN GENOCIDE IN HISTORICAL PERSPECTIVE	4 Units	
Discontinue	HNPG 036R		HISTORY: NAZI GERMANY	4 Units	
Discontinue	HNPG 036S		HISTORY: WATER WORLDS AND WATER WARS--A HISTORY OF WATER	4 Units	
Discontinue	HNPG 036T		HISTORY: HUMAN RIGHTS IN LATIN AMERICA	4 Units	
Discontinue	HNPG 036V		HUNGER AND FAMINE IN THE MODERN WORLD	4 Units	
Discontinue	HNPG 038J		PHILOSOPHY: THE PRIMAL CRIME OF SOUTHERN CALIFORNIA	4 Units	
Discontinue	HNPG 038K		PHILOSOPHY: POETRY	4 Units	
Discontinue	HNPG 038M		PHILOSOPHY: THE INFINITE	4 Units	
Discontinue	HNPG 042K		PSYCHOLOGY: THE DOCTOR-PATIENT RELATIONSHIP IN THE CHANGING HEALTH CARE ENVIRONMENT	4 Units	
Discontinue	HNPG 042M		PSYCHOLOGY: NONVERBAL COMMUNICATION AND PERSONAL CHARISMA	4 Units	
Discontinue	HNPG 042N		PSYCHOLOGY: APPLIED PRINCIPLES OF HEALTH AND WELLNESS	4 Units	
Discontinue	HNPG 096A		FOUNDATIONS OF LEADERSHIP: LEADERSHIP SUCCESS STRATEGIES	4 Units	
Discontinue	HNPG 096B		ETHICAL LEADERSHIP IN PRACTICE: PHILOSOPHY OF LEADERSHIP	4 Units	
Discontinue	HNPG 096C		MENTORS IN ACTION: STUDENT LEADERSHIP AND COMMUNITIES	4 Units	
Discontinue	HNPG 097		HONORS LOWER-DIVISION RESEARCH	2 to 4 Units	
Discontinue	HNPG 151		INDIVIDUAL PROJECTS IN RESEARCH OR CREATIVE ACTIVITY	2 Units	
Discontinue	HNPG 195H		SENIOR HONORS THESIS	1 to 4 Units	
Discontinue	MATH 008A		INTRODUCTION TO COLLEGE MATHEMATICS FOR THE SCIENCES	5 Units	
Discontinue	MATH 008B		INTRODUCTION TO COLLEGE MATHEMATICS FOR THE SCIENCES	5 Units	
New	AHS 025		ART OF MESOAMERICA	4 Units	
New	ANTH 103S	MCS 103S	INTRO TO VISUAL ANTHROPOLOGY	5 Units	
New	CHEM 002A		GENERAL CHEMISTRY FOR CHEMISTRY MAJORS	4 Units	
New	CHEM 002B		GENERAL CHEMISTRY FOR CHEMISTRY MAJORS	4 Units	
New	CHEM 002C		GENERAL CHEMISTRY FOR CHEMISTRY MAJORS	4 Units	
New	CHEM 02LA		GENERAL CHEMISTRY LABORATORY FOR CHEMISTRY MAJORS	1 Unit	
New	CHEM 02LB		GENERAL CHEMISTRY LABORATORY FOR CHEMISTRY MAJORS	1 Unit	
New	CHEM 02LC		GENERAL CHEMISTRY LABORATORY FOR CHEMISTRY MAJORS	1 Unit	
New	CRWT 040S		FICTION AND FILM	5 Units	
New	CS 131		EDGE COMPUTING	4 Units	
New	ECON 138		ECONOMICS OF FINANCIAL INVESTMENTS	4 Units	
New	ENGL 126SA		THE AMERICAN NOVEL: NINETEENTH CENTURY	5 Units	
New	ENGL 126SB		THE AMERICAN NOVEL: SINCE 1900	5 Units	
New	ENGL 136S		LATINA AND LATINO LITERATURE	5 Units	
New	ENGL 141P		LITERATURE AND RELATED FIELDS	4 Units	
New	ENGL 179SA		HISTORY OF SCIENCE FICTION	5 Units	
New	ENTM 101		EVOLUTION OF INSECT GENOMES	4 Units	
New	GEO 184		PLANETARY ATMOSPHERES	4 Units	
New	LBST 001		INTRODUCTION TO LIBERAL STUDIES	5 Units	
New	MATH 005B		THE PRINCIPLES OF CALCULUS II	5 Units	
New	MATH 005C		THE PRINCIPLES OF CALCULUS III	5 Units	
New	MCS 182		TOPICS IN TELEVISION GENRES	4 Units	
New	MCS 183		SPECIAL TOPICS IN TELEVISION CULTURE	4 Units	
New	RLST 129	PHIL 129, AST 130	HISTORY OF PHILOSOPHY IN INDIA	4 Units	
New	RLST 140		LANGUAGE AND TEXT IN CLASSICAL SOUTH ASIAN RELIGIONS	4 Units	
New	STAT 108	CS 108	DATA SCIENCE ETHICS	4 Units	
New	TFDP 153A		INTRODUCTION TO CINEMATOGRAPHY	4 Units	
New	TFDP 153B		ADVANCED CINEMATOGRAPHY	4 Units	
Priority Enrollment	PSYC 011		PSYCHOLOGICAL METHODS: STATISTICAL PROCEDURES	5 Units	
Priority Enrollment	PSYC 012		PSYCHOLOGICAL METHODS: RESEARCH PROCEDURES	6 Units	
Split	HASS 189A		BECOMING AN SCHOLAR	4 Units	
Split	HASS 189B		CONDUCTING ACADEMIC RESEARCH	4 Units	
Split	HASS 189C		WRITING AS AN ACADEMIC	4 Units	
Graduate Courses:					
Change	CEE 233		ADVANCED AIR POLLUTION CONTROL AND ENGINEERING	4 Units	
Change	ECON 200B		MICROECONOMIC THEORY	4 Units	
Change	ECON 200C		MICROECONOMIC THEORY	4 Units	
Change	ECON 201A		MACROECONOMIC THEORY	4 Units	

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To be received and placed on file:

The Committee on Courses has approved the following courses.

<u>Action:</u>	<u>Course:</u>	<u>Cross-listed Course(s):</u>	<u>Title:</u>	<u>Units:</u>	<u>Course Renumbered:</u>
Change	ECON 201C		MACROECONOMIC THEORY	4 Units	
Change	ECON 205A		ECONOMETRIC METHODS I	4 Units	
Change	ECON 205B		ECONOMETRIC METHODS II	4 Units	
Change	ECON 205C		ECONOMETRIC METHODS III	4 Units	
Change	EDUC 236A		BEHAVIOR ANALYTIC SKILLS DEVELOPMENT: LEVEL 1	4 Units	
Change	EDUC 248E		RACE, MERITOCRACY, AND DILEMMAS OF DIVERSITY IN HIGHER EDUCATION	4 Units	
Change	EDUC 248R		COLLEGE STUDENT DEVELOPMENT	4 Units	
Change	EDUC 248W		WHITENESS, POWER, AND PRIVILEGE	4 Units	
Change	EDUC 265D		INTERMEDIATE PRACTICUM IN SCHOOL PSYCHOLOGY: LEVEL 1	2 Units	
Change	EDUC 265E		INTERMEDIATE PRACTICUM IN SCHOOL PSYCHOLOGY: LEVEL 2	2 Units	
Change	EDUC 265F		INTERMEDIATE PRACTICUM IN SCHOOL PSYCHOLOGY: LEVEL 3	2 Units	
Change	EDUC 268A		ADVANCED PRACTICUM IN SCHOOL PSYCHOLOGY: LEVEL 1	2 Units	
Change	EDUC 268B		ADVANCED PRACTICUM IN SCHOOL PSYCHOLOGY: LEVEL 2	2 Units	
Change	EDUC 268C		ADVANCED PRACTICUM IN SCHOOL PSYCHOLOGY: LEVEL 3	2 Units	
Change	EDUC 277		CRITICAL THEORIES OF TEACHING AND TEACHER EDUCATION	4 Units	
Change	EE 212	MSE 212	QUANTUM ELECTRON TRANSPORT	4 Units	
Change	EE 246		INTELLIGENT TRANSPORTATION SYSTEMS	4 Units	
Change	ME 248		INTERNAL COMBUSTION ENGINES	4 Units	
Change	POSC 207		ADVANCED QUANTITATIVE ANALYSIS	4 Units	
Change	PSYC 243		TOPICS IN MULTIVARIATE STATISTICS	3 Units	
Change	STAT 232		STATISTICS FOR BUSINESS ANALYTICS	4 Units	
Discontinue	CHEM 202		ADVANCED INSTRUMENT DESIGN	2 Units	
Discontinue	CHEM 264		NOVEL SYNTHESIS IN INORGANIC CHEMISTRY	2 Units	
Discontinue	CHEM 281		INTERFACE BETWEEN HETEROATOM AND TRANSITION METAL CHEMISTRY	2 Units	
Discontinue	ENSC 206	POSC 206	ENVIRONMENTAL POLICY AND LAW	4 Units	
New	EDUC 262		DIVERSITY, EQUITY, AND INCLUSION IN SCHOOL PSYCHOLOGY	4 Units	
New	EDUC 267		INTRODUCTION TO IMPLEMENTATION SCIENCE AND PRACTICE: REDUCING THE RESEARCH TO PRACTICE GAP IN SCHOOL	4 Units	
New	EE 277	CS 277	DATA CENTRIC COMPUTER ARCHITECTURE	4 Units	
New	GEO 284		PLANETARY ATMOSPHERES	4 Units	
New	NRSC 202		ADVANCED METHODS IN NEUROSCIENCE	3 Units	
New	POSC 210		QUALITATIVE INTERPRETIVE RESEARCH METHODS	4 Units	
New	POSC 277		AFRICAN POLITICS SEMINAR	4 Units	
New	SPN 271		JORGE LUIS BORGES: THE ANTI-NOMIES OF COSMOPOLITANISM AND NATIONAL POPULISM	4 Units	
New	SPN 274		AESTHETICS AS CRITIQUE: FROM THE CRITIQUE OF AESTHETICS TO A DECOLONIAL PERSPECTIVE	4 Units	
New	SPN 276		LATIN AMERICAN CORPorealITIES	4 Units	
Restore	ANTH 200C		CORE THEORY IN ANTHROPOLOGY	4 Units	
Extension Courses:					
Instructor	EDUC X85.A		An Introduction to Early Childhood Studies: Child Growth and Development, Chistopher Lawrence, M.Ed.		
Instructor	ECON XR002		Introduction to Macroeconomics, Haruko Murata, M.A.		
Instructor	ECON XR002		Introduction to Macroeconomics, Mian Raza, Ph.D.		
Instructor	ECON XR003		Introduction to Microeconomics, Haruko Murata, M.A.		
Instructor	ECON XR003		Management Writing and Communication, Mian Raza, Ph.D.		
Instructor	EE XR003		Electronics, Smart Phones, and Mobile Internet, Mohammed Mahdi Honari Kalateh, Ph.D.		
Instructor	EE XR003		Electronics, Smart Phones, and Mobile Internet, Haixin Zhu, Ph.D.		
Instructor	HIST XR020		World History: Twentieth Century, Russell Fehr, Ph.D.		
Instructor	BUS XR100W		Management Writing and Communication, Bryan Ignozzi, M.S.		
Course	BUS XR105		Production and Operations Management		
Instructor	BUS XR105		Production and Operations Management, Bryan Ignozzi, M.S.		
Course	BUS XR132		Foundations of Finance		
Instructor	BUS XR132		Foundations of Finance, Henry Phan, M.B.A.		
Instructor	HIST XR17A		History 17: The United States to 1877, Russell Fehr, Ph.D.		
Instructor	HIST XR17B		The United States from 1865, Russell Fehr, Ph.D.		

**COMMITTEE ON COURSES
REPORT TO THE RIVERSIDE DIVISION
FEBRUARY 22, 2022**

To be received and placed on file:

The Committee on Courses has approved requests to allow the following instructors to teach upper division courses as indicated:

<u>INSTRUCTOR</u>	<u>DEPARTMENT/SCHOOL</u>	<u>LIMITS OF AUTHORIZATION</u>	
Lee, E.	Comparative Literature and Languages	KOR 112	W22
Davianian, A.	Computer Science	CS 183	F21
Allport, A.	English	ENGL 102W	W22
Carranza, N.	English	ENGL 140W	W22
Grant, P.	English	ENGL 172B	W22
Jackson, C.	English	ENGL 120A	W22
Cucurella, P.	Hispanic Studies	SPN 188	W22
Carnell, J.	Philosophy	PHIL 132	W22
Freebourn, J.	Political Science	POSC 182	W22
Hodaly, H.	Political Science	POSC 111	W22
Wang, D.	Political Science	POSC 143S	W22
Conner, K.	Psychology	PSYC 178	W22
Curtis, A.	Psychology	PSYC 140	W22
Wilkinson, D.	Psychology	PSYC 150	W22
Madracchia, N.	School of Education	EDUC 240	W22
Kurtz-Garcia, R.	Statistics	STAT 107	W22

**COMMITTEE ON COURSES
REPORT TO THE RIVERSIDE DIVISION
FEBRUARY 22, 2022**

To be received and placed on file:

The Committee on Courses has approved the following course proposals for deletion, which have been listed in the General Catalog, but for at least four years, have not been offered, been offered with zero enrollment, or have been offered but canceled for deletion with the concurrence of the departments involved.

This following lists courses that were deleted and identified in the 2021-2022 Academic Year as part of the courses not offered for four or more year's process.

CHEM 092	CHEM 202
CHEM 13HA	CHEM 264
	CHEM 281

Courses scheduled to be approved for deletion:

EDUC 230A	EDUC 335B	URST 172
EDUC 230B	EDUC 335C	URST 178
EDUC 242A*	EDUC 346A*	URST 182
EDUC 242C*	EDUC 346B*	URST 184
EDUC 247	EDUC 347A*	
EDUC 249	EDUC 347B*	
EDUC 258R*	EDUC 347C*	
EDUC 274		
EDUC 289		
EDUC 295A		

**Courses being considered for deletion*

This following lists courses that were deleted and identified in the 2019-2020 Academic Year as part of the courses not offered for four or more year's process.

ETST 143B

Courses previously approved for deletion:

BPSC 158	ENSC 001H	ETST 125	RLST 107	RLST 212
BPSC 170	ENSC 002H	ETST 142	RLST 112	RLST 227
BPSC 185	ENSC 003H	ETST 176	RLST 128(E-Z)	RLST 228
BPSC 210	ENSC 141	ETST 178	RLST 128E	RLST 229
	ENSC 207	ETST 193	RLST 128F	RLST 234
			RLST 132	RLST 235
			RLST 136	RLST 238
			RLST 138	RLST 271
			RLST 139	RLST 222
			RLST 145	RLST 236
			RLST 157	RLST 239
			RLST 158	RLST 246
			RLST 175	RLST 250
			RLST 178	
			RLST 210	

**COMMITTEE ON UNIVERSITY EXTENSION
REPORT TO THE RIVERSIDE DIVISION
FEBRUARY 22, 2022**

DEPT	COURSE	TITLE	INSTRUCTOR FIRST NAME	INSTRUCTOR LAST NAME	INSTRUCTOR DEGREE	TYPE OF APPROVAL	APPROVED
	New	Postgraduate Certificate in Computer Science				X	01/25/22
	Revision	Postgraduate Diploma in Public Policy and International Relations				X	01/13/22
	Revision	Postgraduate Diploma in Entrepreneurship				X	01/13/22
BMSC	X440.1	Working with the Homeless Population	Jesse	Juarez	M.S.	I*	01/20/22
BMSC	X440.2	Identifying and Preventing Commercial Sexual Exploitation of Children and Adults	Catherine	Leach	Ed.D.	I*	01/20/22
BMSC	X440.3	Faces of Homelessness	Jesse	Juarez	M.S.	I*	01/20/22
BMSC	X440.4	Mental Health Issues in the Homeless Population	Jesse	Juarez	M.S.	I*	01/20/22
BMSC	X440.4	Mental Health Issues in the Homeless Population	Catherine	Leach	Ed.D.	I*	01/20/22
BMSC	X440.4	Mental Health Issues in the Homeless Population	Jacob	Marciel	MSW	I*	01/20/22
BMSC	X440.5	Effective Case Management: Connecting to the Homeless Community	Jesse	Juarez	M.S.	I*	01/20/22
BMSC	X440.5	Effective Case Management: Connecting to the Homeless Community	Catherine	Leach	Ed.D.	I*	01/20/22
BMSC	X440.5	Effective Case Management: Connecting to the Homeless Community	Jacob	Marciel	MSW	I*	01/20/22
BMSC	X440.6	Introduction to Substance Use and Abuse	Jesse	Juarez	M.S.	I*	01/20/22
BMSC	X440.6	Introduction to Substance Use and Abuse	Jacob	Marciel	MSW	I*	01/20/22
BUS	XR100W	Management Writing and Communication	Bryan	Ignozzi	M.S.	I	01/14/22
BUS	XR105	Production and Operations Management				C	01/14/22
BUS	XR105	Production and Operations Management	Bryan	Ignozzi	M.S.	I	01/14/22
BUS	XR132	Foundations of Finance				C	01/14/22
BUS	XR132	Foundations of Finance	Henry	Phan	M.B.A.	I	01/14/22
ECON	X475	Content and Methods for Teaching Advanced Placement Macroeconomics	David	Mayer	M.A.	I*	01/20/22
ECON	XR002	Introduction to Macroeconomics	Haruko	Murata	M.A.	I*	12/03/21
ECON	XR002	Introduction to Macroeconomics	Mian	Raza	Ph.D.	I*	12/03/21
ECON	XR003	Introduction to Microeconomics	Haruko	Murata	M.A.	I	12/03/21
ECON	XR003	Introduction to Microeconomics	Mian	Raza	Ph.D.	I	12/03/21
EDUC	X310.2	Cognitively Guided Instruction (CGI) Level 2 for TK-5 Teachers				C	01/20/22
EDUC	X310.2	Cognitively Guided Instruction (CGI) Level 2 for TK-5 Teachers	Karon	Akins	M.A.	I	01/20/22
EDUC	X310.2	Cognitively Guided Instruction (CGI) Level 2 for TK-5 Teachers	Dennis	Regus	M.S.	I	01/20/22
EDUC	X330.35	Management of Clinical Practice	Robin	Longinow	M.A.	I	01/20/22
EDUC	X481	Educational Leadership: Leading by Example	Kim A.	Lu Lawe	Ph.D.	I*	01/20/22
EDUC	X482	Creating a Shared Vision of Learning	Kim A.	Lu Lawe	Ph.D.	I*	01/20/22
EDUC	X483	Sharing Leadership in a School Community	Kim A.	Lu Lawe	Ph.D.	I*	01/20/22
EDUC	X484	Instructional Leadership for School Administrators	Kim A.	Lu Lawe	Ph.D.	I*	01/20/22
EDUC	X485	Educational Leadership: Systems and Systems Thinking	Kim A.	Lu Lawe	Ph.D.	I*	01/20/22
EDUC	X486	Regulatory Leadership for School Administrators	Kim A.	Lu Lawe	Ph.D.	I*	01/20/22
EDUC	X487	Educational Leadership Realities and Strategies	Kim A.	Lu Lawe	Ph.D.	I*	01/20/22
EDUC	X491	Clear Administrative Services Credential Program (CASC) - Year 1	Kim A.	Lu Lawe	Ph.D.	I*	01/20/22
EDUC	X492	Clear Administrative Services Credential Program (CASC) - Year 2	Kim A.	Lu Lawe	Ph.D.	I*	01/20/22
EDUC	X85.A	An Introduction to Early Childhood Studies: Child Growth and Development	Christopher	Lawrence	M.Ed.	I*	01/28/22
EE	XR003	Electronics, Smart Phones, and Mobile Internet	Mohammed Mahdi	Honari Kalateh	Ph.D.	I*	12/03/21
EE	XR003	Electronics, Smart Phones, and Mobile Internet	Haixin (Michael)	Zhu	Ph.D.	I*	12/03/21
ENGL	X410.5	Content and Methods for Teaching Advanced Placement English Literature and Composition for Beginning Instructors	Michelle	Iskra	M.A.	I*	01/20/22

**COMMITTEE ON UNIVERSITY EXTENSION
REPORT TO THE RIVERSIDE DIVISION
FEBRUARY 22, 2022**

DEPT	COURSE	TITLE	INSTRUCTOR FIRST NAME	INSTRUCTOR LAST NAME	INSTRUCTOR DEGREE	TYPE OF APPROVAL	APPROVED
ENSC	X451	Content and Methods for Teaching Advanced Placement Environmental Science	Courtney	Mayer	M.Ed	I*	01/20/22
HIST	X475.7	Content and Methods for Teaching Advanced Placement World History	Branden	Stuart Schield	M.A.	I*	01/20/22
HIST	XR020	World History: Twentieth Century	Russell	Fehr	Ph.D.	I*	01/14/22
HIST	XR17A	History 17: The United States to 1877	Russell	Fehr	Ph.D.	I*	01/14/22
HIST	XR17B	The United States from 1865	Russell	Fehr	Ph.D.	I*	01/14/22
MGT	X400.87	Empowering Leaders				C	01/26/22
MGT	X400.87	Empowering Leaders	Jonetta	Thomas-Chambers	M.A.	I	01/20/22
MGT	X410.85	Legal Aspects of Purchasing	Sharon	Roan	Ph.D.	I	01/20/22
MGT	X435.4	Tax Planning	Claudia P.	Garibello-Jordan	B.S.	I*	01/26/22
MGT	X452.41	Employee Benefit Administration	Nidhi	Shah	Ph.D.	I	01/20/22
MGT	X465.4	Motivating, Managing, and Developing Others	Marlon	Ware	Ph.D.	I	01/20/22
MGT	X470.46	Organizational Leadership	Gilma	Anderson	M.S.	I	01/20/22

* Denotes first time approval for Instructor

**Proposed Changes to Graduate Division Regulations of the Riverside Division
Extension of COVID-19 Related Modification through Winter 2022
(GR1.5.7, GR5.4)**

See Statement of Purpose of Effect

PRESENT:

GR1.5.7
Courses may be dropped at any time prior to the end of the fifth week of instruction. If the adviser or instructor withholds approval of a petition to drop a course, the student may appeal to the Graduate Dean. ~~In Spring and Summer 2020 and Fall 2021~~, a graduate student may drop a course before the end of the grade submission deadline and no indication will be entered on the permanent transcript.

GR5.4
Transfer from UCR Extension - Students may transfer up to 8-units of UCR Extension concurrent enrollment credit. Up to 12 units are permitted to be transferred if taken prior to Fall 2021.

PROPOSED:

GR1.5.7
Courses may be dropped at any time prior to the end of the fifth week of instruction. If the adviser or instructor withholds approval of a petition to drop a course, the student may appeal to the Graduate Dean. In Spring 2020, Summer 2020, Fall 2021, and Winter 2022 a graduate student may drop a course before the end of the grade submission deadline and no indication will be entered on the permanent transcript.

GR5.4
No change.

Statement of Purpose and Effect:

This proposal addresses modifications made to the subject regulations in response to campus operations due to COVID-19. During the December 13, 2021 meeting Executive Council discussed this extension with input from the Chair of the Committee on Courses and UCR Registrar.

GR1.5.7 – Extends the COVID-19-related temporary modification through Winter 2022.

GR5.4 – No change.

Section below is for Senate use only

Approved by Executive Council: 12/13/21

The Committee on Rules and Jurisdiction finds the wording to be consistent with the code of the Academic Senate: 12/16/21

Approved by Executive Council in Lieu of the Division: 12/16/21

**Proposed Changes to Regulations of the Riverside Division
Extension of COVID-19 Related Modifications through Fall 2021
(Grading System Regulations R1.1.4, R1.1.5, R1.1.6, R1.2.2, R1.8.1)
*See Statement of Purpose of Effect***

PRESENT:

R1.1.4

A student may drop a course without prior approval no later than the end of the second full week of instruction. ~~For Summer 2021 and Fall 2021~~ a student may also drop a course through the eighth full week of instruction with the approval of the advisor. Any course drop which would reduce the undergraduate student's academic load to less than 12 units must be approved by the Dean.

R1.1.5

If a student drops a course before the end of the eighth full week of instruction in ~~Fall 2021~~, no indication will be entered in the permanent transcript. Deans may permit students to withdraw after the eighth week on a case-by-case basis, in which case a transcript symbol of W, signifying withdrawal, entered in the grade column.

R1.1.6

The final date to petition for conversion from letter grade to S/NC or vice versa will be the end of the eighth week of instruction.

R1.2.2

Students enrolled in any undergraduate degree program may receive credit for courses undertaken and graded S on the Riverside campus to a limit of one-third of the total units undertaken and passed on the Riverside campus at the time the degree is awarded. Courses undertaken and graded S during the ~~Spring 2020, Summer 2020, Fall 2020, Winter 2021, Spring 2021, Summer~~

PROPOSED:

R1.1.4

A student may drop a course without prior approval no later than the end of the second full week of instruction. For Summer 2021, Fall 2021, and Winter 2022 a student may also drop a course through the eighth full week of instruction with the approval of the advisor. Any course drop which would reduce the undergraduate student's academic load to less than 12 units must be approved by the Dean.

R1.1.5

If a student drops a course before the end of the eighth full week of instruction in Fall 2021 and Winter 2022, no indication will be entered in the permanent transcript. Deans may permit students to withdraw after the eighth week on a case-by-case basis, in which case a transcript symbol of W, signifying withdrawal, entered in the grade column.

R1.1.6

No change.

R1.2.2

Students enrolled in any undergraduate degree program may receive credit for courses undertaken and graded S on the Riverside campus to a limit of one-third of the total units undertaken and passed on the Riverside campus at the time the degree is awarded. Courses undertaken and graded S during the Spring 2020, Summer 2020, Fall 2020, Winter 2021, Spring 2021, Summer

~~2021, and Fall 2021 quarters~~, will not count towards this limit. Units completed on another campus of the University by a Riverside undergraduate student enrolled as an intercampus visitor are considered Riverside work for the purposes of this regulation.

2021, Fall 2021, and Winter 2022 quarters, will not count towards this limit. Units completed on another campus of the University by a Riverside undergraduate student enrolled as an intercampus visitor are considered Riverside work for the purposes of this regulation.

R1.8.1

The instructor in charge of an undergraduate course shall be responsible for assigning the final grade in the course. The final grade shall reflect the student's achievement in the course and shall be based upon adequate evaluation of that achievement. The instructor's methods of evaluation must be clearly announced during the progress of the course. Evaluation methods must be of reasonable duration and difficulty and must be in accord with applicable departmental policies. The methods may include a final written examination, a term paper, a final oral examination, a take-home examination, or other evaluation device. If a final written examination is given, it shall not exceed three hours duration.

R1.8.1

No change.

Statement of Purpose and Effect:

This proposal addresses modifications made to the subject regulations in response to campus operations due to COVID-19. During the December 13, 2021 meeting Executive Council discussed this extension with input from the Chair of the Committee on Courses and UCR Registrar.

R1.1.4. – Extends the COVID-19-related temporary modification through Winter 2022.

R1.1.5. – Extends the COVID-19-related temporary modification through Winter 2022.

R1.1.6 – No change.

R1.2.2 – Extends the COVID-19-related temporary modification through Winter 2022.

R1.8.1 – No change.

Section below is for Senate use only

Approved by Executive Council: 12/13/21

The Committee on Rules and Jurisdiction finds the wording to be consistent with the code of the Academic Senate: 12/16/21

Approved by Executive Council in Lieu of the Division: 12/16/21

UC Assembly Meeting
December 8th 2021
Prepared by David Biggs

Chair Robert Horowitz called the meeting to order at 10:00 am with Vice Chair Susan Cochran attending, roll was called, and quorum was met.

Minutes were approved.

There was no voting at this meeting, just discussion of assembly-wide events and issues.

1. A settlement between UC and AFT Unit 18 lecturers is on the verge of conclusion, waiting for lecturers to approve.
 - a. the proposal seeks to raise salaries 20% over 5 years.
 - b. the question of Senate membership for lecturers is ongoing.
2. UAW negotiations are ongoing with respect to graduate researchers.
 - a. The main issue concerns who will be considered in the collective bargaining unit.
 - b. Another continuing issue to be worked out concerns GSRs paid via independent versus UC funding.
3. BUDGET
 - a. The State anticipates a \$31 billion surplus, so UC's budget ask has increased by 6.3% or \$260 million for FY 2022.
 - b. UC will increase enrollment and close equity gaps with peer institutions by raising salaries 10% for a sum of \$422 million.
 - c. In addition, there is a 1-time ask of \$600 for seismic retrofitting and carbon-neutral adaptations.
 - d. Faculty salaries will be raised 4% and an additional 1.5% raise will be used to close equity gaps.
 - e. UCOP plans to reduce employer contributions from 15-14% towards pension obligations, this is different from STIP holdings. There was some opposition to this from the Regents, worried about market fluctuations. They suggested a 2-year "sunset clause" to restore the 15% mark.
4. CLIMATE RESILIENCE
 - a. UCSD has established a standing climate action committee seeking to reduce its carbon footprint and increase investments in education policy and undergraduate initiatives. Other campuses, for the most part, are relying on Sustainability Officers to chart out future carbon reduction plans.
 - b. A Memorial (Memo) to the Regents to fully divest from fossil fuels has been submitted by climate activist faculty and will be voted on at the next Division Assembly Meeting.
 - c. Discussion turned to potential costs to fully electrify campuses and replace fossil fuel-burning power plants with alternative sources of power.

Estimates for replacing fossil-fuel-powered plants at all UC campuses might top several billion dollars.

5. REPORT: ARO (Achievements Relative to Opportunity)
 - a. The ARO report concerns guidelines for campus CAPs to make clearer how to recognize constraints to research efforts due to COVID setbacks. Sample COVID statements will be included, and the President will speak with Chancellors concerning this guidance.
6. REGENTS COMMITTEE FOR INNOVATION TRANSFER AND ENTREPRENEURSHIP
 - a. Regents feel UC is not presently gaining sufficient benefit from technology transfer. The Committee's goal is to facilitate more tech transfer, possibly by providing more seed funding, developing a patent database, and asking Senate to "change the culture of P&T, giving more weight to faculty who do development and obtain patents." It is exploring changes to the APM and this will require full Senate review.
 - b. It was noted that many faculty are against this idea. Those against feel it's an intrusion of the Regents into faculty governance.
7. THEFT OF FACULTY IP
 - a. Office of General Counsel is concerned about private companies facilitating student cheating by stealing syllabi, paper prompts, lectures and other materials from faculty. It's exploring automated take-down requests and other tools to respond to this issue.
8. TEACHING MODALITIES
 - a. Concerns were raised about who should decide on teaching modalities with respect to students and TAs requesting non-medical accommodations due to COVID-related disruptions, issues such as campus-local housing and policies for allowing remote work.
9. TRANSFERS
 - a. AB 928 was changed to create a single Gen Ed pathway, and Legislators and/or Regents expressed an interest in UC Online playing a role to offer transfer-needed courses.

10. PROVOST MICHAEL T. BROWN

Provost Brown met with the Assembly and reported that the President approved the budget with a 4% increase in salaries to make faculty scales more competitive. UC is finalizing NAGPRA and CalNAGPRA policies with a total accounting from every campus with goals to resolve issues of repatriation and consultation to "decant the institution." There is an effort to revise APM 025 concerning "foreign influences in research activities." The President remains committed to supporting UCEAP, UC Sacramento and UCDC. Ground was broken at 1115 11th Street in Sacramento for a UC Sacramento Building. UCOP has contracted funding for the California Digital Libraries but in the long-term looks to bring this funding back systemwide.

11. PRESIDENT MICHAEL DRAKE

President Drake spoke again of the 4% salary increase which will apply to some 225,000 employees. There is concern about inflation in the state and efforts are underway to explore a COLA as well. COVID messaging as of December is following hospitalization rates nationally and statewide. UCOP expects COVID hospitalizations to peak in mid-January. The President attended the Regents Meeting and discussed the salary increase for faculty and staff and the lowered contribution to UCRP from 15-14%. There was more discussion on Unit 18 and UAW representation for GSRs.

The President alluded to “things coming down the road” including: good conversations in Sacramento improving the UC’s relationship with legislators, communicating benefits of state support; contract negotiations with other bargaining units coming up; and online, hybrid and in-person teaching models are still being discussed.

12. NEW BUSINESS

No new business was brought to the Division Senate.

The meeting closed at 1230pm.

The recipient of the **Doctoral Dissertation Advisor/Mentor Award** is:

Nael B. Abu-Ghazaleh, PhD
Computer Science and Engineering
Electrical and Computer Engineering

Nael B. Abu-Ghazaleh is a Professor in the Department of Computer Science and Engineering, the Department of Electrical and Computer Engineering and is the Chair of the Computer Engineering Program. He has mentored over 20 trainees many of whom have gone on to be successful in industry and academia including seven who are now Assistant Professors. Dr. Abu-Ghazaleh's research focuses on architectural support for computer security, redesigning computer hardware to protect attacks and software patches for improved security. His PhD students have contributed to security fixes for Apple, Windows and Linux systems as well authoring publications. Nael is an ACM Distinguished Scientist (2020), an IEEE Distinguished Visitor (2021-2023) and inducted into the Micro Hall of Fame. Letters from the students of this highly accomplished research also describe his life changing mentorship that continues to be important in their career and which they try to emulate. Several letters describe a wonderful balance between having a high research caliber and strong work ethic while encouraging independent thinking and a humble empathetic nature. The 2021 Doctoral Dissertation Award is made to Professor Nael B. Abu-Ghazaleh for this distinguished track record in mentoring.

GRADUATE COUNCIL

REPORT TO THE RIVERSIDE DIVISION

Updated – January 3, 2022

To be adopted:

Proposed changes to GR4 **Requirements for the Degree of Doctor of Philosophy**, GR4.5 **Qualifying Examination, Qualifying Committee and Advancement to Candidacy** and GR4.6 **Dissertation Requirements** bylaws.

<u>PRESENT:</u>	<u>PROPOSED:</u>
GR4 REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY	GR4 REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY
GR4.1 Notice of Intended Candidacy. Notice of intention to proceed to candidacy for the Ph.D. Degree is to be given as early as possible in a graduate student's career, preferably by the end of the first term of graduate study, to the Graduate Division through the department or graduate group of his/her major field of study.	REMOVE

<p>GR4.2 Residence Requirement. The minimum residence requirement for the Ph.D. Degree is two years, one of which must be spent in continuous residence at the University of California, Riverside. Graduates of the University or other approved candidates may complete a part of their residence requirement elsewhere, subject to the approval of the Graduate Council. However, no graduate student may be recommended for the Ph.D. Degree except upon completing at least one year of residence at the University of California, Riverside, devoted to such a course of study as the Graduate Council regards as a proper year's work.</p>	<p>GR4.1 Residence Requirement. The minimum residence requirement for the Ph.D. degree is two years, one of which must be spent in continuous residence at the University of California, Riverside. Graduates of the University or other approved candidates may complete a part of their residence requirement elsewhere, subject to the approval of the Graduate Council. However, no graduate student may be recommended for the Ph.D. degree except upon completing at least one year of residence at the University of California, Riverside, devoted to such a course of study as the Graduate Council regards as a proper year's work.</p>
<p>GR4.3 Foreign Language Requirement. Each department or graduate group shall determine whether or not a reading knowledge of one or more foreign languages shall form an integral part of the student's preparation for the doctor's degree. Satisfaction of a foreign language requirement shall be demonstrated, subject to approval of the department or graduate group, under one of the following options: (a) written or oral examination administered by the department or graduate group; (b) Educational Testing Service Graduate School Foreign Language Test; (c) satisfactory completion of a course at a specified level. Evidence of satisfaction of the requirement will be provided to the Dean of the Graduate Division for each student where appropriate. (Am 11 Dec 69)</p>	<p>GR4.2 Foreign Language Requirement. Each department or graduate program shall determine whether or not knowledge of one or more foreign languages shall form an integral part of the student's preparation for the <u>doctoral</u> degree. Satisfaction of a foreign language requirement shall be demonstrated, subject to approval of the graduate program, under one of the following options: (a) written or oral examination administered by the graduate program; (b) foreign language placement exam or assessment conducted by an accredited organization; (c) satisfactory completion of a language course(s) at a specified level; (d) alternative language certification identified by the graduate program and approved by the Graduate Council. Evidence of satisfaction of the requirement will be provided to the Dean of the Graduate Division for each student.</p>
<p>GR4.4 Program of Study. The student's program of study must be approved by the Graduate Council, embrace a field of investigation previously approved by his/her department or graduate group, and extend over the full period of study. However, recommendation for the degree is based on the attainments of the candidate rather than the duration of his/her study. The field of study chosen by the student may lie in one department, except for essential related subjects, or in a combination of departments.</p>	<p>GR4.3 Program of Study. The student's program of study must be approved by the Graduate Council, embrace a field of investigation previously approved by the graduate program, and extend over the full period of study. However, recommendation for the degree is based on the attainments of the candidate rather than the duration of study. The field of study chosen by the student may lie in one department, except for essential related subjects, or in a combination of departments.</p>
<p>GR4.5 QUALIFYING EXAMINATION, QUALIFYING COMMITTEE, AND ADVANCEMENT TO CANDIDACY.</p>	<p>GR4.4 WRITTEN AND ORAL QUALIFYING EXAMINATIONS, ORAL QUALIFYING EXAM COMMITTEE, AND ADVANCEMENT TO CANDIDACY.</p>

<p>GR4.5.1 Upon the student's satisfactory completion of all preliminary requirements set by the department or graduate group of his/her major field of study and by the Graduate Council, including the maintenance of an average of at least three grade points per unit in all upper division and graduate courses related to his doctoral program and elected during his/her residence as a graduate student, the department or graduate group shall nominate a qualifying committee to the Graduate Council for appointment. This committee consists of not fewer than five members, at least one of whom shall be from a department or graduate group other than that of the student's major. The anticipated principal director of the student's research shall normally be a member of the committee.</p>	<p>GR4.4.1 Upon the student's satisfactory completion of all preliminary requirements set by the <u>graduate program</u> and the Graduate Council, <u>an Oral Qualifying Exam Committee shall be nominated to the Graduate Council for appointment.</u> This committee consists of not fewer than five members. <u>The Chair and the majority of committee members must be Academic Senate members and part of the student's graduate program. Being a part of a graduate program includes, but is not limited to, cooperating faculty and participants in interdepartmental graduate programs. At least one committee member must not be a part of the same graduate program as the student. The purpose of this "oversight member" is primarily to monitor the fairness of the exam itself. Additionally, the "oversight member" may enhance the scholarship of the student and contribute to the academic benefits of the exam. The "oversight member" must be an Academic Senate member. In the absence of a unanimous decision, 1 no pass vote shall result in a pass of the Oral Qualifying Exam. More than 1 no pass vote will result in a fail.</u></p>
<p>GR UNIVERSITY OF CALIFORNIA RIVERSIDE</p> <p>CERTIFICATE OF RESIDENT STUDY</p> <p>(Name)</p> <p>has completed studies in the field(s) of _____ on _____</p> <p>the Riverside campus of the University, covering a period of _____ months between the date of _____</p> <p>_____</p> <p>and _____</p> <p>_____</p> <p>_____</p> <p>Dated _____</p> <p>_____</p>	<p>REMOVE</p>

<p>Chair</p> <p>_____</p> <p>_____</p> <p>Dean</p> <p>_____</p> <p>_____</p> <p>Chancellor</p>	
<p>GR4.5.2 Before he/she is admitted to candidacy, the student must pass a series of qualifying examinations, both written and oral. The written examination may be administered by the department or graduate group but the oral examination must be conducted and reported to the Dean of the Graduate Division by the student's qualifying committee. The qualifying oral is not open to the general public but members of the Academic Senate may attend.</p>	<p>GR4.4.2 Before <u>the student</u> is admitted to candidacy, the student must pass a series of qualifying examinations, both written and oral. The written examination <u>is</u> administered by the <u>graduate program</u>. The <u>Oral Qualifying Exam is</u> conducted by the student's <u>approved</u> committee. The <u>Oral Qualifying Exam</u> is not open to the general public, but members of the Academic Senate may attend. <u>Written and oral exam results must be reported to the Graduate Division.</u></p>
<p>GR4.5.3 Upon successful completion of the qualifying examinations, the candidate shall file an application for advancement to candidacy with the Graduate Division. The candidate is advanced to candidacy by the Graduate Council after certification by the Dean of the Graduate Division that the formal requirements have been met.</p>	<p>GR4.4.3 Upon successful completion of the qualifying examinations, the candidate is advanced to candidacy by the Graduate Council after certification by the Dean of the Graduate Division that the formal requirements have been met.</p>
<p>GR4.6 DISSERTATION REQUIREMENTS</p>	<p>GR4.5 <u>DISSERTATION COMMITTEE AND DISSERTATION REQUIREMENTS</u></p>
<p>GR4.6.1 A dissertation on a subject chosen by the candidate, bearing on his/her principal study and demonstrating his/her ability to make independent investigation, is required of every candidate for the degree. In its preparation, the candidate is guided by a dissertation committee, nominated by the candidate's department or graduate group to the Graduate Council for appointment. This committee is composed of not fewer than three members. The membership may be the same as the qualifying committee, except that the principal director of the candidate's research shall be Chair of the committee. The committee guides the candidate in his/her research and passes upon the merits of his/her dissertation and may conduct a final or oral examination.</p>	<p>GR4.5.1 A dissertation on a subject chosen by the candidate, bearing on the <u>student's</u> principal study and demonstrating <u>the</u> ability to make independent investigation, is required of every candidate for the degree. In its preparation, the candidate is guided by a Dissertation Committee, nominated to the Graduate Council for appointment. This committee is composed of not fewer than three members, <u>the majority of whom must be Academic Senate members from the student's graduate program.</u> The principal director of the candidate's research shall be Chair of the committee. The committee guides the candidate in the <u>candidate's</u> research and may conduct a final <u>defense that is open to the general public.</u></p>

<p>GR4.6.2 The dissertation must be prepared and presented in the form and manner prescribed by the Graduate Council.</p>	<p>GR4.5.2 The dissertation must be prepared and presented in the form and manner prescribed by the Graduate Council. <u>Dissertations are deposited into an open access repository and are freely and openly available to the public. (UC-AA-20-0488)</u></p>
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JUSTIFICATION and EXPLANATION OF CHANGES (2021/2022)

GR4 - REQUIREMENTS FOR THE DEGREE OF DOCTOR OF PHILOSOPHY

GR4.1 - Notice of Intended Candidacy

- Removing this bylaw because it is not currently enforced or required by the Graduate Division. PHD students typically advance to candidacy after the completion of the Oral Qualifying Exam. It is not necessary to announce, “intended candidacy” after a student’s first term in the program.

GR4.2 - Residence Requirement

- Changing number to 4.1.
- No other changes as this mirrors the UCOP requirement.

GR4.3 - Foreign Language Requirement

- Changing number to 4.2.
- Removed the word “reading” because the knowledge of foreign language currently required in graduate programs has expanded beyond that definition. “Reading” can also imply completion of only certain language courses would be acceptable, but that is not the case in most current language requirements.
- No evidence could be found that the Educational Testing Service Graduate School Foreign Language Test still exists. The bylaw was changed to encompass language assessments tests given from UCR or other accredited organizations.
- Programs have naturally expanded beyond the three options given here, allowing “alternative certifications.” This update allows these alternatives, but also specifies that they must be approved by Graduate Council via a program change before being implemented.
- Simplified language to “graduate program.”

GR4.4 - Program of Study

- Changing number to 4.3.
- Removed gender specific language.
- Simplified language to “graduate program.”

GR4.5 - WRITTEN AND ORAL QUALIFYING EXAMINATIONS, ORAL QUALIFYING EXAM COMMITTEE, AND ADVANCEMENT TO CANDIDACY.

&

GR4.6 - DISSERTATION COMMITTEE AND DISSERTATION REQUIREMENTS

Several topics surrounding oral qualifying exam and dissertation committees have been reviewed and updated. The goal of these changes is to simplify the regulations without compromising the integrity of PhD program requirements.

There are no systemwide requirements governing oral qualifying exam and dissertation committees. The structure UCR has in place has not been reviewed or updated in over a decade. Most changes outlined here are being made to match the bylaws to current practice.

GR 4.5.1

- Changing 4.5 to 4.4
- Simplified language to “graduate program”
- Removed mention of 3.0 requirement. That requirement is already covered in the acceptable progress bylaw.
- Removed specifics about who nominates the committee, student or program. This practice already varies across programs.
- Changed the name of the “outside member” to the “oversight member.” This change better explains the purpose of this member. Added expectations and additional definition/information about the “oversight member”.
- Removed requirement that research advisor be on Oral committee. A few graduate programs currently do not operate this way.
- Added language requiring a majority of the committee be academic senate members from the student’s program.
- Added pass information when the decision is not unanimous.
- Adjusted to gender neutral language.

GR (blank) - Certificate of Resident Study

- Removing this bylaw. This is not a certificate that is currently issued or needed.

GR4.5.2

- Removed gender specific language.
- Simplified language to “graduate program.”
- Unified language and formatting describing the Oral Qualifying Exam.
- Clarified that written qualifying exam results must also be reported to the Graduate Division.

GR4.5.3

- Removed the wording that PHD students must file for advancement to candidacy. This is a process that happens automatically once the exams are complete and confirmation paperwork of exam results are submitted. The Graduate Division currently advances students without an application.

GR4.6.1

- Changing 4.6 to 4.5
- Removed gender specific language.
- Added language requiring a majority of the committee be academic senate members from the student’s program.

- Included final defense requirements that are already used in practice.

GR4.6.2

- Updated to include UCOP policy regarding open access requirement for dissertations.

Approvals:

Approved by the Graduate Dean: Shaun Bowler, 1/3/2022

Approved by the Graduate Council: 1/4/2022

Committee on Rules & Jurisdiction finds the wording to be consistent with the code of the Academic Senate: 1/5/22

Received by Executive Council: 2/14/22

Minor corrections indicated by Rules & Jurisdiction made by Director Oswood on 2/15/22.



Graduate Division

100 University Office Building
Riverside, CA 92521

1/3/2022

To: Executive Council

From: Graduate Division, Dean Shaun Bowler

RE: **Proposed changes to GR4 Requirements for the Degree of Doctor of Philosophy, GR4.5
Qualifying Examination, Qualifying Committee and Advancement to Candidacy and GR4.6
Dissertation Requirements**

The Graduate Council and Dean of the Graduate Division has previously approved updates to these bylaws. The Committee on Rules and Jurisdiction then reviewed and provided a second round of feedback in December 2021. That feedback has been addressed below. Please review the changes to consider approval of these bylaw updates.

GR 4.1

Feedback:

- *(From R&J)* The word "Degree" is twice in upper case in this paragraph. We believe it should be lower case. It currently says: "The Ph.D. Degree..."

Resolution:

- Capitalization has been adjusted.

GR 4.5.1

Feedback:

- *(From R&J)* The third sentence "The Chair and the majority member must be Academic Senate..." Please add "members" after Academic Senate.

Resolution:

- The wording has been updated to include “members.”

GR 4.5.2

Feedback:

- *(From R&J)* Fixing text to gender neutral language is acceptable as you have written it, yet the more desirable revision avoids the appearance of error (“they” + singular verb) by changing “they” to “the student” in the first sentence. This is our suggestion.

Resolution:

- The wording has been updated.

GR 4.6.1

Feedback:

- *(From R&J)* Similar issue to GR4.5.2: We suggest changing “their” to “the candidate’s” in the final sentence.

Resolution:

- The wording has been updated.



Academic Senate

GRADUATE COUNCIL

January 4, 2022

To: Jason Stajich, Chair
Riverside Division

From: Don Collins, Chair
Graduate Council

Re: [Campus Review] Regulation Change: 3rd Round-Proposed changes to GR4 Requirements for the Degree of Doctor of Philosophy, GR4.5 Qualifying Examination, Qualifying Committee and Advancement to Candidacy and GR4.6 Dissertation Requirements

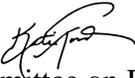
Graduate Council reviewed the proposed changes to GR4, GR4.5, and GR4.6 and was supportive of all proposed Regulation changes.



COMMITTEE ON RULES AND JURISDICTION

January 5, 2022

To: Jason Stajich
Chair, Riverside Division

From: Katie Ford 
Chair, Committee on Rules and Jurisdiction

Re: Proposed changes to GR4 Requirements for the Degree of Doctor of Philosophy, GR4.5 Qualifying Examination, Qualifying Committee and Advancement to Candidacy and GR4.6 Dissertation Requirements bylaws.

The Committee on Rules and Jurisdiction reviewed this item and approves with a minor correction to a numbering error: Section GR4.3 is followed by GR4.5. We assume GR4.5 should be GR4.4.



Academic Senate

EXECUTIVE COUNCIL

December 20, 2021

To: Riverside Division

From: Jason Stajich, Division Chair

RE: Revised Proposal - Proposed Bachelor of Science in Robotics Engineering

During their December 13, 2021 meeting Executive Council discussed the subject item and had no additional comments or objections.

Proposal for the new undergraduate major in Robotics Engineering

- 1. Name of the academic program and the department or unit that will administer the program.*

Name: Robotics Engineering Undergraduate Major

Administration: The Robotics Engineering major will be administered jointly by the Department of Mechanical Engineering (ME), the Department of Electrical and Computer Engineering (ECE), and the Department of Computer Science and Engineering (CSE).

- 2. A thorough justification, including the motivation for the creation of the program in terms of student interest and professional or academic importance.*

Robotics is one of the most frequently inquired-about majors from high school students considering applying to BCOE. The rise of K-12 extra-curricular and curricular activities involving aspects of robotics (such as those based on Arduino) has sparked an interest among high school students considering Engineering.

Robotics sits between a number of traditional engineering academic disciplines. While some universities have dedicated robotics departments (for instance, Carnegie Mellon University), this is not the norm, nor is it necessary to provide a rich robotics program. The current BCOE faculty span many aspects of robotics and have research and teaching interests that bridge multiple disciplines.

Specialization within an existing major would not provide the breadth necessary for understanding robotics. The breadth necessary, from mechanics to circuit design and software engineering cannot be worked into existing undergraduate majors. Yet, graduates with such skills would be in high demand in the job market. The US Bureau of Labor Statistics and the Projections Managing Partnership project 9% job growth in robotics from 2016-2026 in California, higher than the 4% projected over a similar period for the US as a whole (<https://www.onetonline.org/link/localtrends/17-2199.08?st=CA&g=Go>).

- 3. Relationship of the new program to existing programs.*

The proposed program is different in its requirements from the traditional programs in Computer Science and Engineering, Electrical and Computer Engineering, and Mechanical Engineering. For example, the Robotics Engineering program requires students to take classes in Computer Science and Electrical Engineering, which are not required for Mechanical Engineering students. Similarly, Computer Science and Electrical Engineering students need to take classes in Mechanical Engineering, which they do not need to take if enrolled in the classical programs.

With its interdisciplinary emphasis on programming, algorithms, engineering, and computer science, the Robotics Engineering program will provide the students with the necessary foundations to study and understand a broad range of topics that would not be accessible from any individual program.

- 4. The proposed curriculum. Great care should be given in this area, correct rubrics should be listed for courses, all cross listings should be listed, unit total considerations should be taken into account and totals should be verified by program staff, faculty, and appropriate Executive Committee personnel. A copy of the proposed program change should be provided for inclusion in the Catalog.*

The proposed curriculum is detailed in Appendix A, and the catalog entry is in Appendix B.

- 5. A list of faculty who will be involved in the program, including those teaching, advising, and administering.*

Below is the current list of faculty involved in the program (new faculty will be added as the program evolves):

Professors:

Christian Shelton, CSE
Amit Roy-Chowdhury, ECE
Matt Barth, ECE
Bir Bhanu, ECE
Jay Farrell, ECE
Wei Ren, ECE
Philip Brisk, CSE

Associate Professors:

Fabio Pasqualetti, ME
Anastasios Mourikis, ECE
Roman Chomko, ECE

Assistant Professors:

Konstantinos Karydis, ECE
Salman Asif, ECE
Hyoseung Kim, ECE
Samet Oymak, ECE
Erfan Nozari, ME
Jun Sheng, ME
Luat Vuong, ME
Jonathan Realmuto, ME
Vagelis Papalexakis, CSE

- 6. For interdisciplinary programs, the degree of participation and the role of each department must be explicitly described. The chairs of all participating departments must provide written approval for the creation of the program and indicate their commitment to provide necessary resources including faculty release.*

The program will be administered through a joint steering committee. The steering committee will consist of three faculty across the Departments of Computer Science and

Engineering, Mechanical Engineering, and Electrical and Computer Engineering. The Program Director and the program co-Director will be from different departments. The Director and co-Director are the coordinators of the program across the departments, and the Director will also be responsible for coordinating and/or resolving campus-level issues. Normal terms for the Director and co-Director are 3 years and at the end of the 3-year term the co-Director is expected to accede to the Director position. If the Director (or co-Director) is unable to complete their 3-year term, a faculty from the same department will be chosen to assume the duties until the end of that 3-year term. The co-Director will also serve as the undergrad student advisor for the program.

Directors and co-Directors will be appointed by the Dean in consultation with the joint steering committee and program faculty.

Circumstances may intervene that call for consecutive terms of a Director or a co-Director, or consecutive Directors or co-Directors from within the same department. These situations will be recognized, agreed upon, and handled by the joint steering committee and the Dean on a case-by-case basis.

Director and co-Director stipend costs will be set by agreement with the Dean.

Proposed changes to the program will need to be approved by the majority of the steering committee (including Director and co-Director). In the case of a tied vote, the Director makes the final decision. The proposed program change will then be reviewed by the College executive committee and then the committee on education policy. If these committees consider the change to be noncontroversial, the proposed change is placed on the Consent Calendar for a meeting of the Division of the Academic Senate.

Each department will be responsible for offering any of the program's core courses taught by that department at least once per year. The three departments will also cooperate in providing materials needed for any appropriate accreditation process (e.g., ABET or WASC.)

The Director and co-Director will issue an annual report to the Dean to document the state of the program. Based on the report, the Dean can initiate procedures to modify or retire the program.

7. *Projected enrollment in the program.*

The projected enrollment at the start of the program is 25-30 students; we expect a target admission rate of 50 students per year at steady state.

8. *Name of degree, if applicable, and the anticipated number of degrees to be granted when the program reaches steady state.*

B.S. in Robotics Engineering, 40-50 degrees awarded per year.

9. *Potential impact of the new program on existing programs. If the proposed program includes required courses from a department other than the administering department, the proposal must include a statement from the department indicating that it has been consulted and that it will provide access to the required courses.*

The new major uses seven existing lower division courses offered by the Department of Mathematics (namely: MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 011

/ CS 011, MATH 031, MATH 046) and three existing lower division courses offered by the Department of Physics & Astronomy (namely: PHYS 040A, PHYS 040B, PHYS 040C). All these courses are currently being used by CSE and/or ECE and/or ME for satisfying college/major requirements in the BS degrees offered currently by the CSE, ECE, and ME departments. Given that these courses are also used by many other departments to satisfy college requirements, we do not expect a major impact in their offerings by the new program.

The design of the new major led to the creation of one new upper division course (namely: EE 106). This course has been approved by the respective departments and will serve as an elective in the BS programs offered by the ECE and ME departments. All other upper division courses required for the major are currently being taught in the participating departments.

10. *A full listing of resources required for start-up and for operations. In cases where no additional resources will be needed, this must be explicitly stated. This listing may include: personnel (faculty FTE or temporary positions, Teaching Assistants or Readers, administrative staff, technical support); support services including computer facilities and library resources; space requirements. A plan indicating how the resources will be obtained would also be helpful to the committee in reviewing the proposal. A letter of support from the College Dean and/or Executive Vice Chancellor-Provost indicating endorsement as well as a promise of support for the proposal also would be extremely helpful.*

- a. Faculty FTE: initially the program will use existing faculty from the three departments, since the program will have a small number of students.

As the program grows, the number of students in BCOE will also grow. This in turn will require an increase in our advising staff, and staff support to handle undergraduate payroll for paid laboratory positions, purchasing, faculty support. Although not technically defined as staff, TAs will be needed to support the increased number of students. BCOE has shifted to a shared staffing model for smaller departments. This approach has produced the capacity for more specialization through shared resources. This facilitates accommodating the new robotics program in the initial stages followed by staff additions as workload increases.

BCOE is committed to ensuring sufficient staffing for all of its programs. With the RCM budget model, additional tuition revenue will come from both the upcoming undergraduate BS Robotics Engineering students (including some non resident tuition), and from the MS Robotics students. The staff workload increases in proportion to number of students in the program. The RCM model at the MS level generates sufficient revenue to fund the necessary staffing increases as the program grows. At the undergraduate level the RCM, BCOE acknowledges that the RCM model does not return sufficient revenue to programs to fund faculty and staff positions unless class size is very large.

- b. Teaching Assistants: at steady state the program will have approximately 200 students over the four years. Students will take 4 courses per quarter, resulting in about 25

lab/discussion sections per quarter (assuming a section contains 30-35 students). Since students will enroll in existing courses (with the exception of EE 106), should enrollment in the existing courses increase, TA resources will be allocated following the existing policies. Similarly, additional TA resources for the new course EE 106 will be requested based on enrollment and per existing policies. The costs for the additional TA resources, however, will be easily covered by the tuition fees of the new students.

- c. Administrative Staff: the program will be administered by existing staff in the three home departments. Students enrolled in the Robotics Engineering program will be advised by BCOE's Office of Undergraduate Student Academic Affairs (OSAA). OSAA currently has eight full time advisors that will initially accommodate the Robotics students.
- d. Computer facilities and library resources: no new facilities required.
- e. Space requirements: no new space requirements.

11. *Both internal and external letters of support should be provided with the proposal. Internal letters of support are often from UCR department chairs and faculty of related programs. The external letters should be from other UC campuses or other peer institutions. Letters from off-campus help to establish the quality of the program and its fit within the context of related programs at other universities. Upon consultation with the CEP the demand for external letters may be waived.*

Support letters are included below in Appendix C ([letters from Department Chairs at the time of preparation of the proposal are enclosed; current Department Chairs have reviewed and expressed support for the proposal via email.](#)). It should be noticed that external letters were requested from prominent members of the robotics community, including current Chairs of the ECE Departments at the Georgia Institute of Technology and UC Santa Barbara, a former Chair of the ME Department at UC Irvine, and one of the senior-most Computer Science faculty from GRASP Lab, one of the most prestigious robotics lab in the world. All letters are overwhelmingly supportive of the current proposal.

[Some letters provide some detailed comments, which we briefly address next.](#)

- a. [Adequacy of the sequence of physics courses.](#) The proposed courses are standard in our Engineering programs. Additionally, specific topics in electronics of interest to Robotics will be also covered in a dedicated course, EE 005 (see below). Thus, the topics covered in the current physics sequence and courses are deemed adequate for robotics students, and in agreement with all other BCOE programs.
- b. [Three courses on programming.](#) Three-quarter freshman programming sequence is standard in our Computer Science and Engineering program, and any changes would affect many majors. If accelerated options will become available in the future, we will consider such options and revise or adjust the robotics requirements as appropriate.
- c. [Guidance for selecting elective courses.](#) While the proposed curriculum leaves freedom to the students to choose their preferred elective courses, guidance will be provided to ensure that students' selections maximize their preparation and career possibilities. We believe that this formula will achieve the dual objective of remaining flexible, hence more attractive, and ensuring high-quality education. We

will also periodically evaluate the performance of our students, and modify our advising strategies as appropriate.

- d. Ethics and privacy issues. Our senior design courses already include modules on ethics. These will be automatically inherited by the Robotics program.
- e. ABET accreditation. Based on our research, it seems that ABET does not currently have a well-defined set of guidelines for undergraduate robotics programs. Given the expected popularity of robotics programs, we expect precise guidelines to be released in the future, and we plan to make any required changes when appropriate.
- f. Scheduling and organizational issues. The proposed program consists, for the most part, of courses that are currently being offered multiple times per year in the participating departments. Some of the courses that are expected to receive higher enrollment are also cross-listed across departments, making it simple to provide additional offerings (for example, EE144/ME144, ME145/EE145, EE120A/CS120A, EE120B/CS120B, EE142/CS171). The initial projected enrollment can certainly be incorporated in the existing offerings. Additional offerings of key courses will be discussed as enrollment grows, should the need arise. Finally, the three participating Departments have already provided support letters, and have already committed resources for the success of the proposed program. Formal collaboration and coordination mechanisms, including mechanisms to grow or terminate the program, will be detailed and agreed upon as appropriate as the need arise.
- g. MOUs. Courses are "owned" by a particular department, which is responsible for teaching it. For example, EE144/ME144 is owned by ECE, ME145/EE145 by ME, EE120A/CS120A by ECE, EE120B/CS120B by CSE, EE142/CS171 by CSE but with a plan for both ECE and CSE offering the course. These courses are offered almost every year, and many of them multiple times per year. They are required in EE, CE, CS and ME programs and there have not been problems in coordinating who offers the courses. We do not expect such issues in the Robotics program either.
- h. Termination. The structure of the Robotics program has been designed to be as modular as possible, as it consists of courses that are already offered by the participating departments and of independent interest within each department. Thus, termination of the program would only remove the structure of the Robotics program, but would leave intact the participating departments. Further, termination of the program would likely arise if there are not enough enrolled students to justify the existence of the program. For these cases, campus procedures will be followed, and decisions will be taken in consultation with the Senate and administration.

12. Approvals from program faculty, College faculty (if the new proposal affects a college regulation), and the appropriate Executive Committee should be obtained before forwarding the new program to the attention of the Senate Analyst for CEP.

Approved by the Departments of Mechanical Engineering, Electrical and Computer Engineering, and Computer Science and Engineering, as well as by the program faculty. Letters from Department Chairs at the time of preparation of the proposal are enclosed; current Department Chairs have reviewed and expressed support for the proposal via email.

13. Contribution to diversity

Recruitment: UCR is an accredited Hispanic Serving Institution (OPEID 00131600), with approximately 35% Hispanic enrollment. BCOE has a much higher proportion of undergraduates from underrepresented backgrounds compared to Engineering Schools at comparably-ranked R1 universities in the United States. Prior research has established that the hands-on aspects of robotics, coupled with clear workforce-related applications of the technology, appeal to students from underrepresented backgrounds and increase engagement, involvement, and retention [1-3]. The fast-growing nature of the field of robotics (and AI in particular) is a great motivating factor for students to complete a cross-disciplinary BS degree before entering the workforce or graduate studies. The BS Robotics Engineering program will recruit from schools in the Southern California region, the United States, and beyond. UCR is already one of America’s most diverse universities and of the most successful at graduating students from underrepresented groups and disadvantaged backgrounds. The BS Robotics Engineering program will further contribute to UCR’s mission by providing novel and very diverse career opportunities towards addressing the need for a larger, diverse, and globally engaged STEM workforce.

Curriculum and pedagogy: The cross-disciplinary nature of robotics creates the opportunity to build curriculum that is sensitive to the needs of diverse learners as well as diverse members of society. Of particular interest and concern is the subject of algorithmic bias in AI and machine learning. The design of AI systems has been primarily the domain of white, male engineers [4], and several scholars have suggested that efforts toward inclusion in the ranks of those who design AI systems could reduce bias [5, 6]. For example, just 12% of machine learning engineers are women [7], with Black AI leaders pointing to a “diversity crisis” in the field [8]. Critiques of simple inclusivity efforts suggest that diversity programs cannot address overlapping forms of inequality, and have called for applying a more deliberate lens of intersectionality to the algorithm design [9, 10]. To this end, the BS Robotics Engineering program will work closely with the CS and ECE Departments to update their AI, machine learning, and computer vision undergraduate-level curricula to address algorithmic bias, including how biased vs. unbiased robots may impact society as the technology evolves.

Outreach: Students in the BS Robotics Engineering program will be encouraged to participate with ongoing efforts at UCR to provide mentorship and broaden participation in robotics-related activities. One recent example is UCR’s K-12 Lego Robotics Competition [11]. BCOE student organizations such as the IEEE@UCR (affiliated with the ECE Department) have a long and successful history of outreach efforts to the local community which bring K-12 students to campus. The BS Robotics Engineering program will work with BCOE student organizations to create new opportunities for undergraduate student leadership and participation surrounding community outreach events.

[1] H. Yi, “Robotics and kinetic design for underrepresented minority (URM) students in

building education: Challenges and opportunities”, *Comput Appl Eng Educ.* 2019; 27:351–370.

[2] R.A. Pitt, “Impact of an Updated Robotics Laboratory in an Industrial Engineering Program”

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<https://www.asee.org/public/conferences/8/papers/5066/download>

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The Philadelphia Model” 2011 ASEE ANNUAL CONFERENCE retrieved from

https://www.asee.org/file_server/papers/attachment/file/0001/1962/Robotics_In_Urban_STEM_Education-The_Philadelphia_Model.pdf

[4] Crawford, Kate (2016-06-25). "Opinion | Artificial Intelligence's White Guy Problem". *The New York Times*. ISSN 0362-4331. Retrieved 2020-02-11.

[5] Jobin, Anna; Ienca, Marcello; Vayena, Effy (2 September 2019). "The global landscape of AI ethics guidelines". *Nature Machine Intelligence*. 1 (9): 389-399. arXiv:1906.11668. doi:10.1038/s42256-019-0088-2.

[6] "White Paper: How to Prevent Discriminatory Outcomes in Machine Learning". *World Economic Forum*. 12 March 2018. Retrieved 11 February 2020.

[7] "AI Is the Future—But Where Are the Women?". *Wired*. ISSN 1059-1028. Retrieved 2020-02-11.

[8] Snow, Jackie. ""We're in a diversity crisis": cofounder of Black in AI on what's poisoning algorithms in our lives". *MIT Technology Review*. Retrieved 2020-02-11.

[9] Ciston, Sarah (2019-12-29). "Intersectional AI Is Essential". *Journal of Science and Technology of the Arts*. 11 (2): 3–8. doi:10.7559/citarj.v11i2.665. ISSN 2183-0088.

[10] D'Ignazio, Catherine; Klein, Lauren F. (2020). *Data feminism*. MIT Press. ISBN 0262044005.

[11] FIRST LEGO League, www.firstlegoleague.org. UCR has hosted the regional competition in recent years.

14. Program Educational Objectives (PEO)

Graduates of the UCR’s BS degree program in Robotics Engineering will meet high professional,, ethical, and societal goals as demonstrated by accomplishing at least one different item in each of the following different categories:

1. Success in post-graduation studies as evidenced by:

- a. Satisfaction with the decision to further their education
 - b. Advanced courses completed or advanced degree earned
 - c. Professional visibility (e.g., publications, patents, inventions, awards)
 - d. Professional responsibilities (e.g., professional mentoring, professional society memberships, reviewing and editorial work for professional journals)
2. Success in a chosen profession or vocation as evidenced by:
 - a. Career satisfaction
 - b. Promotions/raises (e.g., management leadership positions or distinguished technical positions)
 - c. Entrepreneurial activities
 - d. Consulting activities
3. Contributions to society and profession as evidenced by:
 - a. Leadership roles
 - b. Public service
 - c. Outreach and volunteering activities
 - d. Establishment and maintenance of professional networks

The PEOs are structured into three main objectives, with various specific examples of measurable evidence. It is not expected that students will achieve all of the three main objectives. Rather, the PEOs are designed to meet the needs of students with different interests within the Robotics Engineering program. The first set of PEOs is most relevant to students that pursue advanced degrees. The second set of PEOs is designed for students that instead prefer to enter the workplace immediately after graduation. Finally, we expect most of our students to make some societal contributions within 3-5 years after graduation.

The PEOs of the Robotics Engineering program are consistent and well-aligned with the mission of the Bourns College of Engineering.

Appendix A.

Robotics Engineering Undergraduate Major.

Year 1		
Fall	Winter	Spring
MATH 009A	MATH 009B	MATH 009C
CS 010A	CS 010B	CS 010C
ME 009	PHYS 040A	PHYS 040B
ENGL 001A	ENGL 001B	BREADTH 1

Year 2		
Fall	Winter	Spring
PHYS 040C	MATH 046	MATH 011
MATH 010A	CS 061	EE 005
ME 010	EE 106	ME 120
CS 100	BREADTH 2	MATH 031

Year 3		
Fall	Winter	Spring
ME 103	EE 120A / CS 120A	EE120B / CS 120B
EE 111	EE 114	EE 132
TECH. ELEC. 1	TECH. ELEC. 2	TECH. ELEC. 3
BREADTH 3	BREADTH 4	BREADTH 5

Year 4		
Fall	Winter	Spring
EE 144 / ME 144	ME 145 / EE 145	EE 142 / CS 171
TECH. ELEC. 4	SENIOR DES. 1	SENIOR DES. 2
ENGR 180W	BREADTH 6	BREADTH 7

Comments:

One new course, EE 106 (Programming Practical Robotics).

MATH 009AH, 009BH, and 009CH can be used as alternatives for MATH 009A, 009B, and 009C, respectively.

Students will complete Senior Design courses in one of the participating Departments (Mechanical Engineering, Electrical and Computer Engineering, Computer Science and Engineering): CS 178A and CS 178B, or EE 175A and EE 175B, or ME 175B and ME 175C. Prerequisites to these courses will be adjusted to include senior standing in Robotics after approval of the Robotics program.

Transfer criteria:

BCOE Requirements:

- Minimum 2.8 cumulative GPA
- Minimum 2.5 GPA in the calculus series

- Minimum 2.5 in one of the following sequences:
 - CS 010A, 010B, 010C
 - PHYS 040A, 040B, 040C
 - MATH 010A, MATH 031, MATH 046

Minimum preparation for Robotics:

- CS 010A, CS 010B
- MATH 009A, 009B, 009C
- PHYS 040A

Must complete four of the following:

- CS 010C
- CS 061
- EE 005
- ME 010
- PHYS 040C
- MATH 031
- MATH 046

Strongly recommended courses:

- MATH 010A
- ME 009
- PHYS 040B

Course description:

MATH 009A First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 005 with a grade of “C-” or better or MATH 006B with a grade of “C-” or better or equivalent. Introduction to the differential calculus of functions of one variable. Credit is awarded for only one of MATH 008B, MATH 009A, or MATH 09HA.

MATH 009B First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 008B with a grade of “C-” or better or MATH 009A with a grade of “C-” or better or MATH 09HA with a grade of “C-” or better. Introduction to the integral calculus of functions of one variable. Credit is awarded for only one of MATH 009B or MATH 09HB.

MATH 009C First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009B with a grade of “C-” or better or MATH 09HB with a grade of “C-” or better. Further topics from integral calculus, improper integrals, infinite series, Taylor’s series, and Taylor’s theorem. Credit is awarded for only one of MATH 009C or MATH 09HC.

MATH 010A Calculus of Several Variables (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009B with a grade of “C-” or better or MATH 09HB with a “C-” or better or equivalent. Topics include Euclidean geometry, matrices and linear functions, determinants, partial derivatives, directional derivatives, Jacobians, gradients, chain rule, and Taylor’s theorem for several variables.

MATH 011 Introduction to Discrete Structures (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009A (or MATH 09HA); CS 010 or CS 010V or MATH 009B (or

MATH 09HB). Introduction to basic concepts of discrete mathematics emphasizing applications to computer science. Topics include propositional and predicate calculi, elementary set theory, functions, relations, proof techniques, elements of number theory, enumeration, and discrete probability. **Cross-listed with CS 011.**

MATH 031 Applied Linear Algebra (5) Lecture, 3 hours; discussion, 2 hours. Prerequisite(s): MATH 009A (or MATH 09HA) with a grade “C-” or better and CS 010 or CS 010V or MATH 009B (or MATH 09HB) with a grade of “C-” or better. A study of matrices and systems of linear equations, determinants, Gaussian elimination, vector spaces, linear independence and linear transformation, orthogonality, eigenvalues, and eigenvectors. Also examines selected topics and applications.

MATH 046 Introduction to Ordinary Differential Equations 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 007B or MATH 009B or MATH 09HB with a grade of “C-” or better or equivalent. Introduction to first-order equations, linear second-order equations, and Laplace transforms, with applications to the physical and biological sciences.

PHYS 040A General Physics 5 Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): MATH 007A or MATH 009A or MATH 09HA with a grade of “C-” or better; MATH 007B or MATH 009B or MATH 09HB with a grade of “C-” or better (MATH 009B or MATH 09HB may be taken concurrently). Designed for engineering and physical sciences students. Covers topics in classical mechanics including Newton’s laws of motion; friction; circular motion; work, energy, and conservation of energy; dynamics of particle systems; collisions; rigid-body motion; torque; and angular momentum. Laboratories provide exercises illustrating experimental foundations of physical principles and selected applications. Credit is not awarded for PHYS 040A if it has already been awarded for PHYS 002A, PHYS 02HA, PHYS 040HA, or PHYS 041A.

PHYS 040B General Physics 5 Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): MATH 009C or MATH 09HC (may be taken concurrently); PHYS 040A or PHYS 040HA with a grade of “C-” or better. Designed for engineering and physical sciences students. Covers topics in mechanics and thermodynamics including elasticity; oscillations; gravitation; fluids; mechanical waves and sound; temperature, heat, and the laws of thermodynamics; and the kinetic theory of gases. Laboratories provide exercises illustrating the experimental foundations of physical principles and selected applications. Credit is awarded for only one of PHYS 040B or PHYS 040HB.

PHYS 040C General Physics 5 Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): MATH 009C or MATH 09HC; PHYS 040B or PHYS 040HB with a grade of “C-” or better. Designed for engineering and physical sciences students. Covers topics in electricity and magnetism including electric fields and potential; Gauss’ law; capacitance; magnetic fields; Ampere’s law; Faraday’s law and induction; electromagnetic oscillations; dc and ac current; and circuits. Laboratories provide exercises illustrating the experimental foundations of physical principles and selected applications. Credit is awarded for only one of PHYS 040C, PHYS 040HC, PHYS 002B, PHYS 02HB, or PHYS 041B.

CS 010A Introduction to Computer Science for Science, Mathematics, and Engineering I (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): a college mathematics course (may be taken concurrently) or credit for MATH 009A from the Advanced Placement Examination or the Mathematics Advisory Examination. Covers problem solving through structured programming of algorithms on computers using the C++ object-oriented language. Includes variables, expressions, input/output (I/O), branches, loops, functions, parameters, arrays, strings, file I/O,

and classes. Also covers software design, testing, and debugging. Credit is not awarded for CS 010 if it has already been awarded for CS 010V or CS 030.

CS 010B Introduction to Computer Science for Science, Mathematics, and Engineering II

(4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 010 or CS 010V with a grade of “C” or better; familiarity with C or C++ language. Covers structured and object-oriented programming in C++. Emphasizes good programming principles and development of substantial programs. Topics include recursion, pointers, linked lists, abstract data types, and libraries. Also covers software engineering principles. Credit is awarded for only one of CS 012 or CS 012V or CS 013.

CS 010C Introduction to Data Structures and Algorithms (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 012 or CS 012V with a grade of “C” or better or CS 013 with a grade of “C” or better; proficiency in C++. Topics include basic data structures such as arrays, lists, stacks, and queues. Covers dictionaries (including binary search trees and hashing) and priority queues (heaps). Offers an introductory analysis of algorithms, sorting algorithms, and object-oriented programming including abstract data types, inheritance, and polymorphism. Explores solving complex problems through structured software development.

CS 061 Machine Organization and Assembly Language Programming 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 010 with a grade of “C” or better. An introduction to computer organization. Topics include number representation, combinational and sequential logic, computer instructions, memory organization, addressing modes, interrupt, input/ output (I/O), assembly language programming, assemblers, and linkers.

CS 100 Software Construction (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 014 with a grade of “C-” or better. Emphasizes development of software systems. Topics include design and implementation strategies; selection and mastery of programming languages, environment tools, and development processes. Develops skill in programming, testing, debugging, performance evaluation, component integration, maintenance, and documentation. Covers professional and ethical responsibilities and the need to stay current with technology.

CS 120A Logic Design 5 Lecture, 3 hours; laboratory, 3 hours; individual study, 3 hours. Prerequisite(s): CS 061 with a grade of “C-” or better. Covers design of digital systems. Includes Boolean algebra; combinational and sequential logic design; design and use of arithmetic logic units, carry-lookahead adders, multiplexors, decoders, comparators, multipliers, flip-flops, registers, and simple memories; state-machine design; and basic register-transfer level design. Uses hardware description languages, synthesis tools, programmable logic, and significant hardware prototyping. **Cross-listed with EE 120A.**

CS 120B Introduction to Embedded

Systems 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 120A or CS 120A. Introduction to hardware and software design of digital computing systems embedded in electronic devices (e.g., digital cameras or portable video games). Includes embedded processor programming, custom processor design, standard peripherals, memories, interfacing, and hardware/software trade-offs. Involves use of synthesis tools, programmable logic, microcontrollers, and developing working embedded systems. **Cross-listed with EE 120B.**

CS 178A Project Sequence in Computer Science and Engineering 4 Lecture, 1 hour; laboratory, 3 hours; practicum, 6 hours. Prerequisite(s): CS 141, ENGR 180W; restricted to class level standing of senior. Under the direction of a faculty member, teams propose, design, build, test, and document software and/ or hardware devices or systems. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on

economics, society, and the environment. Completed together, CS 178A and CS 178B may be applied as a substitute for the CS 179 (E-Z) CS major requirement. Graded In Progress (IP) until CS 178A and CS 178B are completed, at which time, a final letter grade is assigned.

CS 178B Project Sequence in Computer Science and Engineering 4 Lecture, 1 hour; laboratory, 3 hours; practicum, 6 hours. Prerequisite(s): CS 178A; restricted to class level standing of senior. Under the direction of a faculty member, teams propose, design, build, test, and document software and/or hardware devices or systems. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment.

ME 009 Engineering Graphics and Design 4 Lecture, 3 hours; discussion, 1 hour.

Prerequisite(s): none. Covers graphical concepts and projective geometry relating to spatial visualization and communication in design. Includes technical sketching, computer-aided design with solid modeling, geometric dimensioning and tolerancing, and an introduction to the engineering design process.

ME 010 Statics 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): MATH 009C, PHYS 040A or PHYS 040HA. Covers equilibrium of coplanar force systems; analysis of frames and trusses; noncoplanar force systems; friction; and distributed loads.

ME 103 Dynamics 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): MATH 046, ME 010 with a grade of "C-" or better, ME 018B with a grade of C- or better. Topics include vector representation of kinematics and kinetics of particles; Newton's laws of motion; force- mass-acceleration, work-energy, and impulse- momentum methods; kinetics of systems of particles; and kinematics and kinetics of rigid bodies.

ME 120 Linear Systems and Controls 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): EE 001A, EE 01LA, ME 018B with a grade of C- or better. Introduces the modeling and analysis of dynamic systems, emphasizing the common features of mechanical, hydraulic, pneumatic, thermal, electrical, and electromechanical systems. Controls are introduced through state equations, equilibrium, linearization, stability, and time and frequency domain analysis.

ME 145 Robotic Planning and Kinematics 4 Lecture, 3 hours; laboratory, 3 hours.

Prerequisite(s): ME 120 or equivalent; or consent on instructor. Motion planning and kinematics topics with an emphasis in geometric reasoning, programming, and matrix computations. Motion planning includes configuration spaces, sensor-based planning, decomposition and sampling methods, and advanced planning algorithms. Kinematics includes reference frames, rotations and displacements, and kinematic motion models. **Cross-listed with EE 145.**

ME 175B Mechanical Engineering Design 3 Lecture, 2 hours; laboratory, 2 hours.

Prerequisite(s): senior standing in Mechanical Engineering. ME 113, ME 116A, ME 170A, ME 174, ME 175A (may be taken concurrently). Outlines the defining of a design problem and the conception and detail of the design solution. Explores design theory, design for safety, reliability, manufacture, and assembly. Graded In Progress (IP) until ME 175B and ME 175C are completed, at which time a final, letter grade is assigned.

ME 175C Mechanical Engineering Design 3 Lecture, 1 hour; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): senior standing in Mechanical Engineering; ME 175B. Students create, test, and evaluate a prototype based on the project design generated in ME 175B. Lecture topics include prototyping techniques, design verification, and special topics in design. Satisfactory (S) or No Credit (NC) grading is not available.

EE 005 Circuits and Electronics 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 040C or PHYS 040HC. Introduces linear circuits analysis, semiconductor diodes and transistors,

analog amplifier circuits, operational amplifiers, and digital circuits. Does not confer credit towards a degree in Electrical Engineering and in Computer Engineering.

EE 106 Programming Practical Robotics 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisites: MATH 031 or EE 020, CS 010A or ME 018A. Covers principles for simulating, programming, and deploying robots using modern robotics middleware. Includes reading/writing of robot programs; simulating robotic systems; interfacing robot sensors and actuators; and implementing introductory motion control algorithms. Teaches contemporary robotics open-source software (ROS, Gazebo), 3D environment creation, and sensor data processing libraries (OpenCV, OpenNI, PCL).

EE 111 Digital and Analog Signals and Systems 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 001B, EE 020, MATH 046; or consent of instructor. Covers continuous- and discrete-time signals and systems; linear time-invariant (LTI) systems; impulse response; Fourier analysis; frequency response; Laplace and Z-transforms; and sampling theorem and Nyquist rates. Includes laboratory experiments with signals, transforms, linear digital filtering, and sampling/aliasing.

EE 114 Probability, Random Variables, and Random Processes in Electrical Engineering 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 110A or EE 111. Covers fundamentals of probability theory, random variables, and random processes with applications to electrical and computer engineering. Includes probability theory, random variables, densities, functions of random variables, expectations and moments, and multivariate distributions. Also addresses random processes, autocorrelation function, spectral analysis of random signals, and linear systems with random inputs.

EE 132 Automatic Control 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 105 or ME 103 or equivalent; EE 110A or ENGR 118; or consent of instructor. Covers mathematical modeling of linear systems for time and frequency domain analysis. Topics include transfer function and state variable representations for analyzing stability, controllability, and observability; and closed-loop control design techniques by Bode, Nyquist, and root-locus methods. Laboratories involve both simulation and hardware exercises.

EE 142 Pattern Recognition and Analysis of Sensor Data 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 114 or STAT 155 or consent of the instructor. Introduction to pattern recognition for multi-dimensional, multi-modal sensor data such as images, videos, and smart grids. Classification and decision functions, feature extraction, regression, and neural networks. Clustering and dimensionality reduction for unsupervised learning. Dynamic models and tracking. Applications of pattern recognition in computer vision, robotics, smart grids, etc.

EE 144 Foundations of Robotics 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 020 or MATH 031 or ME 018B; CS 010A or ME 118; or consent of instructor. Provides foundational knowledge on analysis, control, and programming of robots. Considers configuration space, rigid body motion, forward, inverse and velocity kinematics, dynamics, trajectory planning, robot motion control, localization and mapping, and robot ethics. Integrates hands-on labs to program robots in simulation and experimentally by reading and interpreting sensor data. **Cross-listed with ME 144.**

EE 175A Senior Design Project 4 Lecture, 1 hour; laboratory, 3 hours; practicum, 6 hours. Prerequisite(s): EE 120B or CS 120B; restricted to class level standing of senior; restricted to major(s) Electrical Engineering, Electrical Engineering BS + MS; or consent of instructor. Proposal of design of electrical engineering devices or systems under the direction of the instructor. Develops technical specification; considers design constraints and industry standards; emphasizes

ethical responsibilities; and promotes staying current on technology and its socioeconomic and environmental impact. Graded In Progress (IP) until EE 175A and EE 175B are completed, at which time, a final letter grade is assigned.

EE 175B Senior Design Project 4 Lecture, 1 hour; laboratory, 3 hours; practicum, 6 hours. Prerequisite(s): EE 175A; senior standing in Electrical Engineering. Builds, tests, and redesigns electrical engineering devices or systems. Develops and carries out test plan according to design specification. Presents a demo of the design. Completes project testing and technical documentation. Presents a demo of the design. Satisfactory (S) or No Credit (NC) grading is not available.

ENGR 180W Technical Communications 4 Lecture, 3 hours; workshop, 3 hours. Prerequisite(s): ENGL 001B with a grade of “C” or better; upper-division standing in the Bourns College of Engineering or consent of instructor. Develops oral, written, and graphical communication skills. Includes preparing and critiquing reports, proposals, instructions, and business correspondence. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment. Fulfills the third-quarter writing requirement for students who earn a grade of “C” or better for courses that the Academic Senate designates, and that the student’s college permits, as alternatives to English 001C.

Technical electives:

CS 111 Discrete Structures 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 010; CS 011/MATH 011; MATH 009C (or MATH 09HC). A study of discrete mathematical structures emphasizing applications to computer science. Topics include asymptotic notation, generating functions, recurrence equations, elements of graph theory, trees, algebraic structures, and number theory.

CS 122A Intermediate Embedded and Real- Time Systems 5 Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): CS 012 or CS 013; CS 120B/EE 120B. Covers software and hardware design of embedded computing systems. Includes hardware and software codesign, advanced programming paradigms (including state machines and concurrent processes), real-time programming and operating systems, basic control systems, and modern chip and design technologies. Laboratories involve use of microcontrollers, embedded microprocessors, programmable logic and advanced simulation, and debug environments.

CS 122B Advanced Embedded and Real-Time Systems 5 Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): CS 122A. Explores state-of-the- art aspects of building embedded computer systems. Topics include real-time programming, synthesis of coprocessor cores, application-specific processors, hardware and software cosimulation and codesign, low-power design, reconfigurable computing, core-based design, and platform-based methodology.

CS 135 Virtual Reality 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 100. Covers the development of virtual reality (VR) worlds, including motion and physics of VR worlds. Includes design practices for immersive experiences, human visual perception, environmental and social interactions. Also includes positional tracking with sensors, augmented and mixed reality, and storage and transmission of virtual reality worlds.

CS 141 Intermediate Data Structures and Algorithms 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 014 with a grade of “C-” or better; CS 111; MATH 009C or MATH 09HC; proficiency in C++. Explores basic algorithm analysis using asymptotic notations, summation and recurrence relations, and algorithms and data structures for discrete structures including

trees, strings, and graphs. Also covers general algorithm design techniques including “divide-and-conquer,” the greedy method, and dynamic programming. Integrates knowledge of data structures, algorithms, and programming.

CS 145 Combinatorial Optimization Algorithms 4 Lecture, 3 hours; discussion, 1 hour.

Prerequisite(s): CS 141; MATH 031 or MATH 131. The study of efficient algorithm design techniques for combinatorial optimization problems. Topics include shortest paths, minimum spanning trees, network flows, maximum matchings, stable matchings, linear programming, duality, two-person games, algorithmic techniques for integer programming problems, NP-completeness, and approximation algorithms.

CS 150 Automata and Formal Languages 4 Lecture, 3 hours; discussion, 1 hour.

Prerequisite(s): CS 014 with a grade of “C-” or better; CS 111; MATH 009C (or MATH 09HC). A study of formal languages. Includes regular and context-free languages; computational models for generating these languages such as finite-state automata, pushdown automata, regular expressions, and context-free grammars; mathematical properties of the languages and models; and equivalence between the models. Also introduces Turing machines and decidability.

CS 160 Concurrent Programming and Parallel Systems 4 Lecture, 3 hours; laboratory, 3

hours. Prerequisite(s): CS 061, CS 100, CS 111. A study of concurrent and parallel systems.

Topics include modular structure and design, interprocess communication, synchronization, failures, persistence, and concurrency control. Also covers atomic transactions, recovery, language support, distributed interprocess communication, and implementation mechanisms.

Provides preparation for the study of operating systems, databases, and computer networking.

CS 170 Introduction to Artificial Intelligence 4 Lecture, 3 hours; discussion, 1 hour.

Prerequisite(s): CS 100 with a grade of “C-” or better, CS 111. An introduction to the field of artificial intelligence. Focuses on discrete-valued problems. Covers heuristic search, problem representation, and classical planning. Also covers constraint satisfaction and logical inference.

CS 173 Introduction to Natural Language Processing 4 Lecture, 3 hours; discussion, 1 hour.

Prerequisite(s): CS 150, may be taken concurrently. An overview of modern approaches for natural language processing. Focuses on major algorithms used in NLP for various applications such as part-of-speech tagging, parsing, named entity recognition, coreference resolution, sentiment analysis, and machine translation.

ME 110 Mechanics of Materials 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): CS 009M or ME 018A; MATH 046, ME 010 with a grade of “C-” or better. Topics include mechanics of deformable bodies subjected to axial, torsional, shear, and bending loads; combined stresses; and their applications to the design of structures.

ME 122 Vibrations 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): ME 103. Covers free and forced vibration of discrete systems with and without damping resonance; matrix methods for multiple degree-of-freedom systems; normal modes, coupling, and normal coordinates; and use of energy methods.

ME 130 Kinematic and Dynamic Analysis of Mechanisms 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): ME 009, ME 103. Explores the kinematic analysis of planar mechanisms including linkages, cams, and gear trains. Introduces concepts of multibody dynamics.

ME 131 Design of Mechanisms 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ME 130. Involves design of planar, spherical, and spatial mechanisms using both exact and approximate graphical and analytical techniques. Requires a computer-aided design project.

ME 133 Introduction to Mechatronics 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ME 120. Introduces hardware, software, sensors, actuators, physical systems models, and control

theory in the context of control system implementation. Covers data acquisition (Labview), sensors, actuators, electric circuits and components, semiconductor electronics, logic circuits, signal processing using analog operational amplifiers, programmable logic controllers, and microcontroller programming and interfacing. Uses MATLAB and Simulink.

ME 153 Finite Element Methods 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 118. Covers weak form formulation, the Galerkin method and its computational implementation, mesh generation, data visualization, as well as programming finite element codes for practical engineering applications.

EE 100A Electronic Circuits 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 001B. Electronic systems, linear circuits, operational amplifiers, diodes, nonlinear circuit applications, junction and metal-oxide-semiconductor field-effect transistors, bipolar junction transistors, MOS and bipolar digital circuits. Laboratory experiments are performed in the subject areas and SPICE simulation is used.

EE 115 Introduction to Communication Systems 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 110B. Covers spectral density and correlation, modulation theory, amplitude, frequency, phase and analog pulse modulation and demodulation techniques, signal-to-noise ratios, and system performance calculations. Laboratory experiments involve techniques of modulation and demodulation.

EE 128 Data Acquisition, Instrumentation, and Process Control 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 100B, EE 120B/CS 120B (EE 100B and EE 120B/CS 120B may be taken concurrently); or consent of instructor. Covers analog signal transducers, conditioning, and processing; step motors, DC servo motors, and other actuation devices. Explores analog to digital and digital to analog converters; data acquisition systems; microcomputer interfaces to commonly used sensors and actuators; and design principles for electronic instruments, real time process control, and instrumentation.

EE 141 Digital Signal Processing 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 110B. Transform analysis of Linear Time-Invariant (LTI) systems, discrete Fourier Transform (DFT) and its computation, Fourier analysis of signals using the DFT, filter design techniques, structures for discrete-time systems. Laboratory experiments on DFT, fast Fourier transforms (FFT), infinite impulse response (IIR), and finite impulse response (FIR) filter design, and quantization effects.

EE 146 Computer Vision 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): senior standing in Computer Science or Electrical Engineering, or consent of instructor. Imaging formation, early vision processing, boundary detection, region growing, two-dimensional and three-dimensional object representation and recognition techniques. Experiments for each topic are carried out.

EE 147 Graphics Processing Unit Computing and Programming 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 120B or CS 120B. Introduces principles and practices of programming graphics processing units (GPUs) using the parallel programming environment. Covers memory/threading models, common data-parallel programming patterns and libraries needed to develop high-performance parallel computing applications. Examines computational thinking; a broader range of parallel execution models; and parallel programming principles.

Cross-listed with CS 147.

EE 150 Digital Communications 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 114, EE 115. Topics include modulation, probability and random variables, correlation and

power spectra, information theory, errors of transmission, equalization and coding methods, shift and phase keying, and a comparison of digital communication systems.

EE 151 Introduction to Digital Control 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 132, EE 141. Review of continuous-time control systems; review of Z-transform and properties; sampled-data systems; stability analysis and criteria; frequency domain analysis and design; transient and steady-state response; state-space techniques; controllability and observability; pole placement; observer design; Lyapunov stability analysis. Laboratory experiments complementary to these topics include simulations and hardware design.

EE 152 Image Processing 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 110B or EE 111 or consent of instructor. Digital image acquisition, image enhancement and restoration, image compression, computer implementation and testing of image processing techniques. Students gain hands-on experience of complete image processing systems, including image acquisition, processing, and display through laboratory experiments.

ENGR 160 Introduction to Engineering Optimization Techniques 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010A; CS 010 or EE 020 or ME 018A and ME 018B. ENGR 160 online section; enrollment in the Master-in-Science in Engineering program. Introduction to formulating and solving optimization problems in engineering. Includes single variable and multi-variable optimization; linear programming - simplex method; nonlinear unconstrained optimization - gradient, steepest descent, and Newton methods; and nonlinear constrained optimization - gradient projection methods. Addresses applications of optimization in engineering design problems. Solves various engineering optimization examples using MATLAB.

Appendix B.

Proposed catalog entry for the Robotics Engineering Undergraduate Major.

Robotics Engineering Undergraduate Major (catalog entry)

Major

Robotics studies the design, operation, and deployment of autonomous intelligent systems and mechanisms. Robotics is a fundamentally multidisciplinary field, with core components spanning engineering and computer science, and applications extending beyond science and technology. Courses in the B.S. in Robotics Engineering program focus both on the theory and the practice of contemporary robotics science and engineering, and prepare students for professional careers and graduate studies in robotics and beyond (e.g., autonomous systems, intelligent control systems, and decision making).

The B.S. in Robotics Engineering major is an interdepartmental program offered by the Marlan and Rosemary Bourns College of Engineering (BCOE), and involves the Departments of Mechanical Engineering, Electrical and Computer Engineering, and Computer Science and Engineering. Students are advised in and have their records maintained by the BCOE Office of Student Academic Affairs. Students must fulfill the breadth requirements of the Bourns College of Engineering.

University Requirements

See Undergraduate Students section.

College Requirements

For details on breath requirements, see the Colleges and Programs section of this catalog. Students are encouraged to consult their advisor regarding requirements.

Major Requirements

1. Lower-division requirements (72 units)
 - a. MATH 009A or MATH 009AH; MATH 009B or MATH 009BH; MATH 009C or MATH 009 CH; MATH10A; MATH 011; MATH 031; MATH 46.
 - b. PHYS 040A; PHYS 040B; PHYS 040C.
 - c. CS 010A; CS 010B; CS 010C; CS 061.
 - d. ME 009; ME 010.
 - e. EE 005.
2. Upper-division requirements (65 units)
 - a. CS 100; CS 120B / EE 120B.
 - b. ME 103; ME120; ME 145 / EE 145.
 - c. EE 106; EE 111; EE 114; EE 120A / CS 120A; EE132; EE142 / CS 171; EE 144 / ME 144.
 - d. Four courses (at least 16 units) from the following list, none of which can also be used to satisfy other major requirements: CS 111; CS 122A; CS 122B; CS 135; CS 141; CS 145; CS 150; CS 160; CS 170; CS 173; ME 110; ME 122; ME 130; ME 131; ME 133; ME 153; EE 100A; EE 115; EE 128; EE 141; EE 146; EE 147; EE 150; EE 151; EE 152; ENGR 160.
 - e. One of the following two-course sequences: CS 178A and CS 178B, or EE 175A and EE 175B, or ME 175B and ME 175C.

Appendix C.



Mechanical Engineering
900 University Avenue
Riverside, CA 92521
Tel 951.827.5830
Fax 951.827.2899
www.me.ucr.edu

November 2, 2020

Dear members of the Academic Senate:

On behalf of the Mechanical Engineering department, I enthusiastically support the new BS in Robotics program. This program will be housed in the Bourns College of Engineering, across the departments of Computer Science and Engineering (CSE), Electrical and Computer Engineering (ECE), and Mechanical Engineering (ME). It will draw upon courses from the existing programs in the departments.

In the past decade or so, Robotics has become extremely popular amongst High School students who are interested in pursuing technological careers. Having this program will allow us attract high caliber and extremely motivated students to UCR. The ME program has recently invested heavily in a focus area related to robotics: Controls, Robotics and Automation. Since 2018, we have hired three faculty members in this area, who added to the two we already had, have formed a strong cluster of five ME faculty members plus at least a dozen more in CSE and ECE. In ME, plan to keep adding faculty to this area in the near future.

Robotics is a strategically important area for the country, technically challenging, and provides many opportunities to students after graduation. It is also an inter-disciplinary program which requires an equally inter-connected curriculum. This new program will allow us to provide that holistic training. The curriculum is structured so that graduating students will be competitive in the job market, as well as have the expertise for graduate studies.

Under the leadership of three ME faculty members, the rest of the ME faculty were closely involved in the development of the program and was extensively discussed in faculty meetings in the academic year 19/20. The final program was discussed with the ME undergraduate committee and during faculty meetings, and was unanimously supported by the ME faculty.

In summary, I am extremely supportive of this program and believe it will help in attracting high quality undergraduate students to UCR. Please do not hesitate to contact me should there be any questions.

Respectfully,

A handwritten signature in blue ink, appearing to read "Guillermo Aguilar".

Guillermo Aguilar, Ph.D.
Professor and Chair
University of California Riverside
Department of Mechanical Engineering
A-345 Bourns Hall
Riverside CA, 92521
Off: 951-827-7717
gaguilar@enr.ucr.edu

October 23, 2020

Dear Members of the Academic Senate:

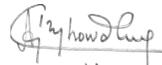
On behalf of the Electrical and Computer Engineering department, it is my pleasure to provide the strongest possible support for the BS in Robotics program. This program will be housed in the Bourns College of Engineering, and is cross-disciplinary, across the departments of Computer Science and Engineering (CSE), Electrical and Computer Engineering (ECE), and Mechanical Engineering (ME) It will draw upon courses from the existing programs in the departments.

Robotics is a strategically important area for the country, technically challenging, and provides many opportunities to students after graduation. High school students are extremely interested in this area, and having this program will allow us attract high caliber and extremely motivated students to UCR. The EE program has two technical focus areas related to robotics: Control and Robotics, which focuses on developing control strategies for robot locomotion, and Intelligent Systems, which focuses on the sensing and decision-making strategies that allows robots to understand their environment. The courses are of high interest, and the majority of the projects in the capstone Senior Design are related to some aspect of robotics. Students in the Computer Engineering program, which is jointly offered by ECE and CSE, have access to all these courses.

However, robotics is an inter-disciplinary program and having it as a specialization within an existing major does not provide students with the entire body of expertise required to work in this area in the future. For example, while EE students interested in robotics will gain some knowledge of the computational aspects of robotics, they will usually not study the mechanical design of robots or how to write and debug software efficiently. Having this inter-disciplinary program will allow us to provide that holistic training. The curriculum is structured so that graduating students will be competitive in the job market, as well as have the expertise to conduct graduate studies.

The faculty in ECE were closely involved in the development of the program. Two ECE faculty were members of the committee, and the program was discussed multiple times in faculty meetings in the 19-20 academic year. On Oct 21, 2020, the final program was discussed in the ECE faculty meeting and was unanimously supported by the faculty.

In summary, I am extremely supportive of this program and believe it will help in attracting high quality undergraduate students to UCR. Please do not hesitate to contact me should there be any questions. Sincerely,



Amit Roy-Chowdhury
Professor and Chair
[Electrical and Computer Engineering](#)
University of California, Riverside



Walid A. Najjar
Professor and Chair
Department of Computer Science and Engineering
351 Winston Chung Hall Riverside, CA 92521
Tel 951.827.5639 Fax 951.827.4643
najjar@cs.ucr.edu www.cs.ucr.edu/~najjar

November 1, 2020

Dear Members of the Academic Senate:

With this letter I would like to express the strong support of the Department of Computer Science and Engineering for the proposed B.S. degree in Robotics within the Bourns College of Engineering at UCR. This cross-disciplinary program will draw upon courses and research knowledge from the departments of Computer Science and Engineering (CSE), Electrical and Computer Engineering (ECE) and Mechanical Engineering (ME).

There is no doubt that robotics is rapidly becoming a very important field of engineering. Robotics requires multi-disciplinary breadth, well beyond what can be covered in courses in a single traditional discipline. The proposed Robotics program provides a comprehensive structure under which students can acquire the cross-disciplinary breadth required for this important and emerging field. It does so at very little expense, since the teaching and research infrastructure are already in place.

The proposed program emphasizes four focus areas: mechanical design and fabrication, embedded platforms and system design, control and navigation, and artificial intelligence and perception. These cover different aspect of robotics, from the design of the mechanical and electronic design to the cognitive aspects that enable decision making.

Within computer science and engineering the proposed B.S. in Robotics program relies on multiple disciplines including, but not limited to, artificial intelligence, machine learning, embedded and real-time systems, computer architecture, operating systems etc.

The CSE Department expects to interact extensively with the proposed Robotics program by participating in teaching the required and elective courses, in robotics research and the mentoring of students through projects and advising, and in helping with the program administration. The program will contribute in a great many positive ways to the CSE Department.

In summary, I am extremely supportive of this program and believe it will greatly benefit the students and will help raise UCR's profile. Please do not hesitate to contact me should there be any questions.

Sincerely,

Walid A. Najjar

Professor and Chair
Department of Computer Science and Engineering
Bourns College of Engineering
University of California Riverside

March 4, 2021

Dear Members of the Academic Senate:

I am writing to express my strong support as Dean of the Bourns College of Engineering for the proposed B.S. degree in Robotics within the Bourns College of Engineering at UCR. This proposed interdepartmental program will draw from courses in the departments of Mechanical Engineering, Electrical and Computer Engineering, and Computer Science and Engineering.

Robotics is a fast-growing discipline in engineering, but does not fit within a single discipline. A full understanding of robotics requires the ability to couple mechanical systems with electrical sensing and actuation, feedback and control systems, embedded computer systems (the hardware / software interface), and advanced software and programming. The proposed Robotics program will provide the cross-disciplinary background needed for success in this emerging field. Most of the courses are already available within departments and thus launching this program will not be excessively expensive.

In this letter, I am committing to a course release for the chair of this program. As the program grows in numbers of students and the workload associated with running the program increases, I anticipate adding a stipend and other support. I am also committing to provide TA support as class sizes grow, commensurate with the existing BCOE TA assignment policy.

Sincerely,



Prof. Christopher S. Lynch
William R. Johnson Jr. Family Chair
Dean, Bourns College of Engineering
University of California, Riverside



03/16/21

RE: BS in Robotics at the University of California, Riverside

Dear Members of the Review Board,

I am writing to support the proposal to initiate a BS in Robotics at the University of California, Riverside. I believe that this proposal addresses current needs in Industry and Academia for students with specialized training in the broad disciplines of artificial intelligence, control theory and algorithm design, among others, which blend together in the robotics discipline. The interdepartmental program proposed at the University of California, Riverside, will provide the students with the required technical knowledge to pursue their careers in the field of robotics. The proposed BS degree will be among the few available in the country, and will likely inspire other institutions to launch similar programs in the near future.

To calibrate my recommendation, I should note that I have seen this play out successfully at the graduate levels as, in the past, I served as the Director for Georgia Tech's Institute for Robotics and Intelligent Machines, which is home to both multidisciplinary PhD and MS degrees. And it is clear that students and their future employers are highly enthusiastic about such programs.

The proposed curriculum is well-thought-out and balanced. In addition to the standard math and physics courses required by most engineering programs, students will need to complete a number of required classes from the three participating Departments, as well as a series of elective courses. This structure guarantees that graduating students will have the required engineering background and skills, but also the knowledge and flexibility to work and function in a multi-disciplinary environment. The proposed combination of courses from Electrical and Computer Engineering, Mechanical Engineering, and Computer Science and Engineering is truly unique to a curriculum in robotics, and particularly different from the coursework required for more classic engineering degrees.

The participating Departments at the University of California, Riverside, are well positioned to initiate, administer, and grow the proposed BS program. The majority of the courses needed for the new program are currently being offered, thus minimizing the time, effort and risks to launch the new program. The organizational structure of the program is also very reasonable and effective, with Director and Co-Directors roles that will oversee course offerings, scheduling, and other practical matters. The projected enrollment of approximately 50 students is easily manageable, although I foresee a higher student demand for this program.

School of Electrical and Computer Engineering
Georgia Institute of Technology
Atlanta, Georgia 30332-0250
ece.gatech.edu

A unit of the University System of Georgia | An Equal Education and Employment Opportunity Institution

March 16, 2021

Page 2

In summary, I have no reservations on the proposal, and I believe that this new program will attract numerous high quality students soon after its launch. Please do not hesitate to contact me should you need further information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Magnus Egerstedt', with a stylized flourish at the end.

Magnus Egerstedt, Ph.D
Steve W. Chaddick School Chair and Professor
School of Electrical and Computer Engineering, Georgia Institute of Technology



Department of Mechanical and Aerospace Engineering
The Henry Samueli School of Engineering

Faryar Jabbari
Professor
3221 Engineering Gateway
Irvine, CA 92697-3975
Phone: (949) 824-6433
Fax: (949) 824-8585
FJABBARI@UCI.EDU

March 17, 2021

Dear Members of UCR Academic Senate Review Committee

RE: Proposed B.S. degree in Robotics at UCR

As a general rule, I am skeptical of non-traditional degrees, as they tend to be created based on temporary fads, but stay around for decades, far beyond their useful shelf-life. Often a degree in a traditional major with an expanded minor would be better.

I do think that Robotics has become an exception to that rule. The proposal describes the landscape well: tremendous interest among high school students, partly due to availability of exciting new hobby devices and accessibility of Arduino-type platforms, partly due to exciting new products of Boston Dynamics and similar. As the proposal states, it is hard to do a decent job training in robotics in a more traditional engineering major: mechanical engineers have a host of fluids, thermodynamics, heat-transfer, mechanics, etc., while EE and CS degrees have their own full requirements. The proposed degree, nestled among 3 departments and drawing courses from mostly existing courses, appears a low entry-cost way to provide this pathway for students. I do think it will be successful and, more importantly, would add a valuable option for students to choose. While I will list my concerns and suggestions below, I am fully supportive of the proposed degree and hope more universities would be able to get three departments to cooperate for such an undertaking. That is not easy and they should be commended.

Educational Aspects

- The physics sequence stops at 19th century. It seems to me that we should ensure engineering students are familiar with modern physics. On the other hand, there is a 3-course sequence in programming in the sophomore year, which might be somewhat excessive.
- There are 4 technical electives, which is a decent number but it would be in students' interest if more 'guided' options are incorporated. Examples include a list of 4-7 courses in CS that do vision, autonomy, graphics or a similar list in EE option that would be focused on communication, networks, cooperative algorithms, and ME with on mobility, design, etc. Perhaps they could be designated that way formally to help

students' careers by giving them more options (so instead EE with Robotics options, it will be Robotics with EE option, implying strong EE background). It will result in a more tangible connection to a traditional degree and increase the chance that the 'option' department and faculty take interest in the students. Of course, a totally flexible option will be great to have, as well.

- Increasingly robotics, particularly the 'automation' side would open up a host of ethical and privacy issues, quite dissimilar to other engineering endeavors. It might be good to ensure that the senior design, or some other place, incorporates them. Maybe even a special breath course!

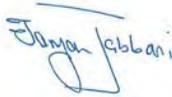
Administrative Aspects

- ABET: Does ABET have Robotics as a degree to review? Does it have minimum coverage of certain areas as requirement? I assume this is checked.
- I assume which department gets what credit (course units, majors, etc.) is clear and worked out. If not, it might be best to develop an MOU for that. As the saying goes, 'if Chairs were angels, we would not need to have MOUs'
- Sunset: The program IS in response to current interests. The nature of robotics might change in a few years, some thought should be given on how the program is discontinued or a department might want to cease its participation.
- There is a statement that each department agrees to teach the key courses at least once a year. Unless they are offered multiple times, chances are some really have to be offered in specific quarter as well. Perhaps this is the kind of detail that cannot be worked out at this stage, but this would force restrictions for the other degrees and over time might become a headache.

The above suggestions/observations do not take away from a very well organized and sound program. They should be seen as simply friendly advice --- which of course can be (perhaps should be!) ignored.

Best of luck with your program.

Sincerely,



Faryar Jabbari
Professor and Senior Associate Dean

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



SANTA BARBARA • SANTA CRUZ

DEPARTMENT OF ELECTRICAL AND
COMPUTER ENGINEERING

SANTA BARBARA, CALIFORNIA 93106-9560

March 24, 2021

Dear Members of the Review Board,

The initiative to create a new undergraduate degree program in robotics at the University of California, Riverside, is timely, well-justified, and needed. The proposed structure and curriculum are carefully thought-out and effective. I have no doubt that this program will be in high demand, and I'm happy to provide this letter to express my full support. In this letter, I'm going to comment on three main aspects of the program:

Need: Demand for engineers that are well-trained in disciplines related to robotics is constantly raising, both from Academia and the Industry. It is undeniable that recent intellectual breakthroughs in Robotics and Artificial Intelligence have enabled important innovations in several technological areas including automated vehicles, rehabilitation and medical devices, and monitoring, to name a few. Yet, to sustain and further such progress, the need for highly trained engineers will only increase, thus guaranteeing the longevity of the pursued program.

Proposed curriculum: Robotics is an inherently multi-disciplinary field, making it virtually impossible to create a competitive program within any single classic department. To address this challenge, the proposed curriculum leverages courses offered in three participating departments, thus guaranteeing that subjects are presented in their "native" way, and that students become proficient in the different disciplines necessary for robotics. While coordinating courses from three different departments can be a challenge, the proposal presents a well-organized structure, with key representative members from all participating departments, that will ensure the well-functioning of this new program.

Capabilities and resources: The proposed curriculum hinges on courses, faculty members and lecturers that are already within the participating departments. Thus, the proposed program requires little new resources to run, mainly related to organizational roles, making it a small investment for the school. Among the three participating departments, the faculty members cover all the required expertise, ensuring the quality of the training that the students will receive.

To conclude, this is a strong proposal for a timely degree in robotics, with support from a well-qualified set of faculty members. I have no doubt that the program will attract strong interest and that it will keep growing over the years.

Sincerely,

A handwritten signature in blue ink, appearing to read "B.S. Manjunath".

B.S. Manjunath
Distinguished Professor and Chair



Academic Senate

June 16, 2021

To: Philip Brisk
Chair, BCOE Faculty Executive Committee

From: Jason Stajich
Chair, Riverside Division

CC: Katelyn Robinson
Advising Enrollment Support Specialist

RE: **Proposal for New Undergraduate Major - Bachelor of Science in Robotics Engineering**

Dear Philip,

I write to provide the consultative feedback regarding the proposed Bachelor of Science in Robotics Engineering. I have attached the comments of the tasked committees. I hope this feedback proves helpful to the proponents.

Sincerely,
/s/ Jason



Academic Senate

COMMITTEE ON EDUCATIONAL POLICY

May 10, 2021

To: Jason Stajich, Chair
Riverside Division

From: Stefano Vidussi, Chair 
Committee on Educational Policy

RE: Proposed B.S. in Robotics Engineering

The Committee on Educational Policy reviewed the proposal for a B.S. in Robotics Engineering at their May 7, 2021 meeting and are generally supportive of the proposal. The Committee does recommend that the proposal be updated to respond to the concerns and suggestions included in the letters of support, with particular regard for the letter from Professor and Senior Associate Dean Faryar Jabbari from UC Irvine.



COMMITTEE ON DIVERSITY, EQUITY, & INCLUSION

May 11, 2021

To: Jason Stajich, Chair
Riverside Division Academic Senate

From: Xuan Liu, Chair
Committee on Diversity, Equity, & Inclusion

Re: Proposal: New Undergraduate Major: Bachelor of Science in Robotics
Engineering

The Committee on Diversity, Equity, and Inclusion reviewed the proposed Bachelor of Science in Robotics Engineering and was in support of the proposal.



Academic Senate

COMMITTEE ON COURSES

May 5, 2021

To: Jason Stajich, Chair
Riverside Division

From: Ming Lee Tang, Chair 
Committee on Courses

Re: Proposal for a B.S. in Robotics Engineering

The Committee on Courses reviewed the proposal for a B.S. in Robotics Engineering at their May 5, 2021 meeting and did not find any concerns with the proposal related to the Committee's charge of courses and instruction.

PLANNING & BUDGET

May 18, 2021

To: Jason Stajich, Chair
Riverside Division

From: Katherine Kinney, Chair 
Committee on Planning and Budget

**RE: [Campus Review] Proposal: New Undergraduate Major: Bachelor of Science
in Robotics Engineering**

Planning & Budget (P&B) discussed the proposed undergraduate major in Robotics Engineering at their May 18, 2021 meeting. While the committee was supportive of the new major, members did want to raise concern over the lack of added staff resources that will surely be required. The proposal mentioned that existing staff will be used to support this program, will staff be taken away from supporting other programs? There will be an increase in students but not an increase to staffing, any growth throws the understaffing situation into greater crisis. This issue should be addressed and explained in detail in the proposal.



COMMITTEE ON UNDERGRADUATE ADMISSIONS

May 27, 2021

To: Jason Stajich, Chair
Riverside Division

From: Sheldon Tan, Chair
Committee on Undergraduate Admissions

RE: CR. Proposal for the new undergraduate major in Robotics Engineering

The Committee on Undergraduate Admissions reviewed the proposal for the new undergraduate major in Robotics Engineering and are generally supportive of the proposal. The committee has the following questions/suggestions:

- 1) The committee suggests the transfer admission requirements (major preparation) be more explicit for new students transferring into the major from a CCC.
- 2) What is the minimum GPA for transfer students?
- 3) How are students selected into the program?

Proposal for the new undergraduate major in Robotics Engineering

1. *Name of the academic program and the department or unit that will administer the program.*

Name: Robotics Engineering Undergraduate Major

Administration: The Robotics Engineering major will be administered jointly by the Department of Mechanical Engineering (ME), the Department of Electrical and Computer Engineering (ECE), and the Department of Computer Science and Engineering (CSE).

2. *A thorough justification, including the motivation for the creation of the program in terms of student interest and professional or academic importance.*

Robotics is one of the most frequently inquired-about majors from high school students considering applying to BCOE. The rise of K-12 extra-curricular and curricular activities involving aspects of robotics (such as those based on Arduino) has sparked an interest among high school students considering Engineering.

Robotics sits between a number of traditional engineering academic disciplines. While some universities have dedicated robotics departments (for instance, Carnegie Mellon University), this is not the norm, nor is it necessary to provide a rich robotics program. The current BCOE faculty span many aspects of robotics and have research and teaching interests that bridge multiple disciplines.

Specialization within an existing major would not provide the breadth necessary for understanding robotics. The breadth necessary, from mechanics to circuit design and software engineering cannot be worked into existing undergraduate majors. Yet, graduates with such skills would be in high demand in the job market. The US Bureau of Labor Statistics and the Projections Managing Partnership project 9% job growth in robotics from 2016-2026 in California, higher than the 4% projected over a similar period for the US as a whole (<https://www.onetonline.org/link/localtrends/17-2199.08?st=CA&g=Go>).

3. *Relationship of the new program to existing programs.*

The proposed program is different in its requirements from the traditional programs in Computer Science and Engineering, Electrical and Computer Engineering, and Mechanical Engineering. For example, the Robotics Engineering program requires students to take classes in Computer Science and Electrical Engineering, which are not required for Mechanical Engineering students. Similarly, Computer Science and Electrical Engineering students need to take classes in Mechanical Engineering, which they do not need to take if enrolled in the classical programs.

With its interdisciplinary emphasis on programming, algorithms, engineering, and computer science, the Robotics Engineering program will provide the students with the necessary foundations to study and understand a broad range of topics that would not be accessible from any individual program.

- 4. The proposed curriculum. Great care should be given in this area, correct rubrics should be listed for courses, all cross listings should be listed, unit total considerations should be taken into account and totals should be verified by program staff, faculty, and appropriate Executive Committee personnel. A copy of the proposed program change should be provided for inclusion in the Catalog.*

The proposed curriculum is detailed in Appendix A, and the catalog entry is in Appendix B.

- 5. A list of faculty who will be involved in the program, including those teaching, advising, and administering.*

Below is the current list of faculty involved in the program (new faculty will be added as the program evolves):

Professors:

Christian Shelton, CSE
Amit Roy-Chowdhury, ECE
Matt Barth, ECE
Bir Bhanu, ECE
Jay Farrell, ECE
Wei Ren, ECE
Philip Brisk, CSE

Associate Professors:

Fabio Pasqualetti, ME
Anastasios Mourikis, ECE
Roman Chomko, ECE

Assistant Professors:

Konstantinos Karydis, ECE
Salman Asif, ECE
Hyoseung Kim, ECE
Samet Oymak, ECE
Erfan Nozari, ME
Jun Sheng, ME
Luat Vuong, ME
Jonathan Realmuto, ME
Vagelis Papalexakis, CSE

- 6. For interdisciplinary programs, the degree of participation and the role of each department must be explicitly described. The chairs of all participating departments must provide written approval for the creation of the program and indicate their commitment to provide necessary resources including faculty release.*

The program will be administered through a joint steering committee. The steering committee will consist of three faculty across the Departments of Computer Science and

Engineering, Mechanical Engineering, and Electrical and Computer Engineering. The Program Director and the program co-Director will be from different departments. The Director and co-Director are the coordinators of the program across the departments, and the Director will also be responsible for coordinating and/or resolving campus-level issues. Normal terms for the Director and co-Director are 3 years and at the end of the 3-year term the co-Director is expected to accede to the Director position. If the Director (or co-Director) is unable to complete their 3-year term, a faculty from the same department will be chosen to assume the duties until the end of that 3-year term. The co-Director will also serve as the undergrad student advisor for the program.

Directors and co-Directors will be appointed by the Dean in consultation with the joint steering committee and program faculty.

Circumstances may intervene that call for consecutive terms of a Director or a co-Director, or consecutive Directors or co-Directors from within the same department. These situations will be recognized, agreed upon, and handled by the joint steering committee and the Dean on a case-by-case basis.

Director and co-Director stipend costs will be set by agreement with the Dean.

Proposed changes to the program will need to be approved by the majority of the steering committee (including Director and co-Director). In the case of a tied vote, the Director makes the final decision. The proposed program change will then be reviewed by the College executive committee and then the committee on education policy. If these committees consider the change to be noncontroversial, the proposed change is placed on the Consent Calendar for a meeting of the Division of the Academic Senate.

Each department will be responsible for offering any of the program's core courses taught by that department at least once per year. The three departments will also cooperate in providing materials needed for any appropriate accreditation process (e.g., ABET or WASC.)

The Director and co-Director will issue an annual report to the Dean to document the state of the program. Based on the report, the Dean can initiate procedures to modify or retire the program.

7. *Projected enrollment in the program.*

The projected enrollment at the start of the program is 25-30 students; we expect a target admission rate of 50 students per year at steady state.

8. *Name of degree, if applicable, and the anticipated number of degrees to be granted when the program reaches steady state.*

B.S. in Robotics Engineering, 40-50 degrees awarded per year.

9. *Potential impact of the new program on existing programs. If the proposed program includes required courses from a department other than the administering department, the proposal must include a statement from the department indicating that it has been consulted and that it will provide access to the required courses.*

The new major uses seven existing lower division courses offered by the Department of Mathematics (namely: MATH 009A, MATH 009B, MATH 009C, MATH 010A, MATH 011

/ CS 011, MATH 031, MATH 046) and three existing lower division courses offered by the Department of Physics & Astronomy (namely: PHYS 040A, PHYS 040B, PHYS 040C). All these courses are currently being used by CSE and/or ECE and/or ME for satisfying college/major requirements in the BS degrees offered currently by the CSE, ECE, and ME departments. Given that these courses are also used by many other departments to satisfy college requirements, we do not expect a major impact in their offerings by the new program.

The design of the new major led to the creation of one new upper division course (namely: EE 106). This course has been approved by the respective departments and will serve as an elective in the BS programs offered by the ECE and ME departments. All other upper division courses required for the major are currently being taught in the participating departments.

10. *A full listing of resources required for start-up and for operations. In cases where no additional resources will be needed, this must be explicitly stated. This listing may include: personnel (faculty FTE or temporary positions, Teaching Assistants or Readers, administrative staff, technical support); support services including computer facilities and library resources; space requirements. A plan indicating how the resources will be obtained would also be helpful to the committee in reviewing the proposal. A letter of support from the College Dean and/or Executive Vice Chancellor-Provost indicating endorsement as well as a promise of support for the proposal also would be extremely helpful.*

- a. Faculty FTE: the program will use existing faculty from the three departments.
- b. Teaching Assistants: at steady state the program will have approximately 200 students over the four years. Students will take 4 courses per quarter, resulting in about 25 lab/discussion sections per quarter (assuming a section contains 30-35 students). Since students will enroll in existing courses (with the exception of EE 106), should enrollment in the existing courses increase, TA resources will be allocated following the existing policies. Similarly, additional TA resources for the new course EE 106 will be requested based on enrollment and per existing policies. The costs for the additional TA resources, however, will be easily covered by the tuition fees of the new students.
- c. Administrative Staff: the program will be administered by existing staff in the three home departments. Students enrolled in the Robotics Engineering program will be advised by BCOE's Office of Undergraduate Student Academic Affairs (OSAA). OSAA currently has eight full time advisors that will initially accommodate the Robotics students.
- d. Computer facilities and library resources: no new facilities required.
- e. Space requirements: no new space requirements.

11. *Both internal and external letters of support should be provided with the proposal. Internal letters of support are often from UCR department chairs and faculty of related programs. The external letters should be from other UC campuses or other peer institutions. Letters from off-campus help to establish the quality of the program and its fit within the context of related programs at other universities. Upon consultation with the CEP the demand for external letters may be waived.*

Support letters are included below in Appendix C. It should be noticed that external letters were requested from prominent members of the robotics community, including current Chairs of the ECE Departments at the Georgia Institute of Technology and UC Santa Barbara, a former Chair of the ME Department at UC Irvine, and one of the senior-most Computer Science faculty from GRASP Lab, one of the most prestigious robotics lab in the world. All letters are overwhelmingly supportive of the current proposal. Some letters provide some detailed comments, which we briefly address here:

- a. Adequacy of the sequence of physics courses. The proposed courses are standard in our Engineering programs. Additionally, topics in electronics, which will be crucial to robotics students, will be also covered in a dedicated course, EE 005 (see below). The topics covered in the physics sequence are deemed adequate for robotics students.
- b. Guidance for selecting elective courses. While the proposed curriculum leaves freedom to the students to choose their preferred elective courses, guidance will be provided to ensure that students' selections maximize their preparation and career possibilities. We believe that this formula will achieve the dual objective of remaining flexible, hence more attractive, and ensuring high-quality education.
- c. Ethics issues. Our senior design courses already include modules on ethics. These will be automatically inherited by the Robotics program.
- d. Three courses on programming. Three-quarter freshman programming sequence is standard, and any changes affect many majors. If accelerated options are available in the future, we will consider such options and revise or adjust the Robotics requirements as appropriate.
- e. ABET accreditation. Based on our research, it seems that ABET does not currently have a well-defined set of guidelines for undergraduate robotics programs. Given the expected popularity of robotics programs, we expect precise guidelines to be released in the future, and we plan to make any required changes when appropriate.
- f. Scheduling and organizational issues. The proposed program consists, for the most part, of courses that are currently being offered multiple times per year in the participating departments. Some of the courses that are expected to receive higher enrollment are also cross-listed across departments, making it simple to provide additional offerings (for example, EE144/ME144, ME145/EE145, EE120A/CS120A, EE120B/CS120B, EE142/CS171). The initial projected enrollment can certainly be incorporated in the existing offerings. Additional offerings of key courses will be discussed as enrollment grows, should the need arise. Finally, the three participating Departments have already provided support letters, and have already committed resources for the success of the proposed program. Formal collaboration and coordination mechanisms, including mechanisms to grow or terminate the program, will be detailed and agreed upon as appropriate as the need arise.

12. Approvals from program faculty, College faculty (if the new proposal affects a college regulation), and the appropriate Executive Committee should be obtained before forwarding the new program to the attention of the Senate Analyst for CEP.

Approved by the Departments of Mechanical Engineering, Electrical and Computer Engineering, and Computer Science and Engineering, as well as by the program faculty.

13. Contribution to diversity

Recruitment: UCR is an accredited Hispanic Serving Institution (OPEID 00131600), with approximately 35% Hispanic enrollment. BCOE has a much higher proportion of undergraduates from underrepresented backgrounds compared to Engineering Schools at comparably-ranked R1 universities in the United States. Prior research has established that the hands-on aspects of robotics, coupled with clear workforce-related applications of the technology, appeal to students from underrepresented backgrounds and increase engagement, involvement, and retention [1-3]. The fast-growing nature of the field of robotics (and AI in particular) is a great motivating factor for students to complete a cross-disciplinary BS degree before entering the workforce or graduate studies. The BS Robotics Engineering program will recruit from schools in the Southern California region, the United States, and beyond. UCR is already one of America's most diverse universities and of the most successful at graduating students from underrepresented groups and disadvantaged backgrounds. The BS Robotics Engineering program will further contribute to UCR's mission by providing novel and very diverse career opportunities towards addressing the need for a larger, diverse, and globally engaged STEM workforce.

Curriculum and pedagogy: The cross-disciplinary nature of robotics creates the opportunity to build curriculum that is sensitive to the needs of diverse learners as well as diverse members of society. Of particular interest and concern is the subject of algorithmic bias in AI and machine learning. The design of AI systems has been primarily the domain of white, male engineers [4], and several scholars have suggested that efforts toward inclusion in the ranks of those who design AI systems could reduce bias [5, 6]. For example, just 12% of machine learning engineers are women [7], with Black AI leaders pointing to a "diversity crisis" in the field [8]. Critiques of simple inclusivity efforts suggest that diversity programs cannot address overlapping forms of inequality, and have called for applying a more deliberate lens of intersectionality to the algorithm design [9, 10]. To this end, the BS Robotics Engineering program will work closely with the CS and ECE Departments to update their AI, machine learning, and computer vision undergraduate-level curricula to address algorithmic bias, including how biased vs. unbiased robots may impact society as the technology evolves.

Outreach: Students in the BS Robotics Engineering program will be encouraged to participate with ongoing efforts at UCR to provide mentorship and broaden participation in robotics-related activities. One recent example is UCR's K-12 Lego Robotics Competition [11]. BCOE student organizations such as the IEEE@UCR (affiliated with the ECE Department) have a long and successful history of outreach efforts to the local community which bring K-12 students to campus. The BS Robotics Engineering program will work with BCOE student organizations to create new opportunities for undergraduate student leadership and participation surrounding community outreach events.

- [1] H. Yi, "Robotics and kinetic design for underrepresented minority (URM) students in building education: Challenges and opportunities", *Comput Appl Eng Educ.* 2019; 27:351–370.
- [2] R.A. Pitt, "Impact of an Updated Robotics Laboratory in an Industrial Engineering Program" 2012 ASEE ANNUAL CONFERENCE retrieved from <https://www.asee.org/public/conferences/8/papers/5066/download>
- [3] V.V. Morris, R.A. Stein, J.F. Keller, and V. Kumar, "Robotics in Urban STEM Education: The Philadelphia Model" 2011 ASEE ANNUAL CONFERENCE retrieved from https://www.asee.org/file_server/papers/attachment/file/0001/1962/Robotics_In_Urban_STEM_Education-The_Philadelphia_Model.pdf
- [4] Crawford, Kate (2016-06-25). "Opinion | Artificial Intelligence's White Guy Problem". *The New York Times*. ISSN 0362-4331. Retrieved 2020-02-11.
- [5] Jobin, Anna; Ienca, Marcello; Vayena, Effy (2 September 2019). "The global landscape of AI ethics guidelines". *Nature Machine Intelligence*. 1 (9): 389-399. arXiv:1906.11668. doi:10.1038/s42256-019-0088-2.
- [6] "White Paper: How to Prevent Discriminatory Outcomes in Machine Learning". *World Economic Forum*. 12 March 2018. Retrieved 11 February 2020.
- [7] "AI Is the Future—But Where Are the Women?". *Wired*. ISSN 1059-1028. Retrieved 2020-02-11.
- [8] Snow, Jackie. "'We're in a diversity crisis': cofounder of Black in AI on what's poisoning algorithms in our lives". *MIT Technology Review*. Retrieved 2020-02-11.
- [9] Ciston, Sarah (2019-12-29). "Intersectional AI Is Essential". *Journal of Science and Technology of the Arts*. 11 (2): 3–8. doi:10.7559/citarj.v11i2.665. ISSN 2183-0088.
- [10] D'Ignazio, Catherine; Klein, Lauren F. (2020). *Data feminism*. MIT Press. ISBN 0262044005.
- [11] FIRST LEGO League, www.firstlegoleague.org. UCR has hosted the regional competition in recent years.

14. Program Educational Objectives (PEO)

Graduates of the UCR's BS degree program in Robotics Engineering will meet high professional, ethical, and societal goals as demonstrated by accomplishing at least one different item in each of the following different categories:

1. Success in post-graduation studies as evidenced by:
 - a. Satisfaction with the decision to further their education
 - b. Advanced courses completed or advanced degree earned
 - c. Professional visibility (e.g., publications, patents, inventions, awards)
 - d. Professional responsibilities (e.g., professional mentoring, professional society memberships, reviewing and editorial work for professional journals)
2. Success in a chosen profession or vocation as evidenced by:
 - a. Career satisfaction
 - b. Promotions/raises (e.g., management leadership positions or distinguished technical positions)
 - c. Entrepreneurial activities
 - d. Consulting activities
3. Contributions to society and profession as evidenced by:
 - a. Leadership roles
 - b. Public service
 - c. Outreach and volunteering activities
 - d. Establishment and maintenance of professional networks

The PEOs are structured into three main objectives, with various specific examples of measurable evidence. It is not expected that students will achieve all of the three main objectives. Rather, the PEOs are designed to meet the needs of students with different interests within the Robotics Engineering program. The first set of PEOs is most relevant to students that pursue advanced degrees. The second set of PEOs is designed for students that instead prefer to enter the workplace immediately after graduation. Finally, we expect most of our students to make some societal contributions within 3-5 years after graduation.

The PEOs of the Robotics Engineering program are consistent and well-aligned with the mission of the Bourns College of Engineering.

Appendix A.

Robotics Engineering Undergraduate Major.

Year 1		
Fall	Winter	Spring
MATH 009A	MATH 009B	MATH 009C
CS 010A	CS 010B	CS 010C
ME 009	PHYS 040A	PHYS 040B
ENGL 001A	ENGL 001B	BREADTH 1

Year 2		
Fall	Winter	Spring
PHYS 040C	MATH 046	MATH 011
MATH 010A	CS 061	EE 005
ME 010	EE 106	ME 120
CS 100	BREADTH 2	MATH 031

Year 3		
Fall	Winter	Spring
ME 103	EE 120A / CS 120A	EE120B / CS 120B
EE 111	EE 114	EE 132
TECH. ELEC. 1	TECH. ELEC. 2	TECH. ELEC. 3
BREADTH 3	BREADTH 4	BREADTH 5

Year 4		
Fall	Winter	Spring
EE 144 / ME 144	ME 145 / EE 145	EE 142 / CS 171
TECH. ELEC. 4	SENIOR DES. 1	SENIOR DES. 2
ENGR 180W	BREADTH 6	BREADTH 7

Comments:

One new course, EE 106 (Programming Practical Robotics).

MATH 009AH, 009BH, and 009CH can be used as alternatives for MATH 009A, 009B, and 009C, respectively.

Students will complete Senior Design courses in one of the participating Departments (Mechanical Engineering, Electrical and Computer Engineering, Computer Science and Engineering): CS 178A and CS 178B, or EE 175A and EE 175B, or ME 175B and ME 175C. Prerequisites to these courses will be adjusted to include senior standing in Robotics after approval of the Robotics program.

Course description:

MATH 009A First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 005 with a grade of “C-” or better or MATH 006B with a grade of “C-” or better or

equivalent. Introduction to the differential calculus of functions of one variable. Credit is awarded for only one of MATH 008B, MATH 009A, or MATH 09HA.

MATH 009B First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 008B with a grade of “C-” or better or MATH 009A with a grade of “C-” or better or MATH 09HA with a grade of “C-” or better. Introduction to the integral calculus of functions of one variable. Credit is awarded for only one of MATH 009B or MATH 09HB.

MATH 009C First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009B with a grade of “C-” or better or MATH 09HB with a grade of “C-” or better. Further topics from integral calculus, improper integrals, infinite series, Taylor’s series, and Taylor’s theorem. Credit is awarded for only one of MATH 009C or MATH 09HC.

MATH 010A Calculus of Several Variables (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009B with a grade of “C-” or better or MATH 09HB with a “C-” or better or equivalent. Topics include Euclidean geometry, matrices and linear functions, determinants, partial derivatives, directional derivatives, Jacobians, gradients, chain rule, and Taylor’s theorem for several variables.

MATH 011 Introduction to Discrete Structures (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009A (or MATH 09HA); CS 010 or CS 010V or MATH 009B (or MATH 09HB). Introduction to basic concepts of discrete mathematics emphasizing applications to computer science. Topics include propositional and predicate calculi, elementary set theory, functions, relations, proof techniques, elements of number theory, enumeration, and discrete probability. **Cross-listed with CS 011.**

MATH 031 Applied Linear Algebra (5) Lecture, 3 hours; discussion, 2 hours. Prerequisite(s): MATH 009A (or MATH 09HA) with a grade “C-” or better and CS 010 or CS 010V or MATH 009B (or MATH 09HB) with a grade of “C-” or better. A study of matrices and systems of linear equations, determinants, Gaussian elimination, vector spaces, linear independence and linear transformation, orthogonality, eigenvalues, and eigenvectors. Also examines selected topics and applications.

MATH 046 Introduction to Ordinary Differential Equations 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 007B or MATH 009B or MATH 09HB with a grade of “C-” or better or equivalent. Introduction to first-order equations, linear second-order equations, and Laplace transforms, with applications to the physical and biological sciences.

PHYS 040A General Physics 5 Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): MATH 007A or MATH 009A or MATH 09HA with a grade of “C-” or better; MATH 007B or MATH 009B or MATH 09HB with a grade of “C-” or better (MATH 009B or MATH 09HB may be taken concurrently). Designed for engineering and physical sciences students. Covers topics in classical mechanics including Newton’s laws of motion; friction; circular motion; work, energy, and conservation of energy; dynamics of particle systems; collisions; rigid-body motion; torque; and angular momentum. Laboratories provide exercises illustrating experimental foundations of physical principles and selected applications. Credit is not awarded for PHYS 040A if it has already been awarded for PHYS 002A, PHYS 02HA, PHYS 040HA, or PHYS 041A.

PHYS 040B General Physics 5 Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): MATH 009C or MATH 09HC (may be taken concurrently); PHYS 040A or PHYS 040HA with a grade of “C-” or better. Designed for engineering and physical sciences students. Covers topics in mechanics and thermodynamics including elasticity; oscillations; gravitation; fluids; mechanical waves and sound; temperature, heat, and the laws of

thermodynamics; and the kinetic theory of gases. Laboratories provide exercises illustrating the experimental foundations of physical principles and selected applications. Credit is awarded for only one of PHYS 040B or PHYS 040HB.

PHYS 040C General Physics 5 Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): MATH 009C or MATH 09HC; PHYS 040B or PHYS 040HB with a grade of “C-” or better. Designed for engineering and physical sciences students. Covers topics in electricity and magnetism including electric fields and potential; Gauss’ law; capacitance; magnetic fields; Ampere’s law; Faraday’s law and induction; electromagnetic oscillations; dc and ac current; and circuits. Laboratories provide exercises illustrating the experimental foundations of physical principles and selected applications. Credit is awarded for only one of PHYS 040C, PHYS 040HC, PHYS 002B, PHYS 02HB, or PHYS 041B.

CS 010A Introduction to Computer Science for Science, Mathematics, and Engineering I (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): a college mathematics course (may be taken concurrently) or credit for MATH 009A from the Advanced Placement Examination or the Mathematics Advisory Examination. Covers problem solving through structured programming of algorithms on computers using the C++ object-oriented language. Includes variables, expressions, input/output (I/O), branches, loops, functions, parameters, arrays, strings, file I/O, and classes. Also covers software design, testing, and debugging. Credit is not awarded for CS 010 if it has already been awarded for CS 010V or CS 030.

CS 010B Introduction to Computer Science for Science, Mathematics, and Engineering II (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 010 or CS 010V with a grade of “C” or better; familiarity with C or C++ language. Covers structured and object-oriented programming in C++. Emphasizes good programming principles and development of substantial programs. Topics include recursion, pointers, linked lists, abstract data types, and libraries. Also covers software engineering principles. Credit is awarded for only one of CS 012 or CS 012V or CS 013.

CS 010C Introduction to Data Structures and Algorithms (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 012 or CS 012V with a grade of “C” or better or CS 013 with a grade of “C” or better; proficiency in C++. Topics include basic data structures such as arrays, lists, stacks, and queues. Covers dictionaries (including binary search trees and hashing) and priority queues (heaps). Offers an introductory analysis of algorithms, sorting algorithms, and object-oriented programming including abstract data types, inheritance, and polymorphism. Explores solving complex problems through structured software development.

CS 061 Machine Organization and Assembly Language Programming 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 010 with a grade of “C” or better. An introduction to computer organization. Topics include number representation, combinational and sequential logic, computer instructions, memory organization, addressing modes, interrupt, input/ output (I/O), assembly language programming, assemblers, and linkers.

CS 100 Software Construction (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 014 with a grade of “C-” or better. Emphasizes development of software systems. Topics include design and implementation strategies; selection and mastery of programming languages, environment tools, and development processes. Develops skill in programming, testing, debugging, performance evaluation, component integration, maintenance, and documentation. Covers professional and ethical responsibilities and the need to stay current with technology.

CS 120A Logic Design 5 Lecture, 3 hours; laboratory, 3 hours; individual study, 3 hours. Prerequisite(s): CS 061 with a grade of “C-” or better. Covers design of digital systems. Includes

Boolean algebra; combinational and sequential logic design; design and use of arithmetic logic units, carry-lookahead adders, multiplexors, decoders, comparators, multipliers, flip-flops, registers, and simple memories; state-machine design; and basic register-transfer level design. Uses hardware description languages, synthesis tools, programmable logic, and significant hardware prototyping. **Cross-listed with EE 120A.**

CS 120B Introduction to Embedded

Systems 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 120A or CS 120A. Introduction to hardware and software design of digital computing systems embedded in electronic devices (e.g., digital cameras or portable video games). Includes embedded processor programming, custom processor design, standard peripherals, memories, interfacing, and hardware/software trade-offs. Involves use of synthesis tools, programmable logic, microcontrollers, and developing working embedded systems. **Cross-listed with EE 120B.**

CS 178A Project Sequence in Computer Science and Engineering 4 Lecture, 1 hour; laboratory, 3 hours; practicum, 6 hours. Prerequisite(s): CS 141, ENGR 180W; restricted to class level standing of senior. Under the direction of a faculty member, teams propose, design, build, test, and document software and/ or hardware devices or systems. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment. Completed together, CS 178A and CS 178B may be applied as a substitute for the CS 179 (E-Z) CS major requirement. Graded In Progress (IP) until CS 178A and CS 178B are completed, at which time, a final letter grade is assigned.

CS 178B Project Sequence in Computer Science and Engineering 4 Lecture, 1 hour; laboratory, 3 hours; practicum, 6 hours. Prerequisite(s): CS 178A; restricted to class level standing of senior. Under the direction of a faculty member, teams propose, design, build, test, and document software and/or hardware devices or systems. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment.

ME 009 Engineering Graphics and Design 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): none. Covers graphical concepts and projective geometry relating to spatial visualization and communication in design. Includes technical sketching, computer-aided design with solid modeling, geometric dimensioning and tolerancing, and an introduction to the engineering design process.

ME 010 Statics 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): MATH 009C, PHYS 040A or PHYS 040HA. Covers equilibrium of coplanar force systems; analysis of frames and trusses; noncoplanar force systems; friction; and distributed loads.

ME 103 Dynamics 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): MATH 046, ME 010 with a grade of "C-" or better, ME 018B with a grade of C- or better. Topics include vector representation of kinematics and kinetics of particles; Newton's laws of motion; force- mass- acceleration, work-energy, and impulse- momentum methods; kinetics of systems of particles; and kinematics and kinetics of rigid bodies.

ME 120 Linear Systems and Controls 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): EE 001A, EE 01LA, ME 018B with a grade of C- or better. Introduces the modeling and analysis of dynamic systems, emphasizing the common features of mechanical, hydraulic, pneumatic, thermal, electrical, and electromechanical systems. Controls are introduced through state equations, equilibrium, linearization, stability, and time and frequency domain analysis.

ME 145 Robotic Planning and Kinematics 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ME 120 or equivalent; or consent on instructor. Motion planning and kinematics

topics with an emphasis in geometric reasoning, programming, and matrix computations. Motion planning includes configuration spaces, sensor-based planning, decomposition and sampling methods, and advanced planning algorithms. Kinematics includes reference frames, rotations and displacements, and kinematic motion models. **Cross-listed with EE 145.**

ME 175B Mechanical Engineering Design 3 Lecture, 2 hours; laboratory, 2 hours.

Prerequisite(s): senior standing in Mechanical Engineering. ME 113, ME 116A, ME 170A, ME 174, ME 175A (may be taken concurrently). Outlines the defining of a design problem and the conception and detail of the design solution. Explores design theory, design for safety, reliability, manufacture, and assembly. Graded In Progress (IP) until ME 175B and ME 175C are completed, at which time a final, letter grade is assigned.

ME 175C Mechanical Engineering Design 3 Lecture, 1 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): senior standing in Mechanical Engineering; ME 175B. Students create, test, and evaluate a prototype based on the project design generated in ME 175B. Lecture topics include prototyping techniques, design verification, and special topics in design. Satisfactory (S) or No Credit (NC) grading is not available.

EE 005 Circuits and Electronics 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): PHYS 040C or PHYS 040HC. Introduces linear circuits analysis, semiconductor diodes and transistors, analog amplifier circuits, operational amplifiers, and digital circuits. Does not confer credit towards a degree in Electrical Engineering and in Computer Engineering.

EE 106 Programming Practical Robotics 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisites: MATH 031 or EE 020, CS 010A or ME 018A. Covers principles for simulating, programming, and deploying robots using modern robotics middleware. Includes reading/writing of robot programs; simulating robotic systems; interfacing robot sensors and actuators; and implementing introductory motion control algorithms. Teaches contemporary robotics open-source software (ROS, Gazebo), 3D environment creation, and sensor data processing libraries (OpenCV, OpenNI, PCL).

EE 111 Digital and Analog Signals and Systems 4 Lecture, 3 hours; laboratory, 3 hours.

Prerequisite(s): EE 001B, EE 020, MATH 046; or consent of instructor. Covers continuous- and discrete-time signals and systems; linear time-invariant (LTI) systems; impulse response; Fourier analysis; frequency response; Laplace and Z-transforms; and sampling theorem and Nyquist rates. Includes laboratory experiments with signals, transforms, linear digital filtering, and sampling/aliasing.

EE 114 Probability, Random Variables, and Random Processes in Electrical Engineering 4

Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 110A or EE 111. Covers fundamentals of probability theory, random variables, and random processes with applications to electrical and computer engineering. Includes probability theory, random variables, densities, functions of random variables, expectations and moments, and multivariate distributions. Also addresses random processes, autocorrelation function, spectral analysis of random signals, and linear systems with random inputs.

EE 132 Automatic Control 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s):

EE 105 or ME 103 or equivalent; EE 110A or ENGR 118; or consent of instructor. Covers mathematical modeling of linear systems for time and frequency domain analysis. Topics include transfer function and state variable representations for analyzing stability, controllability, and observability; and closed-loop control design techniques by Bode, Nyquist, and root-locus methods. Laboratories involve both simulation and hardware exercises.

EE 142 Pattern Recognition and Analysis of Sensor Data 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 114 or STAT 155 or consent of the instructor. Introduction to pattern recognition for multi-dimensional, multi-modal sensor data such as images, videos, and smart grids. Classification and decision functions, feature extraction, regression, and neural networks. Clustering and dimensionality reduction for unsupervised learning. Dynamic models and tracking. Applications of pattern recognition in computer vision, robotics, smart grids, etc.

EE 144 Foundations of Robotics 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 020 or MATH 031 or ME 018B; CS 010A or ME 118; or consent of instructor. Provides foundational knowledge on analysis, control, and programming of robots. Considers configuration space, rigid body motion, forward, inverse and velocity kinematics, dynamics, trajectory planning, robot motion control, localization and mapping, and robot ethics. Integrates hands-on labs to program robots in simulation and experimentally by reading and interpreting sensor data. **Cross-listed with ME 144.**

EE 175A Senior Design Project 4 Lecture, 1 hour; laboratory, 3 hours; practicum, 6 hours. Prerequisite(s): EE 120B or CS 120B; restricted to class level standing of senior; restricted to major(s) Electrical Engineering, Electrical Engineering BS + MS; or consent of instructor. Proposal of design of electrical engineering devices or systems under the direction of the instructor. Develops technical specification; considers design constraints and industry standards; emphasizes ethical responsibilities; and promotes staying current on technology and its socioeconomic and environmental impact. Graded In Progress (IP) until EE 175A and EE 175B are completed, at which time, a final letter grade is assigned.

EE 175B Senior Design Project 4 Lecture, 1 hour; laboratory, 3 hours; practicum, 6 hours. Prerequisite(s): EE 175A; senior standing in Electrical Engineering. Builds, tests, and redesigns electrical engineering devices or systems. Develops and carries out test plan according to design specification. Presents a demo of the design. Completes project testing and technical documentation. Presents a demo of the design. Satisfactory (S) or No Credit (NC) grading is not available.

ENGR 180W Technical Communications 4 Lecture, 3 hours; workshop, 3 hours. Prerequisite(s): ENGL 001B with a grade of “C” or better; upper-division standing in the Bourns College of Engineering or consent of instructor. Develops oral, written, and graphical communication skills. Includes preparing and critiquing reports, proposals, instructions, and business correspondence. Emphasizes professional and ethical responsibilities and the need to stay current on technology and its global impact on economics, society, and the environment. Fulfills the third-quarter writing requirement for students who earn a grade of “C” or better for courses that the Academic Senate designates, and that the student’s college permits, as alternatives to English 001C.

Technical electives:

CS 111 Discrete Structures 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 010; CS 011/MATH 011; MATH 009C (or MATH 09HC). A study of discrete mathematical structures emphasizing applications to computer science. Topics include asymptotic notation, generating functions, recurrence equations, elements of graph theory, trees, algebraic structures, and number theory.

CS 122A Intermediate Embedded and Real-Time Systems 5 Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): CS 012 or CS 013; CS 120B/EE 120B. Covers software and hardware design of embedded computing systems. Includes hardware and software codesign, advanced

programming paradigms (including state machines and concurrent processes), real-time programming and operating systems, basic control systems, and modern chip and design technologies. Laboratories involve use of microcontrollers, embedded microprocessors, programmable logic and advanced simulation, and debug environments.

CS 122B Advanced Embedded and Real-Time Systems 5 Lecture, 3 hours; laboratory, 6 hours. Prerequisite(s): CS 122A. Explores state-of-the-art aspects of building embedded computer systems. Topics include real-time programming, synthesis of coprocessor cores, application-specific processors, hardware and software cosimulation and codesign, low-power design, reconfigurable computing, core-based design, and platform-based methodology.

CS 135 Virtual Reality 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 100. Covers the development of virtual reality (VR) worlds, including motion and physics of VR worlds. Includes design practices for immersive experiences, human visual perception, environmental and social interactions. Also includes positional tracking with sensors, augmented and mixed reality, and storage and transmission of virtual reality worlds.

CS 141 Intermediate Data Structures and Algorithms 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 014 with a grade of “C-” or better; CS 111; MATH 009C or MATH 09HC; proficiency in C++. Explores basic algorithm analysis using asymptotic notations, summation and recurrence relations, and algorithms and data structures for discrete structures including trees, strings, and graphs. Also covers general algorithm design techniques including “divide-and-conquer,” the greedy method, and dynamic programming. Integrates knowledge of data structures, algorithms, and programming.

CS 145 Combinatorial Optimization Algorithms 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 141; MATH 031 or MATH 131. The study of efficient algorithm design techniques for combinatorial optimization problems. Topics include shortest paths, minimum spanning trees, network flows, maximum matchings, stable matchings, linear programming, duality, two-person games, algorithmic techniques for integer programming problems, NP-completeness, and approximation algorithms.

CS 150 Automata and Formal Languages 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 014 with a grade of “C-” or better; CS 111; MATH 009C (or MATH 09HC). A study of formal languages. Includes regular and context-free languages; computational models for generating these languages such as finite-state automata, pushdown automata, regular expressions, and context-free grammars; mathematical properties of the languages and models; and equivalence between the models. Also introduces Turing machines and decidability.

CS 160 Concurrent Programming and Parallel Systems 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): CS 061, CS 100, CS 111. A study of concurrent and parallel systems. Topics include modular structure and design, interprocess communication, synchronization, failures, persistence, and concurrency control. Also covers atomic transactions, recovery, language support, distributed interprocess communication, and implementation mechanisms. Provides preparation for the study of operating systems, databases, and computer networking.

CS 170 Introduction to Artificial Intelligence 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 100 with a grade of “C-” or better, CS 111. An introduction to the field of artificial intelligence. Focuses on discrete-valued problems. Covers heuristic search, problem representation, and classical planning. Also covers constraint satisfaction and logical inference.

CS 173 Introduction to Natural Language Processing 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 150, may be taken concurrently. An overview of modern approaches for natural language processing. Focuses on major algorithms used in NLP for various applications

such as part-of-speech tagging, parsing, named entity recognition, coreference resolution, sentiment analysis, and machine translation.

ME 110 Mechanics of Materials 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): CS 009M or ME 018A; MATH 046, ME 010 with a grade of “C-” or better. Topics include mechanics of deformable bodies subjected to axial, torsional, shear, and bending loads; combined stresses; and their applications to the design of structures.

ME 122 Vibrations 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): ME 103. Covers free and forced vibration of discrete systems with and without damping resonance; matrix methods for multiple degree-of-freedom systems; normal modes, coupling, and normal coordinates; and use of energy methods.

ME 130 Kinematic and Dynamic Analysis of Mechanisms 4 Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): ME 009, ME 103. Explores the kinematic analysis of planar mechanisms including linkages, cams, and gear trains. Introduces concepts of multibody dynamics.

ME 131 Design of Mechanisms 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ME 130. Involves design of planar, spherical, and spatial mechanisms using both exact and approximate graphical and analytical techniques. Requires a computer-aided design project.

ME 133 Introduction to Mechatronics 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): ME 120. Introduces hardware, software, sensors, actuators, physical systems models, and control theory in the context of control system implementation. Covers data acquisition (Labview), sensors, actuators, electric circuits and components, semiconductor electronics, logic circuits, signal processing using analog operational amplifiers, programmable logic controllers, and microcontroller programming and interfacing. Uses MATLAB and Simulink.

ME 153 Finite Element Methods 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ME 118. Covers weak form formulation, the Galerkin method and its computational implementation, mesh generation, data visualization, as well as programming finite element codes for practical engineering applications.

EE 100A Electronic Circuits 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 001B. Electronic systems, linear circuits, operational amplifiers, diodes, nonlinear circuit applications, junction and metal-oxide-semiconductor field-effect transistors, bipolar junction transistors, MOS and bipolar digital circuits. Laboratory experiments are performed in the subject areas and SPICE simulation is used.

EE 115 Introduction to Communication Systems 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 110B. Covers spectral density and correlation, modulation theory, amplitude, frequency, phase and analog pulse modulation and demodulation techniques, signal-to-noise ratios, and system performance calculations. Laboratory experiments involve techniques of modulation and demodulation.

EE 128 Data Acquisition, Instrumentation, and Process Control 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 100B, EE 120B/CS 120B (EE 100B and EE 120B/CS 120B may be taken concurrently); or consent of instructor. Covers analog signal transducers, conditioning, and processing; step motors, DC servo motors, and other actuation devices. Explores analog to digital and digital to analog converters; data acquisition systems; microcomputer interfaces to commonly used sensors and actuators; and design principles for electronic instruments, real time process control, and instrumentation.

EE 141 Digital Signal Processing 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 110B. Transform analysis of Linear Time-Invariant (LTI) systems, discrete Fourier Transform (DFT) and its computation, Fourier analysis of signals using the DFT, filter design techniques,

structures for discrete-time systems. Laboratory experiments on DFT, fast Fourier transforms (FFT), infinite impulse response (IIR), and finite impulse response (FIR) filter design, and quantization effects.

EE 146 Computer Vision 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): senior standing in Computer Science or Electrical Engineering, or consent of instructor. Imaging formation, early vision processing, boundary detection, region growing, two-dimensional and three-dimensional object representation and recognition techniques. Experiments for each topic are carried out.

EE 147 Graphics Processing Unit Computing and Programming 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 120B or CS 120B. Introduces principles and practices of programming graphics processing units (GPUs) using the parallel programming environment. Covers memory/threading models, common data-parallel programming patterns and libraries needed to develop high-performance parallel computing applications. Examines computational thinking; a broader range of parallel execution models; and parallel programming principles.

Cross-listed with CS 147.

EE 150 Digital Communications 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): EE 114, EE 115. Topics include modulation, probability and random variables, correlation and power spectra, information theory, errors of transmission, equalization and coding methods, shift and phase keying, and a comparison of digital communication systems.

EE 151 Introduction to Digital Control 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 132, EE 141. Review of continuous-time control systems; review of Z-transform and properties; sampled-data systems; stability analysis and criteria; frequency domain analysis and design; transient and steady-state response; state-space techniques; controllability and observability; pole placement; observer design; Lyapunov stability analysis. Laboratory experiments complementary to these topics include simulations and hardware design.

EE 152 Image Processing 4 Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): EE 110B or EE 111 or consent of instructor. Digital image acquisition, image enhancement and restoration, image compression, computer implementation and testing of image processing techniques. Students gain hands-on experience of complete image processing systems, including image acquisition, processing, and display through laboratory experiments.

ENGR 160 Introduction to Engineering Optimization Techniques 4 Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010A; CS 010 or EE 020 or ME 018A and ME 018B. ENGR 160 online section; enrollment in the Master-in-Science in Engineering program. Introduction to formulating and solving optimization problems in engineering. Includes single variable and multi-variable optimization; linear programming - simplex method; nonlinear unconstrained optimization - gradient, steepest descent, and Newton methods; and nonlinear constrained optimization - gradient projection methods. Addresses applications of optimization in engineering design problems. Solves various engineering optimization examples using MATLAB.

Appendix B.

Proposed catalog entry for the Robotics Engineering Undergraduate Major.

Robotics Engineering Undergraduate Major (catalog entry)

Major

Robotics studies the design, operation, and deployment of autonomous intelligent systems and mechanisms. Robotics is a fundamentally multidisciplinary field, with core components spanning engineering and computer science, and applications extending beyond science and technology. Courses in the B.S. in Robotics Engineering program focus both on the theory and the practice of contemporary robotics science and engineering, and prepare students for professional careers and graduate studies in robotics and beyond (e.g., autonomous systems, intelligent control systems, and decision making).

The B.S. in Robotics Engineering major is an interdepartmental program offered by the Marlan and Rosemary Bourns College of Engineering (BCOE), and involves the Departments of Mechanical Engineering, Electrical and Computer Engineering, and Computer Science and Engineering. Students are advised in and have their records maintained by the BCOE Office of Student Academic Affairs. Students must fulfill the breadth requirements of the Bourns College of Engineering.

University Requirements

See Undergraduate Students section.

College Requirements

For details on breath requirements, see the Colleges and Programs section of this catalog. Students are encouraged to consult their advisor regarding requirements.

Major Requirements

1. Lower-division requirements (72 units)
 - a. MATH 009A or MATH 009AH; MATH 009B or MATH 009BH; MATH 009C or MATH 009 CH; MATH10A; MATH 011; MATH 031; MATH 46.
 - b. PHYS 040A; PHYS 040B; PHYS 040C.
 - c. CS 010A; CS 010B; CS 010C; CS 061.
 - d. ME 009; ME 010.
 - e. EE 005.
2. Upper-division requirements (65 units)
 - a. CS 100; CS 120B / EE 120B.
 - b. ME 103; ME120; ME 145 / EE 145.
 - c. EE 106; EE 111; EE 114; EE 120A / CS 120A; EE132; EE142 / CS 171; EE 144 / ME 144.
 - d. Four courses (at least 16 units) from the following list, none of which can also be used to satisfy other major requirements: CS 111; CS 122A; CS 122B; CS 135; CS 141; CS 145; CS 150; CS 160; CS 170; CS 173; ME 110; ME 122; ME 130; ME 131; ME 133; ME 153; EE 100A; EE 115; EE 128; EE 141; EE 146; EE 147; EE 150; EE 151; EE 152; ENGR 160.
 - e. One of the following two-course sequences: CS 178A and CS 178B, or EE 175A and EE 175B, or ME 175B and ME 175C.

Appendix C.



Mechanical Engineering
900 University Avenue
Riverside, CA 92521
Tel 951.827.5830
Fax 951.827.2899
www.me.ucr.edu

November 2, 2020

Dear members of the Academic Senate:

On behalf of the Mechanical Engineering department, I enthusiastically support the new BS in Robotics program. This program will be housed in the Bourns College of Engineering, across the departments of Computer Science and Engineering (CSE), Electrical and Computer Engineering (ECE), and Mechanical Engineering (ME). It will draw upon courses from the existing programs in the departments.

In the past decade or so, Robotics has become extremely popular amongst High School students who are interested in pursuing technological careers. Having this program will allow us attract high caliber and extremely motivated students to UCR. The ME program has recently invested heavily in a focus area related to robotics: Controls, Robotics and Automation. Since 2018, we have hired three faculty members in this area, who added to the two we already had, have formed a strong cluster of five ME faculty members plus at least a dozen more in CSE and ECE. In ME, plan to keep adding faculty to this area in the near future.

Robotics is a strategically important area for the country, technically challenging, and provides many opportunities to students after graduation. It is also an inter-disciplinary program which requires an equally inter-connected curriculum. This new program will allow us to provide that holistic training. The curriculum is structured so that graduating students will be competitive in the job market, as well as have the expertise for graduate studies.

Under the leadership of three ME faculty members, the rest of the ME faculty were closely involved in the development of the program and was extensively discussed in faculty meetings in the academic year 19/20. The final program was discussed with the ME undergraduate committee and during faculty meetings, and was unanimously supported by the ME faculty.

In summary, I am extremely supportive of this program and believe it will help in attracting high quality undergraduate students to UCR. Please do not hesitate to contact me should there be any questions.

Respectfully,

A handwritten signature in blue ink, appearing to read "Guillermo Aguilar".

Guillermo Aguilar, Ph.D.
Professor and Chair
University of California Riverside
Department of Mechanical Engineering
A-345 Bourns Hall
Riverside CA, 92521
Off: 951-827-7717
gaguilar@enr.ucr.edu

October 23, 2020

Dear Members of the Academic Senate:

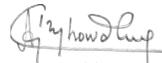
On behalf of the Electrical and Computer Engineering department, it is my pleasure to provide the strongest possible support for the BS in Robotics program. This program will be housed in the Bourns College of Engineering, and is cross-disciplinary, across the departments of Computer Science and Engineering (CSE), Electrical and Computer Engineering (ECE), and Mechanical Engineering (ME) It will draw upon courses from the existing programs in the departments.

Robotics is a strategically important area for the country, technically challenging, and provides many opportunities to students after graduation. High school students are extremely interested in this area, and having this program will allow us attract high caliber and extremely motivated students to UCR. The EE program has two technical focus areas related to robotics: Control and Robotics, which focuses on developing control strategies for robot locomotion, and Intelligent Systems, which focuses on the sensing and decision-making strategies that allows robots to understand their environment. The courses are of high interest, and the majority of the projects in the capstone Senior Design are related to some aspect of robotics. Students in the Computer Engineering program, which is jointly offered by ECE and CSE, have access to all these courses.

However, robotics is an inter-disciplinary program and having it as a specialization within an existing major does not provide students with the entire body of expertise required to work in this area in the future. For example, while EE students interested in robotics will gain some knowledge of the computational aspects of robotics, they will usually not study the mechanical design of robots or how to write and debug software efficiently. Having this inter-disciplinary program will allow us to provide that holistic training. The curriculum is structured so that graduating students will be competitive in the job market, as well as have the expertise to conduct graduate studies.

The faculty in ECE were closely involved in the development of the program. Two ECE faculty were members of the committee, and the program was discussed multiple times in faculty meetings in the 19-20 academic year. On Oct 21, 2020, the final program was discussed in the ECE faculty meeting and was unanimously supported by the faculty.

In summary, I am extremely supportive of this program and believe it will help in attracting high quality undergraduate students to UCR. Please do not hesitate to contact me should there be any questions. Sincerely,



Amit Roy-Chowdhury
Professor and Chair
[Electrical and Computer Engineering](#)
University of California, Riverside



Walid A. Najjar
Professor and Chair
Department of Computer Science and Engineering
351 Winston Chung Hall Riverside, CA 92521
Tel 951.827.5639 Fax 951.827.4643
najjar@cs.ucr.edu www.cs.ucr.edu/~najjar

November 1, 2020

Dear Members of the Academic Senate:

With this letter I would like to express the strong support of the Department of Computer Science and Engineering for the proposed B.S. degree in Robotics within the Bourns College of Engineering at UCR. This cross-disciplinary program will draw upon courses and research knowledge from the departments of Computer Science and Engineering (CSE), Electrical and Computer Engineering (ECE) and Mechanical Engineering (ME).

There is no doubt that robotics is rapidly becoming a very important field of engineering. Robotics requires multi-disciplinary breadth, well beyond what can be covered in courses in a single traditional discipline. The proposed Robotics program provides a comprehensive structure under which students can acquire the cross-disciplinary breadth required for this important and emerging field. It does so at very little expense, since the teaching and research infrastructure are already in place.

The proposed program emphasizes four focus areas: mechanical design and fabrication, embedded platforms and system design, control and navigation, and artificial intelligence and perception. These cover different aspect of robotics, from the design of the mechanical and electronic design to the cognitive aspects that enable decision making.

Within computer science and engineering the proposed B.S. in Robotics program relies on multiple disciplines including, but not limited to, artificial intelligence, machine learning, embedded and real-time systems, computer architecture, operating systems etc.

The CSE Department expects to interact extensively with the proposed Robotics program by participating in teaching the required and elective courses, in robotics research and the mentoring of students through projects and advising, and in helping with the program administration. The program will contribute in a great many positive ways to the CSE Department.

In summary, I am extremely supportive of this program and believe it will greatly benefit the students and will help raise UCR's profile. Please do not hesitate to contact me should there be any questions.

Sincerely,

Walid A. Najjar

Professor and Chair
Department of Computer Science and Engineering
Bourns College of Engineering
University of California Riverside

March 4, 2021

Dear Members of the Academic Senate:

I am writing to express my strong support as Dean of the Bourns College of Engineering for the proposed B.S. degree in Robotics within the Bourns College of Engineering at UCR. This proposed interdepartmental program will draw from courses in the departments of Mechanical Engineering, Electrical and Computer Engineering, and Computer Science and Engineering.

Robotics is a fast-growing discipline in engineering, but does not fit within a single discipline. A full understanding of robotics requires the ability to couple mechanical systems with electrical sensing and actuation, feedback and control systems, embedded computer systems (the hardware / software interface), and advanced software and programming. The proposed Robotics program will provide the cross-disciplinary background needed for success in this emerging field. Most of the courses are already available within departments and thus launching this program will not be excessively expensive.

In this letter, I am committing to a course release for the chair of this program. As the program grows in numbers of students and the workload associated with running the program increases, I anticipate adding a stipend and other support. I am also committing to provide TA support as class sizes grow, commensurate with the existing BCOE TA assignment policy.

Sincerely,



Prof. Christopher S. Lynch
William R. Johnson Jr. Family Chair
Dean, Bourns College of Engineering
University of California, Riverside



03/16/21

RE: BS in Robotics at the University of California, Riverside

Dear Members of the Review Board,

I am writing to support the proposal to initiate a BS in Robotics at the University of California, Riverside. I believe that this proposal addresses current needs in Industry and Academia for students with specialized training in the broad disciplines of artificial intelligence, control theory and algorithm design, among others, which blend together in the robotics discipline. The interdepartmental program proposed at the University of California, Riverside, will provide the students with the required technical knowledge to pursue their careers in the field of robotics. The proposed BS degree will be among the few available in the country, and will likely inspire other institutions to launch similar programs in the near future.

To calibrate my recommendation, I should note that I have seen this play out successfully at the graduate levels as, in the past, I served as the Director for Georgia Tech's Institute for Robotics and Intelligent Machines, which is home to both multidisciplinary PhD and MS degrees. And it is clear that students and their future employers are highly enthusiastic about such programs.

The proposed curriculum is well-thought-out and balanced. In addition to the standard math and physics courses required by most engineering programs, students will need to complete a number of required classes from the three participating Departments, as well as a series of elective courses. This structure guarantees that graduating students will have the required engineering background and skills, but also the knowledge and flexibility to work and function in a multi-disciplinary environment. The proposed combination of courses from Electrical and Computer Engineering, Mechanical Engineering, and Computer Science and Engineering is truly unique to a curriculum in robotics, and particularly different from the coursework required for more classic engineering degrees.

The participating Departments at the University of California, Riverside, are well positioned to initiate, administer, and grow the proposed BS program. The majority of the courses needed for the new program are currently being offered, thus minimizing the time, effort and risks to launch the new program. The organizational structure of the program is also very reasonable and effective, with Director and Co-Directors roles that will oversee course offerings, scheduling, and other practical matters. The projected enrollment of approximately 50 students is easily manageable, although I foresee a higher student demand for this program.

School of Electrical and Computer Engineering
Georgia Institute of Technology
Atlanta, Georgia 30332-0250
ece.gatech.edu

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March 16, 2021

Page 2

In summary, I have no reservations on the proposal, and I believe that this new program will attract numerous high quality students soon after its launch. Please do not hesitate to contact me should you need further information.

Sincerely,

A handwritten signature in black ink, appearing to read 'Magnus Egerstedt', with a stylized flourish at the end.

Magnus Egerstedt, Ph.D

Steve W. Chaddick School Chair and Professor

School of Electrical and Computer Engineering, Georgia Institute of Technology



Department of Mechanical and Aerospace Engineering
The Henry Samueli School of Engineering

Faryar Jabbari
Professor
3221 Engineering Gateway
Irvine, CA 92697-3975
Phone: (949) 824-6433
Fax: (949) 824-8585
FJABBARI@UCI.EDU

March 17, 2021

Dear Members of UCR Academic Senate Review Committee

RE: Proposed B.S. degree in Robotics at UCR

As a general rule, I am skeptical of non-traditional degrees, as they tend to be created based on temporary fads, but stay around for decades, far beyond their useful shelf-life. Often a degree in a traditional major with an expanded minor would be better.

I do think that Robotics has become an exception to that rule. The proposal describes the landscape well: tremendous interest among high school students, partly due to availability of exciting new hobby devices and accessibility of Arduino-type platforms, partly due to exciting new products of Boston Dynamics and similar. As the proposal states, it is hard to do a decent job training in robotics in a more traditional engineering major: mechanical engineers have a host of fluids, thermodynamics, heat-transfer, mechanics, etc., while EE and CS degrees have their own full requirements. The proposed degree, nestled among 3 departments and drawing courses from mostly existing courses, appears a low entry-cost way to provide this pathway for students. I do think it will be successful and, more importantly, would add a valuable option for students to choose. While I will list my concerns and suggestions below, I am fully supportive of the proposed degree and hope more universities would be able to get three departments to cooperate for such an undertaking. That is not easy and they should be commended.

Educational Aspects

- The physics sequence stops at 19th century. It seems to me that we should ensure engineering students are familiar with modern physics. On the other hand, there is a 3-course sequence in programming in the sophomore year, which might be somewhat excessive.
- There are 4 technical electives, which is a decent number but it would be in students' interest if more 'guided' options are incorporated. Examples include a list of 4-7 courses in CS that do vision, autonomy, graphics or a similar list in EE option that would be focused on communication, networks, cooperative algorithms, and ME with on mobility, design, etc. Perhaps they could be designated that way formally to help

students' careers by giving them more options (so instead EE with Robotics options, it will be Robotics with EE option, implying strong EE background). It will result in a more tangible connection to a traditional degree and increase the chance that the 'option' department and faculty take interest in the students. Of course, a totally flexible option will be great to have, as well.

- Increasingly robotics, particularly the 'automation' side would open up a host of ethical and privacy issues, quite dissimilar to other engineering endeavors. It might be good to ensure that the senior design, or some other place, incorporates them. Maybe even a special breath course!

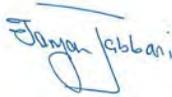
Administrative Aspects

- ABET: Does ABET have Robotics as a degree to review? Does it have minimum coverage of certain areas as requirement? I assume this is checked.
- I assume which department gets what credit (course units, majors, etc.) is clear and worked out. If not, it might be best to develop an MOU for that. As the saying goes, 'if Chairs were angels, we would not need to have MOUs'
- Sunset: The program IS in response to current interests. The nature of robotics might change in a few years, some thought should be given on how the program is discontinued or a department might want to cease its participation.
- There is a statement that each department agrees to teach the key courses at least once a year. Unless they are offered multiple times, chances are some really have to be offered in specific quarter as well. Perhaps this is the kind of detail that cannot be worked out at this stage, but this would force restrictions for the other degrees and over time might become a headache.

The above suggestions/observations do not take away from a very well organized and sound program. They should be seen as simply friendly advice --- which of course can be (perhaps should be!) ignored.

Best of luck with your program.

Sincerely,



Faryar Jabbari
Professor and Senior Associate Dean

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO



SANTA BARBARA • SANTA CRUZ

DEPARTMENT OF ELECTRICAL AND
COMPUTER ENGINEERING

SANTA BARBARA, CALIFORNIA 93106-9560

March 24, 2021

Dear Members of the Review Board,

The initiative to create a new undergraduate degree program in robotics at the University of California, Riverside, is timely, well-justified, and needed. The proposed structure and curriculum are carefully thought-out and effective. I have no doubt that this program will be in high demand, and I'm happy to provide this letter to express my full support. In this letter, I'm going to comment on three main aspects of the program:

Need: Demand for engineers that are well-trained in disciplines related to robotics is constantly raising, both from Academia and the Industry. It is undeniable that recent intellectual breakthroughs in Robotics and Artificial Intelligence have enabled important innovations in several technological areas including automated vehicles, rehabilitation and medical devices, and monitoring, to name a few. Yet, to sustain and further such progress, the need for highly trained engineers will only increase, thus guaranteeing the longevity of the pursued program.

Proposed curriculum: Robotics is an inherently multi-disciplinary field, making it virtually impossible to create a competitive program within any single classic department. To address this challenge, the proposed curriculum leverages courses offered in three participating departments, thus guaranteeing that subjects are presented in their "native" way, and that students become proficient in the different disciplines necessary for robotics. While coordinating courses from three different departments can be a challenge, the proposal presents a well-organized structure, with key representative members from all participating departments, that will ensure the well-functioning of this new program.

Capabilities and resources: The proposed curriculum hinges on courses, faculty members and lecturers that are already within the participating departments. Thus, the proposed program requires little new resources to run, mainly related to organizational roles, making it a small investment for the school. Among the three participating departments, the faculty members cover all the required expertise, ensuring the quality of the training that the students will receive.

To conclude, this is a strong proposal for a timely degree in robotics, with support from a well-qualified set of faculty members. I have no doubt that the program will attract strong interest and that it will keep growing over the years.

Sincerely,

A handwritten signature in blue ink, appearing to read "B.S. Manjunath".

B.S. Manjunath
Distinguished Professor and Chair

Cherysa P Cortez

From: Katelyn Robinson <krobinson@engr.ucr.edu>
Sent: Tuesday, April 20, 2021 11:12 AM
To: Beth Beatty; Senate; Cherysa P Cortez; Jason.stajich@ucr.edu
Cc: Philip Brisk; fabiopas@engr.ucr.edu
Subject: Re: Proposal for New BS in Robotics Engineering
Attachments: Proposal for the new undergraduate major in Robotics (2).pdf

Follow Up Flag: Follow up
Flag Status: Flagged

Hello all,

Beth, thank you for clarifying this process.

Dr. Stajich and Dir. Cortez, please see the attached proposal for a new BS in Robotics Engineering, approved by the BCOE Executive Committee on April 9, 2021. If this is not the proper process for submitting this, please let me know and I will follow your guidance.

Best,
Katelyn Robinson, M.S.

Advising and Enrollment Specialist
BCOE Office of Student Academic Affairs
she, her, hers

BCOEscheduling@engr.ucr.edu
keeplearningucr.edu
student.engr.ucr.edu



From: Beth Beatty <beth.beatty@ucr.edu>
Sent: Tuesday, April 20, 2021 11:08:30 AM
To: Katelyn Robinson; Senate
Cc: Philip Brisk; fabiopas@engr.ucr.edu
Subject: RE: Proposal for New BS in Robotics Engineering

Dear Katelyn,

Many thanks for your message. Proposals for new undergraduate programs need to be submitted to the Senate Chair (Jason.stajich@ucr.edu) and Senate Director (Cherysa.cortez@ucr.edu) as they require review by Committees other than the Committee on Educational Policy.

Best,
Beth

From: Katelyn Robinson <krobinson@engr.ucr.edu>
Sent: Tuesday, April 20, 2021 11:04 AM
To: Senate <senate@ucr.edu>; Beth Beatty <beth.beatty@ucr.edu>
Cc: Philip Brisk <philip@cs.ucr.edu>; fabriopas@engr.ucr.edu
Subject: Proposal for New BS in Robotics Engineering

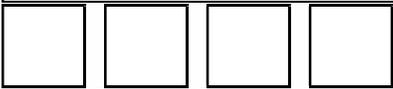
Hi Beth,

Please see the attached proposal for a new BS in Robotics Engineering. Let me know if you see any potential issues.

Best,
Katelyn Robinson, M.S.

Advising and Enrollment Specialist
BCOE Office of Student Academic Affairs
she, her, hers

BCOEscheduling@engr.ucr.edu
keeplearningucr.edu
student.engr.ucr.edu





Academic Senate

EXECUTIVE COUNCIL

January 13, 2022

To: Riverside Division

From: Jason Stajich, Division Chair

Re: Proposal for an Undergraduate Major in Actuarial Science

During their January 10, 2022 meeting Executive Council discussed the subject item and had not additional comments or objections.



EXECUTIVE COUNCIL

January 13, 2022

To: Jean Helwege, Professor of Finance, Anderson Chair in Finance

From: Jason Stajich, Division Chair

Cc: Barry Mishra, Chair, School of Business Faculty Executive Committee

Re: Proposal for an Undergraduate Major in Actuarial Science

Dear Jean,

The *Proposal for an Undergraduate Major in Actuarial Science* will be included on the Winter 2022 Division meeting agenda for consideration and vote. As this is a proposed undergraduate program, it does not undergo system-level review.

Executive Council had no additional comments and advises that the attached consultative feedback provided by Senate committees is reviewed by the major's proponents.

Regards,
/s/Jason

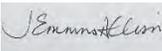


Academic Senate

COMMITTEE ON EDUCATIONAL POLICY

November 12, 2021

To: Jason Stajich, Chair
Riverside Division

From: Juliann Allison, Chair 
Committee on Educational Policy

RE: Proposal for an Undergraduate Major in Actuarial Science

The Committee on Educational Policy reviewed and were supportive of the proposal for an undergraduate major in Actuarial Science at their November 5, 2021 meeting.



November 30, 2021

TO: Jason Stajich, Chair
Riverside Division of the Academic Senate

FROM: Peter Graham, Chair *P. Graham*
CHASS Executive Committee

RE: Proposal: New Undergraduate Major: Proposal for an Undergraduate Major in
Actuarial Science

The CHASS Executive Committee reviewed the New Undergraduate Major: Proposal for an Undergraduate Major in Actuarial Science and has no further comments.

From: Theodore Garland <theodore.garland@ucr.edu>
Sent: Tuesday, December 21, 2021 9:49 AM
To: Cherysa P Cortez <cherysa.cortez@ucr.edu>
Cc: Denise Correll <denise.correll@ucr.edu>; Jason Stajich <jason.stajich@ucr.edu>
Subject: Re: [Follow up] FW: [Campus Review] (Proposal: New Undergraduate Major) Proposal for an Undergraduate Major in Actuarial Science

The CNAS Executive committee reviewed this proposal at our meeting of 5 October 2021. Overall, we had not major concerns. A few comments are as follows.

We wondered if this was just adequately integrated with other programs on campus, and particularly statistics. It seems to have a whole bunch of statistics involved on several courses in statistics.

One member found it fascinating and felt it was written by an actuary because it was very detailed and very precise. They learned a lot about stuff she didn't know, and thought it just spelled things out really well in terms of justifying the new major, explaining why it wouldn't be a huge major, but that it was important for the state of California and the U.S. They felt it was well-justified that UCR is filling a niche that is needed.

What about adding a capstone experience?

Is there a mechanism to keep the major small because of its impact on other departments that are contributing to that major? Might Statistics be impacted?



COMMITTEE ON COURSES

October 18, 2021

To: Jason Stajich, Chair
Riverside Division

From: Stephanie Dingwall, Chair *Stephanie Dingwall*
Committee on Courses

Re: Proposal for an Undergraduate Major in Actuarial Science

The Committee on Courses reviewed the proposal for an undergraduate major in Actuarial Science at their October 15, 2021 meeting and had no concerns related to the Committee's charge of courses and instruction. The Committee does note that there is currently a proposal for consideration to renumber CS 009P to CS 009A and recommends that the course number be corrected in the proposal. Additionally, the Committee reminds the School of Business to consult with the Registrar's Office regarding the establishment of the proposed new subject code ACT to ensure that it is available and compatible with the Course Request System (CRS).

Proposal for an Undergraduate major in Actuarial Science

1. *Name of the academic program and the department or unit that will administer the program.*

Name: Actuarial Science Undergraduate Major

Administration: The Actuarial Science major will be administered by the School of Business (which is one department)

2. *A thorough justification, including the motivation for the creation of the program in terms of student interest and professional or academic importance.*

Actuarial science, which combines financial analysis with statistics, is a well-established field of study, with the profession having an organized presence that dates back to the 1800s. Actuarial science courses have been offered in universities in the U.S. since the early 1900s and at least one school (the University of Illinois at Urbana-Champaign) has offered a B.S. in actuarial science since 1959. Among the UCs, Santa Barbara has offered the B.S. in actuarial science since 2010 and UCLA established the major in 2013. Actuarial science is typically offered as a major in the business school, math department or statistics department. Some schools offer an actuarial track or concentration within those majors, rather than a separate major.

There are two professional organizations, the Society of Actuaries (SOA) and the Casualty Actuary Society (CAS), that provide resources to aspiring actuaries and which conduct certification exams. The first four exams are the same for both societies and are the focus of university actuarial degree programs. University programs that have substantial training in actuarial science are given one of three designations: CAE, UCAP-AC and UCAP-IC. While there are thousands of business schools and math departments in American universities, only about 300 universities in the U.S. have one of the three designations. CAE universities have thriving programs that graduate many students and their students have typically passed at least two exams before graduation. This is a small group of colleges. UCAP-AC and UCAP-IC designations are used for universities that offer coursework related to the career but may not have many students in the program or many that pass the exams before graduation. The UCAP-IC designation is for schools that offer enough courses to pass two exams while the UCAP-AC designation is obtained if the courses cover four exams. UCR is currently a UCAP-IC university. In California there are no CAEs, four UCAP-ACs (including UCSB and UCLA) and two UCAP-ICs (including UCR). In addition to courses that prepare students for the actuarial exams, the SOA and CAS keep a list of courses at each school that satisfy the Validation by Educational Experience (VEE) element of actuarial science training.

Despite the fact that actuarial careers are ranked very high in terms of annual income, the degree is not popular. A study by Georgetown University using 2009 data on incomes of people who have earned a bachelor's degree listed it as one of the highest paying careers among the least popular majors.¹ At \$68,000, the median annual income of actuarial

¹ The Economic Value of College Majors available at <https://cew.georgetown.edu/wp->

science majors was above that of business majors in general, which exceeds that of most of 171 possible majors. The Georgetown study shows that there were only about 9500 actuarial science majors among nearly 8.5 million business majors. The Bureau of Labor Statistics lists the 2019 median income at \$108,350 and projects above average growth in this occupation (18%) over the next decade. While the high income associated with the career may increase the number of students drawn to the major, we do not expect more than a few dozen students to choose this major at UCR given the rigorous training involved and the fact that many of the students with the quantitative training required to do well in the field are less interested in business and finance. This is not a situation that is unique to UCR.

The main reason why the demand for the degree is limited is that the type of student attracted to the field must be extremely quantitatively oriented and also be interested in studying finance. We believe some of our current finance students may be attracted to the more quantitative nature of the degree while some of the current statistics students may learn that the business aspects of the degree are more quantitative than they expected (and therefore more appealing). The existence of a B.S. degree in actuarial science may attract high school students who otherwise might have attended UC Irvine or UC Davis or an out of state program.

3. Relationship of the new program to existing programs.

The courses for succeeding in the actuarial field are currently available to UCR undergraduates (hence our UCAP-IC designation). However, none of the current majors available to UCR undergraduates would easily allow students to take them and graduate on time. Indeed, students would likely need permission to go above the unit cap in order to use an existing major as the basis for an actuarial science education. Specifically, if a student majors in business with a concentration in finance, the required courses do not place enough emphasis on statistics and math, while at the same time using up room for those courses in the schedule by requiring students to take other business courses and breadth requirement courses. The breadth requirements for the finance concentration are suitable for humanities and social science majors rather than the quantitative nature of this STEM major. Likewise, if a student were to major in math or statistics they would not have room for the business courses that are necessary to succeed in the actuarial career. By putting the courses together in an organized method, it would be easy for students to gain the education required for success after graduation.

If students discovered that they do not have the quantitative training to succeed in the program, they would be advised to switch to the business major with a concentration in finance after their second year in the program. This would allow them time to replace the more rigorous math and statistics courses with the non-finance courses required of the business major (BUS 101-103 and BUS 107-109). They might also switch to Economics Administrative Studies with a concentration in finance.

4. *The proposed curriculum. Great care should be given in this area, correct rubrics should be listed for courses, all cross listings should be listed, unit total considerations should be taken into account and totals should be verified by program staff, faculty, and appropriate Executive Committee personnel. A copy of the proposed program change should be provided for inclusion in the Catalog.*

The program requires 44 units from the School of Business, including 24 units from the finance area (BUS 131, BUS 133, BUS 134, BUS 136, BUS 137 and the new course, ACT 001); three 4-unit courses from the supply chain and operation management area (BUS 125, BUS 126 and BUS 181); one introductory business course (BUS 010); one introductory accounting course (BUS 020) and a business writing course (BUS 100W). The new course (ACT 001) covers insurance and would be useful to students in the Business major as well. The BUS 133 requirement could be satisfied by taking BUS 106 and BUS 132.

These above courses have one prerequisite in Business (BUS 105) and two that are offered by the Economics Department (ECON 002, ECON 003). In addition, students are required to take ECON 104A and 104B. ECON 002, ECON 003 and ECON 104A are VEE courses.

The degree requires 28 units from the Statistics Department, plus some pre-requisites. The most important set of courses in Statistics is the 160 A-C series, which prepares the students with a strong foundation in probability. STAT 160B in this series is a required course for the VEE element of the SOA certifications but not for CAS, which has one less requirement. In addition, students are required to take STAT 107 and STAT 146. Students also take two from the following list: STAT 161, STAT 167, STAT 170 and STAT 171. Some of these courses require STAT 010 and STAT 011 as prerequisites. STAT 010 substitutes for STAT 004 (previously STAT 048), which is a prerequisite to many of the Business courses.

The program requires 28 units of Mathematics, including five quarters of calculus (MATH 009A-C and MATH 010A-B). Other required math courses are MATH 031 and MATH 046. Some of these courses are pre-requisites for the Statistics courses.

The program requires two computing classes (CS 008 and CS 009P). CS 008, which focuses on spreadsheets, is a pre-requisite for some business courses.

The breadth requirements for the new degree are similar to those of a CNAS degree, which is appropriate given that this degree is in a STEM discipline. The main difference between the breadth for this degree is that that economics is part of the major requirements and not a breadth requirement, so the social sciences breadth courses must come from a different discipline.

The required courses are included in Appendix A. A sample program of study is included in Appendix B. Course descriptions are included in Appendix C. Catalog copy is included in Appendix D.

5. *A list of faculty who will be involved in the program, including those teaching, advising, and administering.*

Below is the current list of faculty who would teach in the program.

Professors:

Peter Chung, Business (finance area)
Xinping Cui, Statistics
Mohsen El Hafsi, Business (supply chain and operations management area)
Wee Gan, Mathematics
Jean Helwege, Business (finance area)
Yehua Li, Statistics
Yat Sun Poon, Mathematics
Richard Smith, Business (finance area)
Fred Wilhelm, Mathematics
Weixin Yao, Statistics

Associate Professors:

James Flegal, Statistics
Long Gao, Business (supply chain and operations management area)
Elodie Goodman, Business (supply chain and operations management area)
Yawen Jiao, Business (finance area)
Jun Li, Statistics
Shujie Ma, Statistics
Danko Turcic, Business (supply chain and operations management area)
Weixin Yao, Statistics
Ivy Zhang, Business (accounting area)
Shuheng Zhou, Statistics

Assistant Professors:

Alexander Barinov, Business (finance area)
Po-Ning Chen, Mathematics
Yat Tin Chow, Mathematics
Brian Collier, Mathematics
Mike Dong, Business (finance area)
Patricio Gallardo, Mathematics
Esra Kurum, Statistics
Wenxiu Ma, Statistics
Adem Orsdemir, Business (supply chain and operations management area)
Zhanghe Zhang, Mathematics

LSOEs and LPSOEs:

Greg Richey, Business (finance area)
Joab Corey, Economics
Bree Lang, Economics

6. *For interdisciplinary programs, the degree of participation and the role of each department must be explicitly described. The chairs of all participating departments must*

provide written approval for the creation of the program and indicate their commitment to provide necessary resources including faculty release.

The program is not an interdepartmental one, although it is interdisciplinary. The degree is offered through the School of Business, which teaches the majority of the courses in the program. The finance area within Business would staff and schedule the new course (ACT001), which would be part of the area coordinator's job (currently compensated via a cash payment, not a course release). Written approvals from the chair of the Business Department and the dean of the School of Business are included in Appendix E.

7. *Projected enrollment in the program*

The projected enrollment at the start of the program is 10 students with perhaps another dozen once the program is fully established.

8. *Name of degree, if applicable, and the anticipated number of degrees to be granted when the program reaches steady state.*

BS in Actuarial Science, 20 degrees awarded per year

9. *Potential impact of the new program on existing programs. If the proposed program includes required courses from a department other than the administering department, the proposal must include a statement from the department indicating that it has been consulted and that it will provide access to the required courses.*

The new major uses existing courses that are offered by the School of Business, Statistics, Mathematics and Economics. Given that these courses are also been used by many other departments to satisfy college and major requirements, we do not expect a major impact in their offerings by the new program. Also, the number of additional students is likely to be fairly low as some of the students who might switch to this major are likely already in these classes.

The design of the new major led to the creation of one new course (namely: ACT001). This course would be desirable to students majoring in business with a finance concentration so its enrollment is not dependent on the existence of this new major.

10. *A full listing of resources required for start-up and for operations. In cases where no additional resources will be needed, this must be explicitly stated. This listing may include: personnel (faculty FTE or temporary positions, Teaching Assistants or Readers, administrative staff, technical support); support services including computer facilities and library resources; space requirements. A plan indicating how the resources will be obtained would also be helpful to the committee in reviewing the proposal. A letter of support from the College Dean and/or Executive Vice Chancellor-Provost indicating endorsement as well as a promise of support for the proposal also would be extremely helpful.*

- Faculty FTE: the program will use existing faculty given that the new major will only add a few dozen students to existing courses at the most.

- Teaching Assistants: no additional TAs would be required.
- Administrative Staff: the program will be administered by existing staff in the School of Business. An advisor who currently specializes in finance would be given the responsibility of advising these students as well.
- Computer facilities and library resources: no new facilities required
- Space requirements: no new space requirements.

11. Both internal and external letters of support should be provided with the proposal. Internal letters of support are often from UCR department chairs and faculty of related programs. The external letters should be from other UC campuses or other peer institutions. Letters from off-campus help to establish the quality of the program and its fit within the context of related programs at other universities. Upon consultation with the CEP the demand for external letters may be waived.

Letters of support are included in Appendix F.

12. Approvals from program faculty, College faculty (if the new proposal affects a college regulation), and the appropriate Executive Committee should be obtained before forwarding the new program to the attention of the Senate Analyst for CEP.

Approved by the Executive Committee of the School of Business: 5/7/2021

Approved by the faculty of the School of Business: 5/24/2021

Appendix A: Requirements for the new B.S. in Actuarial Science degree

Finance (24 units)

BUS 133 – Intro and Foundations combined (can instead do both BUS 106 and BUS 132)

Requires BUS 020, ECON 003, STAT 004 or ECON 101 or equivalent

BUS 131 - Fixed Income

Requires BUS 133 or both BUS 106 and BUS 132

BUS 134 – Corporate Finance

Requires BUS 133 or both BUS 106 and BUS 132

BUS 136 – Investments and Portfolio Management

Requires BUS 133 or both BUS 106 and BUS 132

BUS 137 – Derivatives

Requires BUS 133 or both BUS 106 and BUS 132

ACT01 – Foundations of Insurance (offered by the finance area) **NEW**

Requires BUS 106 or BUS 133

Supply Chain and Operations Management (12 units)

BUS 125 Simulation for Business

Requires BUS 104/STAT 104 or STAT 004 or equivalent

BUS 126 Forecasting

Requires BUS 105

BUS 181 Business Modeling and Optimization

Requires BUS 105

Accounting (4 units)

BUS 020 – Accounting

General Business (8 units)

BUS 010 – Introduction to Business

BUS 100W – Management Writing and Communications

Statistics (32 units)

STAT 107 - Statistical Computing – intro

Requires STAT 10

STAT 146- Statistical Forecasting

Requires STAT 10

STAT 160A Probability Theory

Requires MATH 009C

STAT 160B Probability Theory

Requires STAT 160A

STAT 160C Probability Theory

Requires STAT 160BA

Choose two from these courses:

STAT 161 – Probability models

Requires STAT 160B

STAT 167 – Introduction to Data Science (uses R)

Requires STAT 011 and STAT 107

STAT 170 -Regression Analysis

Requires STAT 160C and STAT 107

STAT 171 – General Linear Models

Requires STAT 170

Math (28 units)

MATH 009A Calculus – Differentials

MATH 009B Calculus – Integration

Requires MATH 009A

MATH 009C Calculus – Additional topics

Requires MATH 009B

MATHC 010A – Calculus – Multivariate, matrices, determinants

Requires MATH 009B

MATHC 010B – Calculus – Multivariate, vectors, differentials

Requires MATH 010A

MATH 031 - Applied Linear Algebra

Requires MATH 009B and MATH 009C

MATH 046 – Intro to Differential Equations

Requires MATH 009B

Computing (4 units)

CS 008 – Introduction to computing

CS 009P – Introduction to computing (python)

Requires MATH 009B but can be taken concurrently

Economics (16 units)

ECON 002 – Introduction to Macroeconomics

ECON 003 – Introduction to Microeconomics

ECON 104A and 104B – Intermediate Microeconomics Sequence

Requires ECON 003 and MATH 009A

Appendix B. Sample Program of Study

Year 1	Fall	Winter	Spring	SOA exams
	MATH 009A	MATH 009B	MATH 009C	VEE accounting completed
	BUS 010	STAT 010	BUS 020	VEE economics completed
	ENGL 001A	ENGL 001B	CS 008	
	ECON 002	ECON 003	Ethnic Studies	
Year 2	Fall	Winter	Spring	
	MATH 010A	MATH 010B	MATH 031	VEE finance completed
	BUS 133	BUS 131	BUS 100W	Take Exam FM in Spring
	STAT 011	BUS 105	BUS 125	
	World History	CS 009P	STAT 107	
Year 3	Fall	Winter	Spring	
	STAT 160A	STAT 160B	STAT 160C	VEE statistics completed
	MATH 046	ACT 001	BUS 136	Take Exam P in Winter
	STAT 146	Elective	Biological Science	
	ECON 104A	ECON 104B	Humanities	
Year 4	Fall	Winter	Spring	
	STAT elective	BUS 134	STAT elective	Take Exam IFM in Spring
	BUS 181	Physical Science	BUS126	
	Social Science	BUS 137	Elective	
	Humanities	Social Science	Additional Science	

Appendix C. Course Descriptions

ACT 001 Foundations of Insurance (4) Lecture, 3 hours, extra reading, 1 hour. Prerequisite(s): BUS 106 or BUS 133. An introduction into the field of insurance from the perspective of financial analysis.- **NEW**

BUS 010 Introduction to Business (4) Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): none. Provides an overview of the field of business administration. Explores business goals and strategies, functional areas of business and their integration in policy and decision making, social responsibility, computers in business, and business trends and challenges including the international dimension.

BUS 020 Financial Accounting and Reporting (4) Lecture, 3 hours, discussion, 1 hour. Prerequisite(s): none. A study of the concepts and techniques for measurement and communication of financial information. Includes interpretation of financial statements.

BUS 100W Management Writing and Communication (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): ENGL 001B with a grade of C or better; BUS 020; ECON 003; STAT 048; or equivalent; or consent of instructor. Focuses on writing and communication methods in business environment. Topics include written and oral presentations, interpersonal skills, teamwork in multicultural setting, and effective use of communication technologies. Fulfills the third-quarter writing requirement for students who earn a grade of “C” or better for courses that the Academic Senate designates, and that the student’s college permits, as alternatives to English 001C.

BUS 105 Production and Operations Management (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): CS 008; STAT 048 or STAT 100A; or equivalent. Addresses the issues of design and control of production systems in manufacturing and service organizations. Covers product and process selection, capacity planning, location and layout design, project and job scheduling, inventory control, material planning, and quality control.

BUS 124 Business Analytics (4) Lecture, 3 hours; term paper, 1 hour; written work, 2 hours. Prerequisite(s): STAT 048 or consent of instructor. Provides fundamental concepts and tools needed to understand the emerging role of business analytics in organizations. Applies basic business analytics tools in a spreadsheet environment. Introduces market-leading techniques that help identify and manage key data from business processes. Provides the essential tools required for data mining and business process re-engineering.

BUS 125 Simulation for Business (4) Lecture, 3 hours; extra reading, 1.5 hours; outside projects, 1.5 hours. Prerequisite(s): BUS 104/STAT 104, STAT 048, or equivalents. Introduces simulation as a tool for analyzing complex systems. Analyzes and discusses the theory and practice of modeling through simulation. Topics include modeling uncertainty and collecting input data, Monte Carlo simulation techniques, model verification and validation, and sensitivity analysis. Examines applications in finance, marketing, operations, and supply chain management.

BUS 126 Practical Business Forecasting (4) Lecture, 3 hours; activity, 3 hours. Prerequisite(s): BUS 105; or consent of instructor. Teaches how forecasts are developed and utilized. Emphasizes common forecasting methods used in business and uses specific cases to illustrate these methods. Applications to business include forecasting sales, production, inventory, macroeconomic factors such as interest and exchange rates, and other aspects of both short- and long-term business planning.

BUS 131 Fixed Income Securities (4) Lecture, 3 hours; extra reading, 1 hour. Covers fixed income securities and basic analytical tools in fixed-income markets. Topics include relative pricing of fixed-income securities, yield-curve estimation, securities with embedded options, and trading strategies. Utilizes instruments such as interest rate swaps, mortgage-backed securities, and credit derivatives.

BUS 133 Accelerated Foundations of Finance (4) Lecture, 3 hours; extra reading, 1 hour. Covers materials from BUS 106/ECON 134 and ECON 132. Examines investment and operational decisions of individuals and companies. Covers the relationship between investment decisions, wealth, and risk tolerance. Operational decisions are from the perspective of an entrepreneur or manager. Pursues strategies that are personally appealing rather than investments that maximize shareholder value.

BUS 134 Corporate Finance (4) Lecture, 3 hours; term paper, 2 hours; extra reading, 1 hour. Prerequisite(s): BUS 106/ECON 134 and BUS 132 with grades of “C-” or better. Explores capital budgeting under uncertainty, cost of capital, capital structure, and basics of corporate governance. May cover other related topics. Provides an understanding of the theoretical issues related to these topics. Emphasizes formulating optimal financial decisions. May include case-method teaching and data analysis.

BUS 136 Investments: Security Analysis and Portfolio Management (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 106/ECON 134 and BUS 132 with grades of “C-” or better. Provides a thorough study of the investment process. Topics include portfolio selection, asset-pricing models, term structure, and portfolio performance valuation. Discusses empirical uses of securities data and empirical issues in testing asset pricing models.

BUS 137 Investments: Derivatives Markets (4) Lecture, 3 hours; extra reading, 2 hours; projects, 1 hour. Prerequisite(s): BUS 106/ECON 134 and BUS 132 with grades of “C-” or better. Covers option market characteristics, option pricing theories, and speculative strategies used in local, national, and international markets. Analyzes other derivatives instruments including futures, forwards, and swaps. Discusses empirical uses of securities data related to derivatives markets.

BUS 181 Business Modeling and Optimization (4) Lecture, 3 hours; homework problems and project 3 hours. Prerequisite(s): STAT 048, upper-division standing, or instructor’s consent. The course teaches the analytical approach to business decision making and performance improvement. It focuses on how to structure and analyze business problems to arrive at optimal solutions and compelling insights. The course covers applications in marketing, operations, supply chain, and finance. The main techniques include probability, statistics, and optimization.

CS 008 Introduction to Computing (4) Lecture, 3 hours; laboratory, 3 hours. Includes operating system basics (Windows and Unix), word processing, spreadsheets, databases (e.g., Access), e-mail, the Internet, and the World Wide Web. Designed for students not majoring in computer science, engineering, mathematics, or science. CS 008 if it has already been awarded for CS 010A.

CS 009P Introduction to Python Programming with Applications (4) Lecture, 3 hours; laboratory, 3 hours. Prerequisite(s): a college mathematics course (may be taken concurrently) or credit for MATH 009A from the Advanced Placement Examination or the Mathematics Advisory Examination. Covers problem solving through structured programming of algorithms on computers using the Python language. Includes variables, expressions, input/output (I/O), branches, loops, functions, strings, lists, and use of common libraries. Also covers software design, testing, and debugging. Credit is awarded for one of the following CS 009P, CS 009M, or CS 010A.

ECON 002 Introduction to Macroeconomics (5) Lecture, 3 hours; discussion, 1 hour; written work, 3 hours. Prerequisite(s): none. An introduction to the study of the economic system from a macro, or aggregate, perspective. Includes analysis of business cycles, economic growth, unemployment, inflation, and the impact of government policies on the level of economic activity. Credit is awarded for only one of ECON 002 or ECON 002H.

ECON 003 Introduction to Microeconomics (5) Lecture, 3 hours; discussion, 1 hour; written work, 3 hours. Prerequisite(s): none. An introduction to the study of the economic system from the micro, or individual decision-maker's, perspective. Includes the study of opportunity cost, markets, consumption, production and competition. Credit is only awarded for one of ECON 003 or ECON 003H.

ECON 104A Intermediate Microeconomic Theory (5) Lecture, 3 hours; discussion, 1 hour; written work, 3 hours. Prerequisite(s): ECON 003 with a grade of C- or better or ECON 003H with 286 a grade of C- or better, MATH 007A or MATH 009A or MATH 09HA. A calculus-based course that develops theories of consumers and firms. Provides the foundation for partial equilibrium study of competitive markets. Explores welfare properties of competitive markets. Credit is awarded for one of the following ECON 104A or ECON 102.

ECON 104B Intermediate Microeconomic Theory (5) Lecture, 3 hours; discussion, 1 hour; written work, 3 hours. Prerequisite(s): ECON 102 with a grade of C or better or ECON 104A; MATH 007A or MATH 009A or MATH 09HA; or consent of instructor. A continuation of ECON 104A that covers monopoly, oligopoly, externalities, and public goods. Develops elementary concepts of game theory. May also cover information economics and economics of uncertainty.

ENGL 001A Beginning Composition (4) Lecture, 3 hours; written work, 3 hours. Prerequisite(s): ENGL 004 with a grade of C or better or ENGL 005 with a grade of C or better; fulfillment of the University of California Entry Level Writing Requirement. Introduces students to the strategies of personal writing in a multicultural context. Students must be formally

enrolled prior to the beginning of instruction and must attend the first day to avoid being dropped from the class. Credit is awarded for only one of ENGL 001A or ENGL 01PA.

ENGL 001B Intermediate Composition (4) Lecture, 3 hours; extra writing and rewriting, 3 hours. Prerequisite(s): ENGL 001A with a grade of “C” or better or ENGL 01PA with a grade of “C” or better. Emphasizes the transition from personal to public writing in a multicultural context. Students must be formally enrolled prior to the beginning of instruction and must attend the first day to avoid being dropped from the class.

MATH 009A First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 005 with a grade of “C-” or better or MATH 006B with a grade of “C-” or better or equivalent. Introduction to the differential calculus of functions of one variable. Credit is awarded for only one of MATH 008B, MATH 009A, or MATH 09HA.

MATH 009B First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 008B with a grade of “C-” or better or MATH 009A with a grade of “C-” or better or MATH 09HA with a grade of “C-” or better. Introduction to the integral calculus of functions of one variable. Credit is awarded for only one of MATH 009B or MATH 09HB.

MATH 009C First-Year Calculus (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009B with a grade of “C-” or better or MATH 09HB with a grade of “C-” or better. Further topics from integral calculus, improper integrals, infinite series, Taylor’s series, and Taylor’s theorem. Credit is awarded for only one of MATH 009C or MATH 09HC.

MATH 010A Calculus of Several Variables (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009B with a grade of “C-” or better or MATH 09HB with a “C-” or better or equivalent. Topics include Euclidean geometry, matrices and linear functions, determinants, partial derivatives, directional derivatives, Jacobians, gradients, chain rule, and Taylor’s theorem for several variables.

MATH 010B Calculus of Several Variables (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 010A with a grade of “C-” or better or equivalent. Covers vectors; differential calculus, including implicit differentiation and extreme values; multiple integration; line integrals; vector field theory; and theorems of Gauss, Green, and Stokes.

MATH 031 Applied Linear Algebra (5) Lecture, 3 hours; discussion, 2 hours. Prerequisite(s): MATH 009A (or MATH 09HA) with a grade “C-” or better and CS 010 or CS 010V or MATH 009B (or MATH 09HB) with a grade of “C-” or better. A study of matrices and systems of linear equations, determinants, Gaussian elimination, vector spaces, linear independence and linear transformation, orthogonality, eigenvalues, and eigenvectors. Also examines selected topics and applications.

MATH 046 Introduction to Ordinary Differential Equations (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 007B or MATH 009B or MATH 09HB with a grade of “C-” or

better or equivalent. Introduction to first-order equations, linear second-order equations, and Laplace transforms, with applications to the physical and biological sciences.

STAT 010 Introduction to Statistics (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): MATH 005 or MATH 006B or MATH 009A or MATH 09HA or equivalent. A general introduction to descriptive and inferential statistics. Topics include histograms; descriptive statistics; probability; normal, binomial, and Poisson distributions; sampling distributions; hypothesis testing; and confidence intervals. Credit is awarded for only one of STAT 004, STAT 048 or STAT 100A.

STAT 011 Introduction to Statistics (5) Lecture, 3 hours; discussion, 1 hour; laboratory, 3 hours. Prerequisite(s): STAT 100A “An introduction to statistics” with a grade of C- or better. Topics include linear regression, correlation, analysis of variance, and simple experimental designs.

STAT 107 Introduction to Statistical Computing (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 100A or equivalent. Introduction to computer-assisted data analysis and statistical inference using both the R and SAS packages. Topics include input, output, and editing of data; graphical procedures; descriptive statistics; cross-tabulation; inferential statistical techniques including estimation and testing; and analysis of variance.

STAT 146 Statistical Forecasting Techniques (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 100B or equivalent. Topics include exponential smoothing, simple and multiple regression analysis, time series, trend analysis, and seasonal analysis

STAT 160A Elements of Probability and Statistical Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): MATH 009C or MATH 09HC (may be taken concurrently). Topics include statistical regularity, probability spaces, fundamental theorems in discrete probability, Bayes’ theorem, random variables, densities and distribution functions, and continuous distributions.

STAT 160B Elements of Probability and Statistical Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160A with a grade of “C-” or better. Topics include transformations of random variables and central limit theorem, distributions of sample statistics, statistical inference, and estimation.

STAT 160C Elements of Probability and Statistical Theory (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160B with a grade of “C-” or better. Topics include hypothesis testing, chi-square tests, and nonparametric methods.

STAT 161 Introduction to Probability Models (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 160B or equivalent with a grade of “C-” or better. Covers Compound distributions, branching processes. and random walk. Explores continuous time models such as Poisson process and queuing models. Examines the Markov property and introduces Markov chains. Also covers simple time series models.

STAT 167 Introduction to Data Science (4) Lecture, 3 hours; discussion, 1 hour.

Prerequisite(s): STAT 100B with a grade of C- or better or STAT 155 with a grade of C- or better; CS 010A, STAT 147; or consent of instructor. Introduction to data science using the R programming language. Topics include big data management, visualization and analytical skills, unsupervised and supervised statistical learning methods, and real-world data science application examples.

STAT 170 Regression Analysis (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 157, STAT 160C, or equivalents. Topics include simple and multiple linear regression, scatter-plots, and point and interval estimation. Addresses prediction, testing, calibration, interpretation, and practical applications of multiple regression. Explores simple, partial, and multiple correlation; variable selection methods; diagnostic procedures; and regression for longitudinal data.

STAT 171 General Statistical Models (4) Lecture, 3 hours; discussion, 1 hour. Prerequisite(s): STAT 170B. Generalized linear models and least squares. Analysis of covariance, nonlinear regression, nonlinear least squares. Regression methods for discrete data: loglinear models, logistic regression, discriminant analysis. Regression methods for life data. Cox survival model, Kaplan-Meier estimation, Mantel-Haenszel test.

Appendix D. Catalog Copy for the New B.S. in Actuarial Science

Actuarial Science

Subject Abbreviation: ACT

School of Business

Major

Actuarial science studies the probability and risk associated with financial payments, such as death benefits in the case of life insurance, accident reimbursements as in the case of fire or car crashes, pensions, and other contingencies. Students receive their degree from the School of Business and focus much of their studies in the area of finance, but a large amount of statistical and mathematical studies are also involved. Students are encouraged to visit the websites of the Society of Actuaries and Casualty Actuary Society to learn more about careers in actuarial science.

University Requirements

See Undergraduate Students section.

College Requirements

in Actuarial Science are the same as those for the B.S. in CNAS except that the requirement for Social Sciences is only two units and must not be a course in Economics. Note that college breadth requirements for the B.S. in Actuarial Science differ from those of CHASS, which are the requirements for the B.S. in Business

Major Requirements

1. Lower-division requirements (41 units):

a) ACT 001

b) BUS 010; BUS 020

c) CS 008; CS 009P

d) MATH 009A; MATH 009B; MATH 009C; MATH 010A; MATH 01B; MATH 031;
MATH 046

Upper-division requirements (80 units, minimum):

a) BUS100W; BUS 125; BUS 126; BUS 131; BUS 133 (or BUS 106 and BUS 132);
BUS 136; BUS 137

b) STAT 107; STAT 146; STAT 160A; STAT 160B; STAT 160C

c) Choose two from among STAT 161, STAT 167, STAT 170 and STAT 171

Appendix E. Written Approvals

This section contains letters from the following department chairs:

1. Yunzeng Wang, Dean, School of Business
2. John Haleblian, Chair, Business
3. Yehua Li, Chair, Statistics
4. Yat Sun Poon, Chair, Mathematics
5. Steven Halfend, Chair, Economics



900 University Avenue, Anderson Hall, Riverside, CA, 92521

Tel: 951.827.4237 Fax: 951.827.3970 e-mail: yunzeng.wang@ucr.edu web-site: <http://soba.ucr.edu>

May 25, 2021

To Whom It May Concern:

I am writing to endorse the proposed Actuarial Science Undergraduate Major. This is a well thought-through to serve a niche market that offers opportunities to professionals with specialized educational training in actuarial science. In addition, the program creates great opportunities for the School of Business to collaborate with rest of the campus.

Like the faculty, I enthusiastically support the program, and the School is committed to support the program by offering the courses required by the proposal.

Sincerely

A handwritten signature in black ink, appearing to read "Yunzeng Wang", written in a cursive style.

Yunzeng Wang
Dean

May 25, 2021

To Whom it Concerns,

I approve the actuarial science major and allow the faculty in the School of Business to teach the required courses for students to complete this major.

The School of Business consists of one department with five areas of specialization: finance, marketing, operations, accounting and management. Many existing courses offered by the finance and marketing areas are relevant for the study of actuarial science. Accordingly, the vast majority of resources necessary to offer this new major are currently in place at the school of business. Given the program will likely have a small enrollment it is unlikely that additional sections of existing courses will be required. However, in the event additional sections are necessary, the department is prepared to support the program to ensure actuarial students are able to schedule their courses in a timely manner. The program proposal includes one new insurance course, which will also be of interest to finance and marketing students in addition to the students in the actuarial science program. Thus, the actuarial science major will only require limited additional resources not already allocated to existing students.

The actuarial science program has the potential to highlight the extensive mathematical studies students engage in at the School of Business. As a STEM degree, it will enhance UCR's reputation as an R1 university and signal to existing finance, marketing and operations students that additional statistical training has significant market value. Finally, we believe this major will appeal to underrepresented minorities in the Inland Empire who seek a career that takes advantage of their mathematical talents.

Sincerely,

Jerayr "John" Haleblian

Department Chair

School of Business

July 6, 2021

To Whom It May Concern,

As Chair of the Department of Statistics, I write to offer my support for the proposed major in Actuarial Science in the School of Business. The proposed program is expected to small and selective. It will provide UCR students, especially the underrepresented minority students, with quality trainings on some highly employable skills.

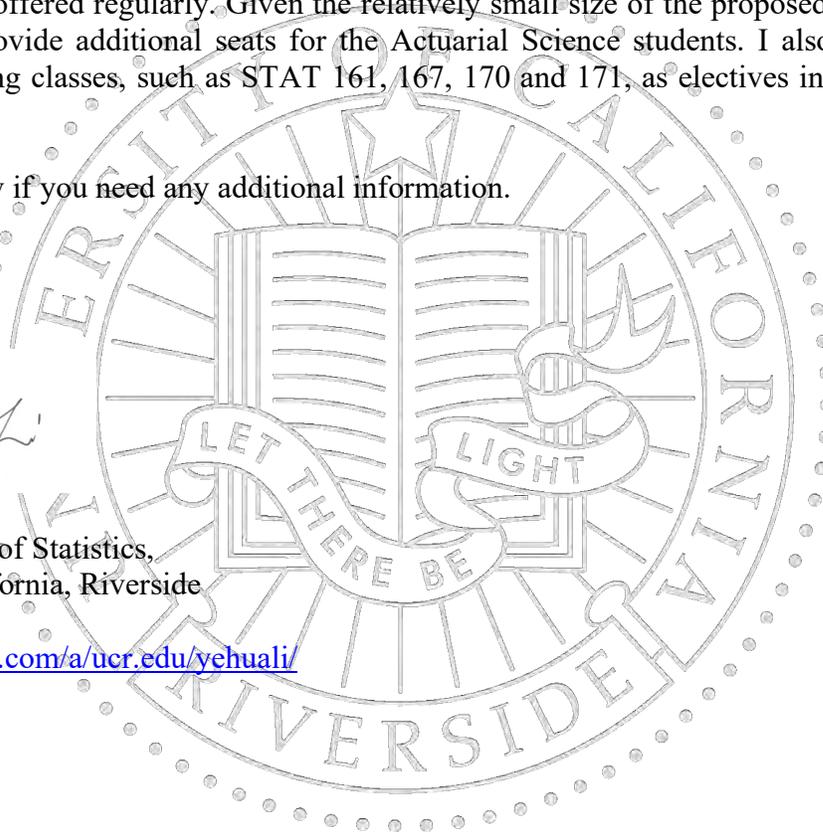
I approve the inclusion of STAT 107, 146, 160A, 160B, 160C as upper division major requirements in the proposed program. All, but STAT 146, are required courses for Statistics majors and hence offered regularly. Given the relatively small size of the proposed program, we will be able to provide additional seats for the Actuarial Science students. I also approve the inclusion of existing classes, such as STAT 161, 167, 170 and 171, as electives in the proposed program.

Please let me know if you need any additional information.

Sincerely yours,



Yehua Li
Professor & Chair of Statistics,
University of California, Riverside
yehuali@ucr.edu
<https://sites.google.com/a/ucr.edu/yehuali/>



June 3, 2021

Dear Colleagues of the Academic Senate,

The Department of Mathematics acknowledges receiving a *Proposal for an Undergraduate Major in Actuarial Science*.

We observe that it proposes its students to take Math 009A, 009B, 009C, 010A, 031, and 046. Some students may also take Math 149A or Math 149B. The Department of Mathematics expects to offer these courses in the foreseeable future. We will be able to serve students of this program alongside with many other programs.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Yat-Sun Poon', written in a cursive style.

Yat-Sun Poon
Professor and Chair
Department of Mathematics
University of California, Riverside



Dr. Steven M. Helfand
Professor & Chair
Department of Economics
UC Riverside
Riverside, CA 92521
steven.helfand@ucr.edu
(951) 827-1572

6/1/2021

To whom it may concern,

As Chair of the Department of Economics, I write to provide my support for the proposed major in Actuarial Science to be offered by the School of Business. I think this is an important addition to the majors offered on campus, and I think it would be attractive to a relatively small and select group of students.

I write, in addition, to provide my approval for the inclusion of ECON 2, 3, 104A and 104B in this proposed major. The Economics Department offers Introductory Macroeconomics (ECON 2) and Introductory Microeconomics (ECON 3) every quarter for at least 550 students each. Thus, it would not be a problem to accommodate students from the proposed major in these courses. Similarly, every year the Department offers the Intermediate Microeconomic Theory courses (ECON 104A and ECON 104B) 2-3 times each for a total of around 450 seats. Space in these courses would also not be an issue.

Please let me know if you need any additional information.

Sincerely,

A handwritten signature in cursive script that reads 'Steven Helfand'.

Steven Helfand

Appendix F. Letters of Support

This section contains letters of support from the following individuals:

1. Ian Dunkin, UC Santa Barbara
2. Mikhael Chernov, UCLA
3. Steven Sault, Australian National University
4. Renee Henderson, Southern California Casualty Actuarial Club
5. Michael De Mattei, Milliman Consulting
6. Christopher Girod, Milliman Consulting
7. Fisher Li, United Health Group
8. Kenneth Hsu, Uber
9. Joshua Ng, California Department of Insurance and Chapman University
10. Jeremiah Gonzalez and other UCR students

June 3rd, 2021

UCR Actuarial Science Major

To whom it may concern:

This letter supports the proposed establishment of an Actuarial Science Major at UC Riverside.

My name is Ian Duncan. I am an adjunct professor in the Dept. of Statistics & Applied Probability at UC Santa Barbara, where I have taught actuarial courses and led actuarial research for 11 years. I have been an actuarial student and actuary for 47 years, practicing in 4 countries and founding and leading 5 companies (two sold previously). I was also the donor of the Janet and Ian Duncan chair in actuarial science within our department.

The actuarial profession is a small, although highly-respected one. Actuaries serve clients by managing financial risks in numerous ways: retirement, health, life and property-casualty. Actuaries are required to pass rigorous examinations and the failure and withdrawal rates along the pathway to fellowship are relatively high. The rigorous training that even those not completing the examinations undergo, however, fits them for leadership roles in finance industries served by the profession.

When I entered the profession there were very few actuarial programs and my own undergraduate degree was in economics and mathematics. I believe I would have a difficult time now gaining an entry-level position with this background, however, given the number of actuarial programs and graduates. The education of actuaries has, for many years, been the province of the universities and there are estimated to be about 200 North American universities that provide actuarial courses. A considerably smaller number have full-fledged actuarial majors and actuarial programs because these require a critical mass of faculty and industry relationships. Unlike other professions actuaries graduating from actuarial programs have been required to pass all the examinations; this policy is, however, in the process of being changed and graduates with high grades of approved programs will, in the future, be exempted from some exams. Although many actuarial degrees are found within mathematics departments, as a business-oriented science it makes sense to establish a major within the business school. The courses available within a business school will give students a grounding in business that employers often find is lacking in graduates of maths programs.

The market for actuarial talent is a strange one: there is usually an over-supply of entry-level candidates and a shortage of experienced actuaries. Traditionally, the large insurance companies hired and trained a large cohort of entry-level graduates, expecting a certain percentage attrition. This tends no longer to be the case and actuaries are finding employment in a wide range of companies, particularly in the property-casualty and health fields. As an employer we have found in the last year that it has been

much more difficult to recruit entry-level graduates and we have extended our recruiting outside California as a result. I believe that we and other employers would find an additional school within California from which to recruit to be attractive.

The other area in which the profession is placing emphasis is data science. With the focus on mathematics and statistics in actuarial training, this has been a recent development but it is being given considerable emphasis. The range of programming, data science and forecasting courses available to prospective students within the new major is important.

I congratulate UC Riverside on the new major and look forward to meeting the graduates in the future.

Please feel free to contact me with any additional questions you may have regarding this recommendation.

Sincerely Yours,

A handwritten signature in black ink, appearing to read 'Ian Duncan', with a horizontal line underneath it.

Ian Duncan PhD B.Phil. FSA FIA FCIA FCA CSPA MAAA
Adj. Professor, Statistics & Applied Probability

16 June 2021

UC Riverside Senate

Reference: UCR proposal for a major in actuarial science

Dear Senate Members,

I am Professor of Finance at the Anderson School of Management at UCLA. In addition, I serve as Faculty Director of the Master in Financial Engineering program at Anderson, which graduate students for careers in quantitative finance. Just like Actuarial Science, the program is eclectic and challenging in terms of its demands. It requires deep knowledge of mathematics, statistics, computational methods and finance. We would not have been able to offer our students a pathway to this popular career in finance by simply offering electives in the framework of a more traditional MBA program.

Because of this experience I fully support the undertaking of UCR's School of Business to create a dedicated major in in actuarial science. This is an exceedingly important career path. That is especially so in California where the elevation of disaster risk is translated by actuaries into insurance premiums, economic justification of mitigation efforts, and development of government policies related to these risks.

The proposal lays out clearly the attractiveness of the major for future careers and how existing UCAP designations (including the one at UCLA) are ultimately inadequate or impractical for students desiring actuarial careers. Furthermore, dearth of CAE universities in the United States, in general, and in California, in particular, makes a good business case for introducing such a major. It offers UCR a tantalizing opportunity to attract quantitatively strong students who would otherwise select other colleges.

To conclude, I offer unequivocal support for establishing a major in actuarial science at UCR.

Sincerely,



Mikhail Chernov

28 May 2021

UC Riverside Senate

RE: Actuarial Science Undergraduate Major

Dear UC Riverside Senate,

I write in strong support of the proposal for an Actuarial Science Undergraduate Major to be offered at UC Riverside. At the Australian National University, we have offered a bachelor degree in actuarial studies for over 20 years within the Research School of Finance, Actuarial Studies and Statistics. Further, the School was designated a Centre of Actuarial Excellence by the Society of Actuaries in 2016. Particular strengths of the proposed program at UCR include:

- The major in actuarial science has the capacity to appeal to both current and prospective students with a strong quantitative focus, who also share an interest in studying finance. These students are typically high performing and talented.
- The proposed major would signal a pathway to students to complete the necessary courses for their Society of Actuaries exams without the need to overload or seek special permission for enrolment. A named major would also assist in the marketing and promotion of an actuarial pathway at UCR.
- The proposed major leverages current courses offered at UCR, with only one new course needing to be offered, so does not have a significant impact on resourcing requirements.
- The faculty who will instruct courses within the proposed major have excellent training and are leaders in their field. In some departments it is common that the education received by actuarial students is only given by actuarial faculty. This program will see students instructed by academics trained in the relevant fields of finance, economics, statistics and accounting. This ensures that students receive specific discipline training.

As mentioned previously, we have offered a Bachelor of Actuarial Studies within the Research School of Finance, Actuarial Studies and Statistics for the past 20 years, having been designated a Centre of Actuarial Excellence in 2016. Our School also offers a similar program at the postgraduate level. Over the past 5 years, the various programs within the School have had a student cohort of approximately 75 students, and I believe the proposed enrolment at UCR of 20-25 is achievable.

In summary I believe the proposed major in actuarial science at UCR has been well crafted and will prove to be robust and popular. I am certain it will attract a high quality student cohort, and be sustainable in terms of the numbers attracted. I also trust the program will enhance the reputation of UCR for delivering programs of excellence that are in demand.

Yours sincerely,

A handwritten signature in black ink, appearing to read 'Steve Sault', with a long horizontal flourish extending to the right.

Steve Sault
Director

Renee Henderson, FCAS
University Outreach Coordinator
Southern California Casualty Actuarial Club (SCCAC)
Renee.Henderson@aig.com
+1 212 458 6131

University of California, Riverside
900 University Avenue
Riverside, CA 92521
+1 951 827 1012

To whom it may concern

Re: University of California, Riverside's Proposal for an Undergraduate Major in Actuarial Science

The Southern California Casualty Actuarial Club is a regional affiliate of the national Casualty Actuarial Society (CAS). The CAS mission statement is as follows: to establish and maintain standards of qualification for membership; to promote and maintain high standards of conduct and competence; to increase the awareness of actuarial science; and, to contribute to the well being of society as a whole.

To be a credentialed actuary through the CAS, one is required to take a series of rigorous exams. The exam structure changes slightly over time, but on average there are a series of a dozen required exams that take an average of seven years to complete. When companies look to hire interns or recent graduates, they are typically expected to have passed at least one or two exams, with this number increasing over time. Along with exams, there is also a "Validation of Educational Experience" (VEE) requirement for credits in Statistics, Economics and Finance courses.

While a major in actuarial science is not necessary to enter the field, it is a huge advantage for students to complete the required VEE courses through school and have courses associated with the entry-level exams to increase their chances of passing these exams before graduating. Without an actuarial science degree program, students in southern California would have to take courses outside their major or study hundreds of hours for exams on their own which can be very difficult. In my personal experience, I decided to go out of state to major in actuarial science since the major was not offered at any schools in southern California at the time. In the Midwest and East Coast, actuarial science majors are much more common and accessible.

Members of SCCAC currently include representatives of many different companies based out of southern California that recruit actuarial students. As a small sample, the current board members work at Farmers Insurance Group, AIG, Liberty Mutual, Oliver Wyman, and Great American Custom.

As both credentialed actuaries and residents of Southern California, we fully support University of California, Riverside (UCR)'s proposed undergraduate degree program in Actuarial Science.

Best regards



Renee Henderson, FCAS



Michael L. DeMattei
FCAS, MAAA
Principal & Consulting Actuary

michael.demattei@milliman.com
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251 South Lake Avenue
Suite 910
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USA

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To whom it may concern

Re: University of California, Riverside's Proposal for an Undergraduate Major in Actuarial Science

I am an actuary and have spent the entirety of my 33 year career with the Los Angeles office of Milliman. Milliman is one of the largest actuarial consulting firms with locations in major cities worldwide. In Southern California, we have offices in Los Angeles, Irvine and San Diego.

As both an actuary and a lifelong resident of Southern California, I fully support University of California, Riverside's (UCR) proposed undergraduate degree program in Actuarial Science. While the availability of actuarial programs and courses in California has increased since I attended college, we are still limited compared to the Midwestern and Eastern parts of the country.

A degree in Actuarial Science is not necessary to enter the profession, but nowadays students with such degrees have a competitive advantage in securing jobs. The proposed program would also enable students to graduate with three or four actuarial exams, instead of the current one or two. Since exam status is important, particularly early on in one's career, the ability of students to graduate with more exams is significant.

In addition, as a current member of Milliman's Opportunity Scholarship Committee and a past member of the Casualty Actuarial Society/Society of Actuaries Joint Committee on Minority Recruiting, UCR's significant Hispanic & Latino student population is very much the type of talented individuals we are trying to reach. The actuarial profession presents excellent opportunities for people interested in math and finance, and some segments of society are currently very underrepresented. UCR's proposed program can help change this.

Thank you for the opportunity to submit this letter.

Best regards.

Michael L. DeMattei, FCAS, MAAA
Principal and Consulting Actuary



4370 La Jolla Village Drive, Suite 700
San Diego, CA 92122

(858) 587-5304 tel
(858) 597-0111 fax

www.milliman.com

May 26, 2021

University of California Riverside

RE: Support for New Actuarial Science Major

Dear UC Riverside:

I am sending this letter on behalf of the San Diego office of Milliman, Inc. to express my support for UC Riverside establishing an actuarial science program.

The actuarial profession is small, but strong, and I have never regretted my decision to become an actuary 32 years ago. The job market for actuaries has been excellent for all of those years, and I do not expect that to change in the foreseeable future.

An often cited quote in our profession is that the work of science is to substitute facts for appearances and demonstrations for impressions. That rigorous pursuit of truth, coupled with the skills to find it, has given actuaries a high degree of respect in the business world. The business leaders that I work with daily need sound, accurate, unbiased information to inform their decisions in environments where the best answer is often unclear. As actuaries we are trained to support decision making, bringing data and science to bear, and then helping our audiences understand and interpret the information to address their business needs. The actuarial profession needs more people with these capabilities—strong skills in analytics, communications, accounting, economics, and business.

If UCR can expand the pool of well prepared actuarial candidates, then you have my support.

Sincerely,

A handwritten signature in black ink that reads "Chris Girod".

Christopher S. Girod, FSA, MAAA
Principal and Consulting Actuary

Mr Jason Stajich,

I am writing to petition for the Actuarial science major at UCR. I am an UCR alumni graduated in 2010 with a degree in applied mathematics with emphasis on economic, and I am currently working at SoCal as an actuary. I had a master degree in Actuarial Science and obtained highest title, Fellow of Society Actuaries, from the Society of Actuaries.

One of the most important criteria for an entry level job at the actuarial field is passing actuarial exams to obtain the professional title. The professional qualification process involved 8-10 rigorous exams, 5-7 educational modules, and 2 in-person training courses. The proposed curriculum for Actuarial Science major can help UCR student organize educational requirement, prepare for exams and kick start a prestigious career options. I wish I could have a complete guideline on this career 10 years ago.

Local inland empire and SoCal companies offer plenty of employment opportunity for actuarial students. Experience actuaries are still in high demand. I hope the future UCR students would have more helps in getting into actuarial science field.

Sincerely,

Fisher Li, UCR class of 2010.



Jean Helwege <helwege@ucr.edu>

UCR Actuarial Science Program

1 message

Kenneth Hsu <kennethshsu@gmail.com>

Thu, Jun 3, 2021 at 10:08 PM

To: Jean Helwege <helwege@ucr.edu>

Dear Senate Chair, Jason Stajich,

I am writing to express my support for the University of California, Riverside to launch its Actuarial Science degree. I am a UCR alumnus and the direction of UCR's academic program is very important to me.

I graduated in 2015 with a BS in Statistics and a minor in Computer Science and Engineering. I am now a Fellow of the Casualty Actuarial Society and a practicing actuary at Uber Technologies, Inc based out of San Francisco, CA. I first learned about actuarial science through a cousin and had inquired about it more with my academic advisor. At the time, knowledge was extremely limited and I was often redirected to other campuses such as UCSB or UCLA. In fact, after graduation from UCR, I had such a difficult time getting started as an actuary I went to get a Master's from Columbia University in Actuarial Science. As we know, the actuarial profession is projected for high growth in the next 15 years, yet many students such as myself did not have the adequate resources to learn about this niche yet rewarding career. UCR needs to launch an actuarial science degree so students can be better prepared and have access to the essential support that they need. I have also reviewed the course work proposed and I believe it will adequately prepare students to become successful entry-level actuarial analysts upon completing their degree.

The industry and the society also stand ready to connect and assist the faculty members, should they need any guidance. I am on a University Liaison as a volunteer for the Casualty Actuarial Society, where we provide vital information to prepare students to launch their actuarial careers while they are still in school. Support such as exam preparation tips, summer internships completely run by volunteers, and interviewing prepare all common things that students reach out to volunteers for.

Should you have any questions, please feel free to reach out to me.

Kenneth Hsu, Class of 2015
Uber Technologies, Inc
kenneth.hsu@uber.com

Jason Stajich
900 University Ave
Riverside, CA 92521

Dear Dr. Stajich:

As an alumnus from UC Riverside who has taken over 80% of the proposed curriculum, former Professor, and current professional in the Actuarial field, I am a large supporter of the Senate Proposal for an Undergraduate major in Actuarial Sciences. Introduction of the major utilizes existing resources without compromising curriculum, strengthens the prospects for future graduates, and strengthens interdepartmental relationships at the University.

The rigor of the curriculum matches the expectations of the Actuarial field and is comparable to UCLA and UCSB's curriculum for Actuarial Science majors. Students who follow the Sample Program of Study provided in Appendix B of the proposal would be adequately prepared for success in their three SOA/CAS exams at the end of their 2nd, 3rd, and 4th year. In the current market, a student with three exams combined with relevant internships is competitive and more than qualified for entry-level positions at any firm. The Actuarial field is expected to grow with the increasing use of predictive analytics and expand into non-traditional areas within the next decade. Offering the major would be attractive to incoming students and would garner interest in current students. The proposal utilizes not only the existing resources at the University but strengthens relationships between business, statistics, economics, and math departments. For these reasons, I support the Senate Proposal for an Undergraduate major in Actuarial Sciences. If you have any questions, feel free to contact me.

Sincerely,

Joshua Ng, MA
Actuarial Assistant at California Department of Insurance
916-505-9463
Joshua.Ryan.Ng@gmail.com

June 8, 2021

To whom it may concern,

We are writing this letter to show support to our potentially new major at UCR: Actuarial Sciences. Initiated by our designated Finance Professor at the School of Business Jean Helwege, we (current undergraduates) are in favor of the proposition.

Meeting the demands of a student body who wants to learn and major in this academic field requires funding from the University as well as faculty who are willing to teach the curriculum courses. In line with this, we would like to ask for approval in this endeavor since we cannot do this alone. As a result, we the students are signing this letter for attention towards supporting the cause.

Should you have any more queries or concerns, please feel free to contact us at **661-609-7088** or email the enacting professor: helwege@ucr.edu Thank you in advance for your support. Your generosity shall be remembered.

Regards,

Jeremiah Gonzalez,
Former President of The Actuarial Club at UCR
And other Actuarial students

NAME	SIGNATURE	EMAIL
Jeremiah Gonzalez	Jeremiah Gonzalez	jgonz239@ucr.edu
Patrick Luong	patrick luong	pluong006@ucr.edu
Yue Yin	Yue Yin	yyin027@ucr.edu
Oswaldo Ramirez	Oswaldo Ramirez	orami007@ucr.edu
Timothy Kim	Timothy Kim	tkim182@ucr.edu
Dung Dinh	Dung Dinh	ddinh011@ucr.edu
Michelle Hoang	Michelle Hoang	mhoan019@ucr.edu
Jonathan Young	Jonathan Young	jyoun049@ucr.edu
Niko Romero	Niko Romero	nrome013@ucr.edu
Ian Dimapasok	Ian Dimapasok	cdima002@ucr.edu



Academic Senate

EXECUTIVE COUNCIL

February 15, 2022

To: Riverside Division

From: Jason Stajich, Division Chair

RE: **Proposal to Rename the UCR Ph.D. in Management to Ph.D. in Business Administration**

During their February 14, 2022 meeting Executive Council discussed the subject item and had no additional comments or objections.

December 2, 2021

To: Senate Chair Jason Staijch

From: Rami Zwick, Associate Dean for Graduate Programs

Proposal to rename the UCR “Ph.D. in Management” to “Ph.D. in Business Administration.”

The UCR “Ph.D. in Management” offers a Doctor of Philosophy Degree (Ph.D.) with concentrations in five major areas:

- Accounting
- Finance
- Marketing
- Operations
- Strategic Management and Organizations (SMO)

The Ph.D. Program trains doctoral students in the design and execution of original research in Management.

Justification for the proposed name change

The name of the PhD Program (Ph.D. in Management) is confounded with the name of one of our concentration areas (Strategic Management and Organizations). The proposed change disentangles the name of the degree from the name of the concentration. The name “Ph.D. in Business Administration” is a common name for the degree at other universities (e.g., [UC Berkeley](#), [USC](#), [Duke](#), [University of Minnesota](#), [University of Washington](#), [Arizona State University](#), [University of Illinois at Urbana-Champaign](#)).

The new name will also be consistent with the name of our flagship “Master of Business Administration” (MBA)

There is no associated change in degree requirements of the program and/or any need for substantial new resources.

Approvals:

Approved by the School of Business PhD Program Committee: June 2, 2021

Approved by the School of Business Executive Committee: October 15, 2021

CC: Cherysa Cortez, Senate Executive Director

Thomas Kramer, School of Business, Chair of the PhD Committee

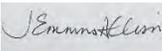


Academic Senate

COMMITTEE ON EDUCATIONAL POLICY

January 12, 2022

To: Jason Stajich, Chair
Riverside Division

From: Juliann Allison, Chair 
Committee on Educational Policy

RE: Proposal to Rename the UCR Ph.D. in Management to Ph.D. in Business Administration

The Committee on Educational Policy reviewed the proposal to rename the Ph.D. in Management to the Ph.D. in Business Administration at their January 7, 2022 meeting and have no comments as the proposal does not fall under the Committee's purview of undergraduate education.



Academic Senate

GRADUATE COUNCIL

January 21, 2022

To: Jason Stajich, Chair
Riverside Division

From: Don Collins, Chair
Graduate Council

Re: [Campus Review] (Graduate Program Name Change) Rename Ph.D. in
Management to Ph.D. Business Administration in the School of Business

Graduate Council reviewed the proposal to rename the Ph.D. in Management to Ph.D. in Business Administration in the School of Business at their January 20, 2022 meeting and was supportive of the proposed graduate program name change.

Proposed Committee on Diversity, Equity and Inclusion (CoDEI) Resolution

Resolution on Centrality of Academic Freedom Relative to Content Pertaining to Critical Studies

WHEREAS state legislative proposals are being introduced across the United States that target academic discussions of racism and related issues in American history in schools, colleges and universities under the guise of banning critical studies, including critical race theory,

WHEREAS the UCR CoDEI affirms the importance of academic freedom to the proper functioning of universities in alignment with the American Association of University Professors' [1940 statement of Principles on Academic Freedom and Tenure](#);

WHEREAS faculty have responsibility for the curriculum at their colleges and universities;

WHEREAS restrictions on curricula and pedagogies addressing histories and legacies of gendered antiblack chattel slavery, segregation/U.S. apartheid, genocidal conquest and colonization, heteronormativity, patriarchy, and other oppressive power relations attempt to repress and intimidate educators, undermining their capacity to explore a wide variety of topics based on a rigorous approach to social and historical knowledge and the development of essential critical thinking skills;

WHEREAS access to curricula which contains content about systemic, historical forms of oppressive violence and power relations based on race, gender, sexuality, ability, religion, citizenship, and other social/cultural/political identities is inseparable from the active and engaged pursuit of knowledge in the 21st century and is a basic pedagogical responsibility to students and multiple communities;

WHEREAS over seventy organizations, including the American Association of University Professors (AAUP) and the Association of American Colleges and Universities (AACU), issued the [Joint Statement on Legislative Efforts to Restrict Education about Racism and American History](#) (June 16, 2021) stating their "firm opposition to a spate of legislative proposals being introduced across the country that target academic lessons, presentations, and discussions of racism and related issues in American history in schools, colleges and universities . . . In higher education, under principles of academic freedom that have been widely endorsed, professors are entitled to freedom in the classroom in discussing their subject. Educators, not politicians, should make decisions about teaching and learning;"

THEREFORE BE IT RESOLVED that the UCR CoDEI resolutely rejects any attempts by bodies external to college and university faculty to restrict or dictate college and university curriculum on any matter, including matters related to racial, gender and social justice, and will firmly oppose encroachment on faculty authority by legislatures, boards of trustees, and similar or analogous bodies;

BE IT FURTHER RESOLVED that the UCR CoDEI stands with our K-12 colleagues throughout the U.S. who may be affected by such legislation when they seek to teach U.S. history, civics, literature, and other courses;

BE IT FURTHER RESOLVED that the UCR CoDEI calls on relevant college and university administrators, including provosts, presidents, and chancellors, to affirm that they reject any attempts by bodies external to the faculty to restrict or dictate college and university curriculum on any matter, including matters related to racial, gender and social justice, and will firmly oppose encroachment on faculty authority by by legislatures, boards of trustees, and similar or analogous bodies;

BE IT FURTHER RESOLVED that the UCR CoDEI affirms the [Joint Statement on Efforts to Restrict Education about Racism](#), authored by the AAUP, PEN America, the American Historical Association, and the Association of American Colleges & Universities, endorsed by over seventy organizations, and issued on June 16, 2021.

Master Attendance 2020-2021

Executive Council	9/28/2020	10/26/2020	11/9/2020	1/11/2021	1/25/2021	2/8/2021	2/22/2021	3/8/2021	4/12/2021														
Jason E. Stajich	P	P	P	P	P	P	P	P	P														
Christiane Werauch	P	P	P	P	P	P	P	P	P														
Richard Michael Carpiano	P	P	P	P	P	P	P	P	P														
Hui Che	P	P	P	P	P	P	P	P	P														
Joseph Kahne	P	P	P	P	P	P	P	P	P														
Alejandra Dubcovsky	P	P	P	P	P	P	P	P	P														
Subramanian Balalander	P	P	P	P	P	P	P	P	P														
Amanda Lucia	P	P	P	P	P	P	P	P	P														
Declan F. McCole	P	P	P	P	P	P	P	P	P														
Philip Brisk	P	P	P	P	P	P	P	P	P														
Ben Bishin	P	P	P	P	P	P	P	P	P														
Stefano G. Vidussi	P	P	P	P	P	P	P	P	P														
Richard K. Seto	P	P	P	P	P	P	P	P	P														
Jingsong Zhang	P	P	P	P	P	P	P	P	P														
Yinsheng Wang	P	P	P	P	P	P	P	P	P														
Theodore Garland Jr.	P	P	P	P	P	P	P	P	P														
Xuan Liu	P	P	P	P	P	P	P	P	P														
Luille Chia	P	P	P	P	P	P	P	P	P														
Katherine A. Kinney	P	P	P	P	P	P	P	P	P														
Patricia A. Morton	P	P	P	P	P	P	P	P	P														
Sheldon Xiangdong Tan	P	P	P	P	P	P	P	P	P														
Feng Xu	P	P	P	P	P	P	P	P	P														
Peter Chung	P	P	P	P	P	P	P	P	P														
Isgouhi Kaloshian	P	P	P	P	P	P	P	P	P														
Academic Freedom	10/29/2020	1/21/2021																					
Frederick H. Wilhelm Jr.	P	P																					
Ivy Zhang	P	P																					
Dora A. Weber	P	P																					
Roya Zandi, Exofficio	P	P																					
Patricia A. Morton, Exofficio	P	P																					
Christopher Fernandez, ASUCR	P	P																					
Valeria Orue, GSA	P	P																					
Academic Personnel	54 Meetings	# of meetings attended																					
Yinsheng Wang	54																						
Srikant Krishnamurthy	54																						
Mark Alber	54																						
Jean Helwege	54																						
Sean Cutler	53																						
Stephen J. Wimpenny	54																						
David C. Funder	53																						
Georgia C. Wamke/L/winter - Si	36of39																						
Deborah A. Worz	54																						
Aman Ullah	53																						
Susan Ossman (Fall - 1/2 winter)	13of 15																						
Diversity, Equity, and Inclusion	10/15/2020	1/21/2021	4/15/2021	6/10/2021																			
Xuan Liu	P	P	P	P																			
Victoria Reyes	P	P	P	P																			
Katherine Stavropoulos	P	P	P	P																			
Austin H. Johnson	P	P	P	P																			
Philip Brisk	P	P	P	P																			
Cha-Er Chang	P	P	P	P																			
Amr Zaki	P	P	P	P																			
Mariam Lam, Exofficio	P	P	P	P																			
Mufida Assaf, ASUCR	P	P	P	P																			
Isabela Perez, GSA	P	P	P	P																			
Charges	10/7/2020	10/7/2020	11/4/2020	11/4/2020	2/11/2021	4/5/2021	4/9/2021	5/17/2021															
Richard Smith	P	P	P	P	P	P	P	P															
Jennifer Merolla	P	P	P	P	P	P	P	P															
Seema K. Tiwari-Woodruff	P	P	P	P	P	P	P	P															
Setsu Shigematsu	P	P	P	P	P	P	P	P															
Karine Le Koch	P	P	P	P	P	P	P	P															
Richard Stouthamer	P	P	P	P	P	P	P	P															
Guanshui Xu	P	P	P	P	P	P	P	P															
Committees	10/8/2020	10/29/2020	11/19/2020	11/19/2020	1/14/2021	1/28/2021	2/4/2021	2/11/2021	2/25/2021	3/8/2021	4/1/2021	4/8/2021	4/15/2021	4/22/2021	4/29/2021	5/6/2021	5/13/2021	5/20/2021	5/27/2021	6/3/2021	6/10/2021		
Richard K. Seto	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	
Jonathan P. Eccott	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Heng Yin	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Meng Chen	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Samantha C. Yin	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Alice La Blanc	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
De-en Jiang	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Victor Ortega-Marti	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
David D. Lee	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Jianlin Liu	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Lawrence D. Rosenblum	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Mohsen El Hafsi	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P	P
Courses	10/14/2020	10/29/2020	1/13/2021	1/27/2021	3/10/2021	4/21/2021	5/5/2021	6/2/2021															
Ming Lee Tang	P	P	P	P	P	P	P	P															
Anika Loyd	P	P	P	P	P	P	P	P															
Qi Chen	P	P	P	P	P	P	P	P															
Wenbin Chen	P	P	P	P	P	P	P	P															
Stephanie Orinavalli	P	P	P	P	P	P	P	P															
Ben J. Newman	P	P	P	P	P	P	P	P															
Zhiyun Qian	P	P	P	P	P	P	P	P															
Eldode Goodman	P	P	P	P	P	P	P	P															
Weiwei Gu	P	P	P	P	P	P	P	P															
Zhenbiao Yang	P	P	P	P	P	P	P	P															
Natalie Hernandez, ASUCR	P	P	P	P	P	P	P	P															
Judi Palencia Gutierrez, GSA	P	P	P	P	P	P	P	P															
Distinguished Teaching	3/9/2021																						
Susan C. Stragel	P																						
Gregory J. O. Beran	P																						
Morris Maduro	P																						
Peter M. Sadler	P																						
Carl F. Cramer	P																						
Cody Simmons, GSA	P																						
Orlando Cabalo, ASUCR	P																						
Educational Policy	10/2/2020	11/5/2020	12/4/2020	1/8/2021	2/5/2021	3/19/2021	3/5/2021	4/2/2021	5/7/2021	6/4/2021	7/2/2021												
Stefano G. Vidussi	P	P	P	P	P	P	P	P	P	P	P												
Goldberry Long	P	P	P	P	P	P	P	P	P	P	P												
Changcheng Zhou	P	P	P	P	P	P	P	P	P	P	P												
Catherine M. Lussier	P	P	P	P	P	P	P	P	P	P	P												
Bruce Alan Babcock	P	P	P	P	P	P	P	P	P	P	P												
Ashish Sood	P	P	P	P	P	P	P	P	P	P	P												
Bryan M. Wong	P	P	P	P	P	P	P	P	P	P	P												
Eldode Goodman	P	P	P	P	P	P	P	P	P	P	P												
Lorenzo Mangalini	P	P	P	P	P	P	P	P	P	P	P												
Fariba Zarinetaf	P	P	P	P	P	P	P	P	P	P	P												
Gareth J. Funning	P	P	P	P	P	P	P	P	P	P	P												
Morris Maduro	P	P	P	P	P	P	P	P	P	P	P												
Isgouhi Kaloshian	P	P	P	P	P	P	P	P	P	P	P												
Jullann E. Allison	P	P	P	P	P	P	P	P	P	P	P												
Jiang-ting Guo	P	P	P	P	P	P	P	P	P	P	P												
Cody Simons, GSA	P	P	P	P	P	P	P	P	P	P	P												
Mufida Assaf, ASUCR	P	P	P	P	P	P	P	P	P	P	P												
Faculty Research Lecturer	3/16/2021																						
David N. Reznick	P																						
Walter Clark	P																						
Xuanni Chen	P																						
Alexander S. Raikhel	P																						
Aman Ullah	P																						
Faculty Welfare	10/13/2020	12/15/2020	1/19/2021	2/16/2021	2/16/2021	3/16/2021	4/20/2021	5/18/2021	6/15/2021														
Patricia A. Morton	P	P	P	P	P	P	P	P	P														
Sika Zheng	P	P	P	P	P	P	P	P	P														
Maqan L. Robbins	P	P	P	P	P	P	P	P	P														
Urmet Khan	P	P	P	P	P	P	P	P	P														
Ravi Gupta	P	P	P	P	P	P	P	P	P														
Venugopala Reddy Gonehal	P	P	P	P	P	P	P	P	P														
Begona Echeverria	P	P	P	P	P	P	P	P	P														
John M. Heraty	P	P	P	P	P	P	P	P	P														
Brian A. Federici	P	P	P	P	P	P	P	P	P														
Marcus W. Martins-Green	P	P	P	P	P	P	P	P	P														
Bradley C. Hyman	P	P	P	P	P	P	P	P	P														
Jacob Greenstein	P	P	P	P	P	P	P	P	P														
Graduate Council	9/24/2020	11/19/2020	12/10/2020	1/21/2021	2/18/2021	3/18/2021	4/15/2021	5/20/2021	6/3/2021	6/10/2021													
Amanda Lucia	P	P	P	P	P	P	P	P	P	P													
Eith Jaffe-Benz	P	P	P	P	P	P	P	P	P	P													
Don Collins	P	P	P	P	P	P	P	P	P	P													
Weiwei Yao	P	P	P	P	P	P	P	P	P	P													
Maria Santa Seo	P	P	P	P	P	P	P	P	P	P													
Djordjica Coss	P	P	P	P	P	P	P	P	P	P													
Roya Bahreini	P	P	P	P	P	P	P	P	P	P													
Tanya A. Nieri	P	P	P	P	P	P	P	P	P	P													
Todd Falco	P	P	P	P	P	P	P	P	P	P													
Khaled Abdurazzak	P	P	P	P	P	P	P	P	P	P													
Thomas Girke	P	P	P	P	P	P	P	P	P	P													
Heungjung Jung	P	P	P	P	P	P	P	P	P	P													

