Integrating History and Engineering to Examine Foundational Assumptions

Evie Levin
History
California Polytechnic State University
San Luis Obispo, USA
evlevin@calpoly.edu

Lizabeth Thompson
General Engineering
California Polytechnic State University
San Luis Obispo, USA
lschleme@calpoly.edu

***Abstract*— The General Engineering Program at California Polytechnic State University, San Luis Obispo, is non-ABET accredited and must participate in a university level Program Review every seven years. As part of this process a self-study is produced, followed by a visit from several external reviewers, which results in action planning for program improvement. This mirrors the ABET accreditation process and is typical for reviews of this type. This General Engineering program was launched in 1972 which of course was preceded by several years of development, review, and planning. The period of the program's development (1968-1972) was also one of great social, political, and cultural upheaval: the end of the Vietnam War, the tumultuous Civil Rights movement, and the counterculture efforts rejecting many social norms. It is the thesis of this work that this cultural context, and the identity of those who developed it, influenced the program at inception and may be influencing it still. To explore these foundations, the program director engaged an undergraduate history student to research and write a historical narrative. Original documents from the period including newspaper articles, press releases, and founding documents were used along with recognition of the social political landscape to reveal the important context at inception.**

This paper will include the relevant portions of the historical narrative and the methods used to do this in the review.

Keywords— Program review; History; Systems thinking

As James Baldwin indicates "… the great force of history comes from the fact that we carry it within us, are unconsciously controlled by it in many ways, and history is literally present in all that we do. It could scarcely be otherwise, since it is to history that we owe our frames of reference, our identities, and our aspirations."[1]

I. Research Methods

When I was lucky enough to be picked for this project, my assignment was deceptively straightforward: examine the creation of General Engineering (GENE), its relationship to the United States military, and the structures within California Polytechnic State University, San Luis Obispo (Cal Poly, or CP) and the Engineering department that laid the groundwork for what the program is today. However, upon discovering the absence of any prior historiographical work on the program, my task was complicated. To this effect, this project (to the exclusion of the historiography) is based entirely on primary source research conducted at Cal Poly's own Special Collections and Archives – particularly documentation in school newspapers, Staff Bulletins, Cal Poly Reports, Academic Senate minutes, and Accreditation reports.

The process of constructing a well-supported, relatively unbiased historical narrative – especially one so primary-source based as this one – is akin to detective work. First, one must begin with a research question – something that is specific enough to guide research, but flexible enough to accommodate complex findings. It is vital to also eliminate all preconceived arguments that could hinder the accumulation of relevant sources. Researching in this way is a process of following promising trails to their conclusions, and the development of a central thesis is reserved for the final stages of the process, when enough evidence has been gathered to argue probable cause. For this reason, historical research can be a very time-consuming process. Fortunately, the Cal Poly archives is very well-organized, and many of their university-related documents are digitized on their website. This enabled me to gather evidence on my own time, and before I had ever visited the archives in person. With the help of the reference and instruction archivist, Laura Sorvetti, I was able to scour various school publications like student-run newspaper the *Mustang*

[1] James Baldwin, *The Price of the Ticket: Collected Nonfiction, 1948-1985* (New York: St. Martin's/Mabek, 1985), 410.

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Daily, Accreditation reports, and internal Faculty and Staff bulletins.

In the initial stages, I narrowed my search to documents related to Engineering Science[2] by date range, to pinpoint the exact year the major was created, and other basic information. After accumulating more threads to follow from this preliminary background search (i.e. names of faculty and staff, or dates of events) I was able to find artifacts that discussed specifics, like the biographies of Engineering Science Deans Archie Higdon and Robert G. Valpey, contained in Staff Bulletins. This was relatively easily done, once again due to Cal Poly's user-friendly and well-curated digital collection. After piecing together a general image of the founding of Engineering Science itself, I was able to pull back from the program to look at how it fit into the contemporaneous university environment. Unfortunately, due to the vastness of the archives, and the fact that not all the material they possess is processed, my research may be incomplete. Perhaps the most regrettable gap is the lack of information on direct donors from whom Cal Poly received funding in the 1960s and 70s, which I did not have access to at time of writing.

Regarding notetaking and organization, before beginning research, I often construct a basic concept outline to lay out the kinds of information I would like to find based on my historical question, and how it may fit together to create a cohesive structure that is easy to follow. Additionally, I find it most effective to conduct preliminary research by taking separate notes on each individual source, focusing on main arguments and/or purpose of production. Once these notes have been taken, they can be organized by theme, chronology, or any other framework chosen to deliver the information. This structure is then used to construct a more thorough outline, through which the historical narrative is chosen, and thesis is developed.

I had the privilege of speaking to Laura Sorvetti, the archivist who supported my research during this project, about the process of archival research. In our conversation, she stated that the role of an archivist is to be the "gateway to collections," especially those unavailable online, and stressed the value in connecting with an archivist to navigate the archives and get advice on potential sources. She also emphasized the importance of flexibility as research accumulates and narratives take different shapes. Depending on what an archives has, a topic might have to be broadened or narrowed, or switched altogether. It is for this reason, too, that it is important to reserve thesis-building until after the research portion is (nearly) concluded.

In conjunction to a discussion about process, she also touched on the value of archival research to engineers in an academic setting. She emphasized the goal of an archives to be "the repository for the decision making of the campus and to hold the institution accountable for its choices." In a contemporary media landscape that is oversaturated with information -- factual or not -- the ability to understand where ideas, practices, and institutions come from is ever more important. Working in archives enables researchers to become critical consumers of information, providing primary sources which they must interpret for themselves. Through this process, a researcher is confronted with their own biases and lenses as they inevitably encounter contradictory material. Universities must be held accountable for all their decision-making, both contemporary and historical, and it is only through studying archives that these decisions can be revealed and analyzed, and preconceptions can be unlearned. This is especially the case with engineering programs, which, as I will show, are fundamentally inextricable from questionable involvement with the military on a national scale. Conversely, researchers coming from non-historical fields like engineering are incredibly important for the expansion of understanding and knowledge that can be preserved in an archives. While archivists are experts on materials as parts of a collection, frequently they cannot apply deeper understanding to the specific content contained within. Since most archivists are trained in history and/or preservation (which is the case at Cal Poly), they can provide little academic insight into the meanings of STEM, architectural, or agricultural collections. Collaborative work with an archives by engineers is a mutually beneficial relationship, creating dialogues and research paths to deeper understandings for both parties.

II. History of General Engineering

In 1961, United States president Dwight D. Eisenhower popularized the term "military-industrial complex" to describe the expanding economic power of the military through private defense companies after World War II. Throughout the 1960s, Senator William Fulbright expanded on the phrase, utilizing the incisive concept of a "military-industrial-academic complex" (MIAC) to criticize not only the growth of the defense industry, but also the rapid encroachment of the Department of Defense (DOD) into university STEM research.[3] Eisenhower and Fulbright predicted an increasingly anti-democratic system, in which the military acquires a monopoly on knowledge production at universities for the development of defense products, made to be used in perpetual profit-generating warfare. Their fears were validated throughout the Cold War, as top universities in the US began receiving exorbitant funding from the DOD to construct laboratories, develop curricula, and hire military personnel for defense-specific knowledge production – particularly in engineering and the physical

[2] In this piece, the General Engineering (GENE) program is referred to as "Engineering Science" – the original name of the major, and the name that it went by during the era at hand, approximately 1967-1977.

[3] Henry A. Giroux, *The University in Chains: Confronting the Military-Industrial-Academic Complex*, (Boulder, CO: Paradigm Publishers, 2007), 14.

sciences – in service of the Korean and Vietnam Wars.[4] While prestigious, STEM-focused, research universities like MIT, Stanford, and Cal Tech received the majority of direct funding, the process of converting universities into extensions of military production touched campuses across the country. On a smaller scale, the MIAC is a useful lens through which to examine military influence in Cal Poly, specifically regarding the origins of its Engineering Science program.

Engineering Science was founded in 1972, squarely during the Vietnam War (1955-1975). Acting as host to both an unprecedented scale of student political activism, and as a direct line between up-and-coming young professionals and military-backed industry, the Vietnam War revealed universities like Cal Poly to be a microcosm of the ecopolitical tensions that were boiling over across the United States. This was especially the case with the Engineering department and the establishment of Engineering Science. Utilizing archival sources from 1967-1977, this piece will detail the environment at Cal Poly during the Vietnam War, the histories of the first military men who ran Engineering Science, and the initial goals of the major, in order to shed light on the complex ecopolitics of the creation of the program. Ultimately, I will contend that Engineering Science's 1972 founding is inextricable from Cal Poly's military connections of the time, and thus functions within the broader military-industrial-academic complex.

In order to fully understand the way that the MIAC functioned in CP's Engineering department, it is vital to first discuss the development of the MIAC on a national scale. After World War II, universities in the United States faced a precarious economic climate and an even more precarious political one. The Cold War inspired the DOD's increased interest in development of new information and technology, particularly due to US fears of Soviet advancements and the prospect of an arms race.[5] At the same time, many universities began to rely more and more heavily on government funding as their income became unstable.[6] These factors made a union between universities and the military seem mutually beneficial, as schools could acquire the money they needed, and the military could rapidly expand the scope of their arms holdings. In her book *University and Military Research: Moral Politics at MIT*, Dorothy Nelkin explains that, for the government, "salaries and overhead costs [of universities] are often lower than in industry, and competent staff is readily available, attracted by the university affiliation," and that "for the universities, there are also advantages: increased expertise, consulting opportunities for faculty, and 'real world' professional engineering facilities for students."[7] The convergence of these sectors is expanded on by Stuart W. Leslie in *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford.* Leslie unearths striking information on the funds provided by the DOD, revealing that throughout the 1950s, the DOD was by far the largest funder of American scientific and engineering research and development in universities, reaching into the multiple-millions, and – after the Korean War (1950-53) – the billions.[8] While, given the limited scope of my research, it is unclear just how much money Cal Poly was granted by the DOD (if any), it remains that within this national economic climate, Cal Poly was aggressively expanding its engineering department. Given the 1972 advent of Engineering Science and its context within the Vietnam War, it is also important to note the unique place that the War has within the history of the MIAC. The anti-war protests that erupted on campuses across the country, like at Cal Poly, demonstrated a level of popular awareness of the growing entanglement of universities and the military. However, as Henry A. Giroux states in *The University in Chains: Confronting the Military-Industrial-Academic Complex*, this was an awareness that the public would quickly lose by the 1980s, when the military garnered its greatest power over universities.[9]

Despite this broader cultural consciousness, the Vietnam War helped to cultivate an environment within Cal Poly administration that was – at the very least – not opposed to military influence in the school. For the duration of the War, private industries were visiting Cal Poly with the express purpose of recruiting students – particularly engineering students – into their companies. This is clearly exemplified in the week of February 7, 1967, in which a total of 43 companies visited the university with the intention of interviewing senior students. While engineers were not the only students sought, they were certainly the majority. Of the 43 companies that visited, 33 (76.7%) of them were seeking engineering students.[10] Many of these companies were also directly affiliated with the military, like the Aerojet General Corporation which interviewed students in aerospace, electrical, and mechanical engineering; the US Naval Ship Engineering Center which interviewed students in electrical and mechanical engineering; and the US Naval Civil Engineering Laboratory, interviewing students in electrical, industrial, and mechanical engineering.[11] Though this reporting occurred prior to the founding of Engineering Science in 1972,

[4] Stuart W. Leslie, *The Cold War and American Science: The Military-Industrial-Academic Complex at MIT and Stanford*, (New York: Columbia University Press, 1993), 1.

[5] Dorothy Nelkin, *University and Military Research: Moral Politics at MIT* (Ithaca, NY: Cornell University Press, 2019), 3.

[6] Nelkin, 3.

[7] Nelkin, 32-33.

[8] Leslie, 1.

[9] Giroux, 17.

[10] "Placement Calendar – Interviews on Campus This Week," *California State Polytechnic College Staff Bulletin* 17, no. 18 (February 7, 1967): 8-12, https://digitalcommons.calpoly.edu/pao_rpt/2141/.

[11] "Placement Calendar – Interviews on Campus This Week" 8-12, https://digitalcommons.calpoly.edu/pao_rpt/2141/.

the phenomenon it represents contributed to the industry-focused environment out of which the brand new major was developed – an environment that was demonstrably open to military organizations and their affiliates recruiting from their graduating classes.

The complicity of Cal Poly's administrative institutions with the recruitment campaigns of military-backed companies is no better illustrated than in their role during the student protests of the Dow Chemical Company, against which over 400 students rallied in February of 1968.[12] Dow was contracted with the United States government to produce Agent Orange from 1961 to 1971, and napalm from 1965 to 1969 for the Air Force's chemical warfare programs.[13] They had had a presence in the school as early as 1952, and their recruiting practice continued throughout the Vietnam War.[14] Given its direct participation in chemical warfare overseas, anti-war students protested Dow as representative of the war itself, rallying on the days in which recruiter Glenn Allen visited. [15] The presence of opposition, rather than discrediting the influence of military-backed companies over the school, reinforced the structures that enabled or passively endorsed it. Cal Poly president Robert E. Kennedy and other administrators knew the sentiment of students, and not only continued to allow Dow's presence at the school, but also tried to quell resistance to it. As Steve Riddell, editor-in-chief of *The Mustang Daily*, stated in the February 5, 1968, edition of the paper, "[Dean of Students, Everett Chandler] explained… to staff members that their role in any disturbance would be to break up the anonymity of potential rioters. Students are not apt to act foolishly if some of their teachers are standing around," and "[President Kennedy] advocated 'posi-positive' [sic] action in advance rather than negative action after the fact of an occurrence on campus which would disrupt the orderly business of the college."[16] Cal Poly administrators' preoccupation with maintaining "the orderly business of the college" at the expense of the wishes of their student body, and enlisting faculty to neutralize student activity cultivated an environment in which these companies could hire students without serious institutional pushback.

Simultaneously, Cal Poly, and the College of Engineering and Technology specifically, began a hard push for higher education levels and a background in professional field work as prerequisites for hireability. As early as 1969, the Engineering department began seeking out and providing opportunities for those with doctorate degrees and industrial experience, favoring them when it came to faculty hiring, promotions, and tenure.[17] During the accreditation process, the university submitted a *Questionnaire for Review* on October 24, 1972, to the Engineering and Accreditation Committee, where they explicitly discussed this new emphasis on field experience. The *Questionnaire* states,

> We continue to increase the academic requirements for faculty appointments, tenure, and promotion with emphasis on industrial experience associated with appropriate terminal degrees… we will continue to push forward for acceptance of the concept of six months of industrial experience within a four year period for consideration for promotion. [18]

Considering that the Vietnam War had persisted for over ten years at the point this was written – and that engineering programs were being encouraged or paid to hire military engineers on a nationwide scale – it is clear that many people with large bodies of field work were those who had engineered for the military. This is compounded by the fact that, as Nelkin explains, university positions were appealing to military engineers due to the credibility offered by a university title. [19] By this same principle, military positions may have been valued by students, as they were certain to get extensive professional experience in that sector.

This phenomenon is firmly evidenced by the succession of Deans of the School of Engineering and Technology that established Engineering Science major. The dean who created the program was Archie Higdon, who retired in 1972 after serving at Cal Poly since 1967. Aside from his appointment at the university, Higdon spent most of his professional life in the military. The August 15, 1967 Staff Bulletin provides an extensive history on Higdon, revealing that he was a Colonel in the United States Air Force from 1942 to 1946, before acting as a management analyst at the 15th Air Force Headquarters from 1950 to 1951.[20] He later became a faculty member at the US Military Academy, West Point, where he was the head of the Mechanics and Physics Departments, and acted as chairman of the Engineering Science Division at the US Air Force Academy.[21] Higdon was nationally renowned for his extensive work in the field of engineering, receiving various accolades for not only his work in the military and his teaching prowess, but

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[12] Steve Riddell, "Protesters produce no punches," *Mustang Daily*, February 5, 1968, https://digitalcommons.calpoly.edu/studentnewspaper/1265/.

[13] Ibid.

[14] "Weedmen Hit Campus for Annual Conference," *El Mustang*, January 18, 1952, https://digitalcommons.calpoly.edu/studentnewspaper/499/.

[15] Riddell, "Protestors produce no punches."

[16] Riddell, "Protestors produce no punches."

[17] *Questionnaire For Review of Engineering Curricula, October 24, 1972*, College of Engineering Accreditation Reports, Box 2. University Archives, Special Collections and Archives, California Polytechnic State University, 23-1 – 23-2.

[18] *Questionnaire For Review of Engineering Curricula,* 23-5.

[19] Nelkin, 32-33.

[20] "Dean of Engineering Named," *California State Polytechnic College Staff Bulletin* S-18, no. 2 (August 15, 1967): 1, https://digitalcommons.calpoly.edu/pao_rpt/2004/.

[21] Ibid.

also his two published works, *Engineering Mechanics* (Prentice Hall, Inc.) and *Mechanics of Materials* (John Wiley & Sons, Inc.). The Staff Bulletin further reports that he even received the Army and Air Force Commendation Medals and the Legion of Merit for his engineering services to the Air Force.[22] Higdon was evidently a well-versed engineer with considerable field experience, the majority of which he received in service to the military.

While Colonel Archie Higdon retired in 1972, the dominance of military personnel within Cal Poly's Engineering department did not. In fact, brought in to replace Higdon was a man who worked closely with him in several military sectors: Robert G. Valpey. The *Questionnaire for Review* inquired about the replacement of the position, to which the school revealed that Valpey was "a former co-worker with Dean Higdon at the U.S. Military Academy and the U.S. Air Force Academy."[23] Graduating with his Bachelors of Science from the United States Military Academy in 1945, his BME from Cornell University in 1950, his Masters of Science from the University of Colorado in 1958, and his Ph.D. from the University of Illinois in 1962, Valpey was no doubt a highly educated and exceedingly experienced engineer, and a perfect fit for the increasingly strict hiring standards of the Department.[24] He also had a striking relationship to the United States military, documented everywhere from the University Announcements, to *The Cal Poly Report,* to *The Mustang Daily*. In addition to his work, he was also an officer in the Air Force, and later an instructor at US Military Academy, West Point (1950-1953). [25] Just like military co-worker Higdon before him, most of Valpey's engineering/technological experience was gained through a multitude of military-related positions. He acted as chief of the Turbo-machinery Section at the Wright Air Development Center, as well as the director of the Launch Vehicle and Advanced Programs Sections in the Air Force's Space Systems Division. [26] It was specifically his extensive background in military engineering projects that made him a competitive choice for Dean of Engineering and Technology, giving him a leg up in the increasingly competitive field.

It was within a context of direct military-industrial involvement in the Engineering department, structural compliance on the part of Cal Poly, and faculty hiring standards that increasingly favored ex-military personnel, that the Engineering Science major was developed. Engineering Science was constructed to meet goals that aligned with the (predominantly veteran) engineers behind the program, and were expressed in various curriculum reports. Prior to his retirement, Colonel Higdon had prepared Engineering Science for several years before its official presentation in 1972, though it was only approved by President Kennedy in 1971.[27] A *Cal Poly Report* released on September 17, 1971 reveals that the program would be a compilation of preexisting engineering, mathematics, and science courses; and there would be no new courses created specifically for it.[28] Given that this *Report* was one of the first publicly accessible discussions of Engineering Science, it provides insight into the goals of Higdon and Kennedy in creating the major, and in fact quotes Higdon directly. He states, "There are a number of students each year who request more flexible programs with room for them to select courses that better fit their personal objectives… The engineering science program is particularly designed for those students."[29] While a noble cause, providing students a more adaptable, personalized program was not their only expectation. In addition to emphasizing the plasticity of Engineering Science, gravity was also placed on preparing students for careers in industry and production. The *Report* reads,

> Dr. Higdon said the bachelor's degree program in engineering science should be particularly attractive to students planning for careers in industry in such positions as production team leaders and research and development engineers, and in areas where basic knowledge without a high degree of specialization is needed. Students whose career objectives include graduate study in such fields as engineering, mathematics, business administration, medicine, and law should also find it of interest.[30]

While military engineering wasn't an explicit aim, it is important to keep in mind that – as previously discussed – during the Vietnam War many private industries were partnered with the US military to produce weapons and chemicals used overseas, and it was these industries that were actively recruiting from Cal Poly's pool of students.

The statements made by Higdon and Kennedy are reflected in the official 1972-1973 Course Catalog, the first to feature Engineering Science as a major, where the goals of the

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[22] Ibid.

[23] *Questionnaire For Review of Engineering Curricula*, 23-1.

[24] *California Polytechnic State University Announcements: 1977-1979* (August 1977): 510. https://digital.lib.calpoly.edu/rekl-64345?solr_nav%5Bid%5D=38e8b9d1a59306409d21&solr_nav%5Bpage%5D=0&solr_nav%5Boffset%5D=1#page/510/mode/1up.

[25] "New Dean, Associate Dean for School of Engineering and Technology Begin Duties," *Cal Poly Report* 23, no. 2 (July 11, 1972): 3. https://digitalcommons.calpoly.edu/pao_rpt/1877/.

[26] *California Polytechnic State University Announcements,* 510.

[27] "Engineering Science Degree Program Will Open This Fall," *Cal Poly Report* 22, no. 7 (September 17, 1971), 11, https://digitalcommons.calpoly.edu/pao_rpt/1841/.

[28] Ibid.

[29] "Engineering Science Degree Program Will Open This Fall," 11.

[30] Ibid.

Engineering and Technology department and the major are displayed most publicly. The ability of engineering students to enter the industrial workforce is highlighted throughout the segment, both in general discussions about the college and more specifically in reference to Engineering Science. The catalog reads, "Engineering… is strongly oriented toward preparing young people for immediate entry into the practice of engineering in the industrial world… Engineering graduates… enter design, manufacturing, research, development… maintenance, operation, etc. in industry, government, [and] consulting firms."[31] The largest selling point for Engineering Science itself appears to be, as Higdon stressed, the flexibility and adaptability of the program, and the freedom of the student to craft their own course of study.[32] As it states, "The curriculum in engineering science is designed for those students seeking comprehensive education in the fundamental principles and concepts of engineering… It is a broad, flexible program… which provides ample opportunity for each student (with the aid of his adviser) to plan a program to meet his personal career objectives."[33] With a goal of providing a broad, flexible schedule for students to individualize their curriculum, the major contained 30 elective units, and only required 21 to be approved by an advisor.[34]

Examining the original 1972-1973 Full Engineering Science Curriculum Chart, juxtaposed with the most recent 2022-2026 General Engineering Curriculum Sheet, Non-Concentration, it is clear that, apart from an expanded and more diverse set of General Education requirements -- like Ethnic Studies, for instance -- the core major classes have maintained similar functions and educational goals.[35] The similarities between the original version of Engineering Science and its current 2023 iteration as General Engineering do not start and end with similar curricula. The current home page for General Engineering on Cal Poly's website begins with a strong emphasis on the program's adaptable and student-oriented nature, stating, "The general engineering curriculum brings together mathematics, the fundamental sciences, engineering sciences, engineering design and the liberal arts. The flexible, student-driven environment allows you to develop core competencies and an individualized area of expertise."[36] The phrasing of this statement strongly echoes the rhetoric present both in Dean Higdon's words and in the curriculum report, and ultimately indicates that the goals laid out at the founding of the program have remained consistent – an analysis solidified by the second key point listed on the webpage. It proclaims "General engineering graduates are ready for immediate entry into the professional engineering field and often rise to leadership roles in companies across California, the nation and the world."[37] While this is certainly not to say that the current General Engineering program is necessarily related to the military, it is still a means by which its foundational military connections influenced its ideological foundations. When seeing how similar Engineering Science and General Engineering are in aim and content, it becomes clear that its background as a product of the Vietnam war and the military men who created it has had an incalculable impact on the General Engineering of 2023.

III. Conclusion

Historicizing contemporary academia, even on such a small scale as one major within a college, is crucial in the deconstruction of harmful or downright undemocratic complexes that currently underlie these institutions. As Henry A. Giroux posits, "higher education must be engaged as a public sphere that offers students the opportunity to involve themselves in the deepest problems of society and to acquire the knowledge, skills, and ethical vocabulary necessary for modes of critical dialogue and forms of broadened civic participation."[38] If the expansion of equitable, progressive, generative knowledge to new generations of thinkers is the goal of the university system, this goal is unachievable without the process of historical reflection. Uncovering the history of a program like General Engineering not only provides vital insight into the mechanisms of the major, but also a touchpoint by which to measure structural changes implemented going forward.

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[31] "School of Engineering and Technology," *California Polytechnic State University Bulletin: 1972-1973* 52, no. 3 (July 1, 1972): 135. https://digitalcommons.calpoly.edu/catalogs/71/.

[32] "School of Engineering and Technology," 142.

[33] "School of Engineering and Technology," 142.

[34] "School of Engineering and Technology," 143.

[35] "Degree Flowcharts and Curriculum Sheets," Cal Poly, accessed August 22, 2023, https://flowcharts.calpoly.edu/downloads/curric/22-26.General%20Engineering.pdf

[36] "General Engineering," College of Engineering, California Polytechnic State University, accessed August 26, 2022, https://www.calpoly.edu/major/general-engineering.

[37] Ibid.

[38] Giroux, 200.