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Predicting and Improving First Year Engineering Student Retention Through Lean Thinking and Quality Management Concepts **The Elements of Electrical Engineering A Comprehensive Integration of First Year Engineering Education Elementary Physics for Engineers The First Year of College** The Elements of Electrical Engineering **Chemical and Bioprocess Engineering Factors Associated with African American Engineering Student Success in First Year College Calculus Examining Academic and Demographic Characteristics to Retain and Graduate Engineering Students at a Mid-Western Public University** *Student-oriented Program* Considering Context **ELEMENTS OF ELECTRICAL ENGINEE Questionnaires Returned by First Year Engineering Students as to why They Chose the University of Virginia Engineering School** *Measurement of Student Attitudes in First Year Engineering-- Intervention to Improve Engineering Self-efficacy and Sense of Belonging of First-year Engineering Students* Institutional and Major Persistence Among First-generation Engineering Students in a First-year Program **Practical Electricity** Introduction to Engineering Design **Elementary Physics for Engineers The Elements of Electrical Engineering A Textbook of Engineering Physics, Volume-I (For 1st Year of Anna University) Predicting Success in the First Year of Engineering Study** *Introduction to Engineering Python* **Elements of Electrical Engineering Elementary Physics for Engineers Addressing the Writing Needs of First-year Engineering Students in the UCSD Sixth College Core Sequence** Introduction To Computer Simulations For Integrated Stem College Education *A Textbook of Engineering Mathematics (For First Year ,Anna University)* **The Phenomenon of Learning Understanding the Impact of a First-year Engineering Program on Undergraduate Student Persistence in Engineering Being Smart is Not Enough Variables Predicting Retention in First-year Engineering Students The First-year Experiences of Women Engineering Majors at Community Colleges First-year Engineering Student Design Structures or Why things don't fall down Syllabus for Engineering Basic Technical Training, First Year, Course No. 60,000 Enhancing the First Year Experience for Engineering Students Negotiating cultural humility** *The First-year Fatalities* **Survey of First-year Graduate and Postdoctoral Enrollment in Science and Engineering**

Retention of engineering students is a problem for many universities, especially during the first year. The problem of introducing students to engineering while increasing retention rates has recently been addressed by many different universities. Implementing novel lab structures, adjusting the lecture to incorporate more effective teaching techniques, and using orientation programs to build learning communities are all different methods being used. In September 2006 a freshman mentor program was started for Electrical and Computer Engineering (ECE) students at Oregon State University (OSU) to improve retention rates by increasing selfefficacy and developing learning communities. This mentoring program uses a trained cohort of undergraduate freshman mentors to connect a Platform for Learning (PFL) with three terms of lectures and labs during the first year of ECE education. This approach changes a sequence of three distinct courses into a comprehensive integration of technical experiences. Survey data collected throughout the program tracks changes in learning self-efficacy and learning community development. Results from the mentor program indicate a positive effect on students' self perceived communication, time management, resource location, problem solving, and stress management skills. These improvements should translate into increased retention rates as these students continue their engineering education. As engineers contribute to solving the increasingly complex problems facing our society, there is a growing need for the engineers graduating from undergraduate programs to deeply understand the context within which they are solving problems. There is a particular need for engineers who recognize the complexities of global and societal issues and respond to those complex issues with the solutions they develop. The Academic Pathways Study (APS) research element of the Center for the Advancement of Engineering Education (CAEE) is a multi-institution, mixed-method, longitudinal study which examines engineering students' learning and development. Data were collected from forty students at each of four CAEE institutions for a total of 160 participants using surveys, structured interviews, and ethnographic observations. Students were also asked to perform simple engineering tasks during timed sessions at the conclusion of interviews. This paper describes a subset of the first-year data gathered for the APS--findings from a brief engineering design task and findings from an engineering design question in the spring survey in the first year of the study. Demand is high for engineering students and educators must identify factors affecting persistence and graduation of engineers. Retention and graduation rates remain problematic for many institutions. Higher education research focuses on these two issues as many students head to engineering programs with a wide range of attributes, characteristics, and abilities. This study focused on the retention and graduation rates of a Midwestern Urban University's (MUU) College of Engineering students. Two cohorts of FTIAC (First Time In Any College) students, those starting in Fall 2007 and Fall 2013, were examined for pre-admission variables of academic preparation and demographic characteristics predicting first year retention and graduation. A quantitative analysis compared these two groups, in addition to a subset of at-risk pre-engineering students, to determine if there were significant predictors of persistence or non-persistence in the engineering college.The research design was quantitative with a logistic regression analysis applied to determine relationship among the independent variables (pre-admission, demographic and post-admission characteristics) and first year retention and graduation. Initial questions in the study addressed the association between the different admissions policies and retention and graduation of the two cohorts of engineering students. In addition, academic and demographic characteristics associated with graduation across the two cohorts was examined. The second part of this study examined two at-risk pre-engineering FTIAC student groups (Fall 2007 group was labelled the Bridge group while the Fall 2013 group was labelled the EOS group. Research questions guiding this subset group's retention and graduation factors examined participation in these two groups and first year retention in and graduation from the Engineering program. Descriptive and inferential statistical analysis of the institutional data collected uncovered several factors predictive of first year retention and graduation. Generally, graduation rates showed noticeable increases in Fall 2013 versus Fall 2007 cohort which could be attributed to the increased standards in admission for the Fall 2013 cohort. Analyses of the research questions showed that if a student was retained in the first year, their graduation rate increased from 45% to 65% from Fall 2007 to Fall 2013; and if they took Calculus in their first year they graduated at a higher rate in Fall 2013 (51% to72%). Strikingly lesser number of African American students graduated in Fall 2013 (from 11% to 3%). Logistic regression analysis showed statistically significant results for first year retention of Bridge or EOS students if they took Calculus 1 or higher in the first year. For graduation from Engineering, the same regression analysis showed that having a HSGPA between 3.0 and 4.0 and taking their first math class at Calculus 1 or higher in the first term proved statistically significant for the Fall 2007 students. For the Fall 2013 cohort, completing Calculus 1 in the first year was the only statistically significant predictor for graduation. Students taking Calculus 1 in the first year was determined to be a statistically significant predictor of retention and graduation in the study. The findings from this study provide valuable information for engineering leaders within enrollment management and academic affairs. The models developed for predicting persistence based on HSPGA and math level can be used by advisors in focusing retention efforts and by deans for making resource allocation decisions. Based on the results in this study of freshman engineering student retention, where Calculus 1 was identified to be a significant factor, faculty members, administrators, advisors, and essentially anyone involved in the process of freshman engineering curriculum can use the predictor factors to identify students in jeopardy of being retained in engineering. This research study examined the factors that positively influenced the first-to-second year institutional and major persistence efforts of first-generation engineering undergraduates that participated in a first-year program at Kansas State University, a large, land-grant, public, and four-year institution in

the Midwestern United States. Historically, both first-generation college students and engineering majors have lower rates of persistence when compared to other populations. In order to provide sufficient context for the study, previous work on college student retention, engineering major persistence, first-year program participation, and the experience of first-generation undergraduate students was examined. Through these efforts, it was determined that the first-year persistence of first-generation engineering students that had participated in a first-year program had not been sufficiently examined. The purpose of this study was to explore the factors that positively influenced the institutional and major persistence efforts of first-generation engineering undergraduate students in a first-year program through a qualitative design and a grounded theory methodology. The following research question at the center of the study was addressed: What were the factors that positively influenced the first-to-second year institutional and major persistence efforts of first-generation engineering students that participated in a first-year program? Through the incorporation of a grounded theory methodology, first-generation engineering students that participated in first-year program and had persisted in engineering from their first to their second year were interviewed. Within the interview setting, the research participants provided considerable insight into their experiences and persistence efforts throughout their first year in the engineering program. The collection and analysis of data led to findings that suggest the existence of six primary elements that positively influenced the first-to-second year institutional and major persistence of first-generation engineering students. By adhering to the grounded theory methodology, a theoretical model, which can be identified as the First-Generation Engineering Student First-Year Persistence Model, was developed. The First-Generation Engineering Student First-Year Persistence Model illustrates the six primary elements that positively influenced the first-to-second year institutional and major persistence for first-generation engineering students and the various subcategories of factors that contribute to each element. Furthermore, a summary of and further discussion of the primary findings were provided. Finally, recommendations for future studies concerning first-generation engineering students and first-to-second year institutional and major persistence efforts were offered. The percentage of bachelor's degrees in STEM awarded to women and underrepresented minority students needs to increase dramatically to reach parity with their majority counterparts. While three key underrepresented minority (URM) groups, African Americans, Hispanic/Latinos, and Native Americans constitute some 30 percent of the overall undergraduate student population in the United States, the share of engineering degrees earned by members of these groups declines as degree level increases. Underrepresented minority students accounted for about 12% of engineering bachelor's degrees awarded in 2009, 7% of master's degrees and 3% of doctorates (NSF Science Resource Statistics, 2009). The percent in engineering has been steadily decreasing, while overall participation in higher education among these groups has increased considerably. Keeping those thoughts in mind it is important to examine the historical theories and frameworks that will help us not only understand why underrepresented minority students pursue and persist in STEM majors in low numbers, but to also develop interventions to improve the alarming statistics that hamper engineering diversity. As indicated by our past two U.S. Presidents, there has been an increased discussion on the national and state level regarding the number of students entering engineering disciplines in general and underrepresented minority students in particular. Something happens between a student's freshman year and the point they decide to either switch their major or drop out of school altogether. Some researchers attribute the high dropout rate of underrepresented minority students in engineering programs to low engineering self-efficacy (e.g. Jordan et al., 2011). A student's engineering self-efficacy is his/her belief that he/she can successfully navigate the engineering curriculum and eventually become a practicing engineer. A student's engineering self-efficacy is formed by mastery experiences, vicarious experiences, his/her physiological state, and social persuasions, such as student-professor interaction. Increasing the awareness of a student's engineering self-efficacy could potentially improve sense of belonging and persistence for underrepresented minority students in engineering. The hypothesis of this study is that an intervention during the first semester of an incoming freshman's tenure can help improve their engineering self-efficacy, sense of belonging, and overall retention in the engineering program. This study explored the following research questions: 1. What are the differences in engineering self-efficacy, and sense of belonging for first-year underrepresented minority engineering students compared to majority students? 2. What factors or variables should be considered and/or addressed in designing an intervention to increase engineering self-efficacy and sense of belonging amongst first-year underrepresented minority engineering students? 3. Can a small intervention during the beginning of the first semester improve a student's sense of belonging, engineering self-efficacy, and student-professor interaction? Using the race, social fit, and achievement study by Walton and Cohen as a model, the author developed an intervention consisting of short compelling videos of upperclass engineering students from diverse backgrounds. In these videos, students discussed their pursuit of the engineering degree, what obstacles they faced in terms of sense of belonging and coping efficacy, and how they overcame those obstacles. Treatment groups of students watched the videos during the first few weeks of the semester, and pre and post tests were administered to measure mean gains in the student's engineering self-efficacy, sense of belonging, and other variables. The results showed that underrepresented minority students had a lower sense of belonging than whites. The intervention used in the study contributed to mean gain increases in participants' engineering self-efficacy, which could ultimately improve persistence. A single intervention did not show a significant increase in students' sense of belonging; more work needs to be done to develop an effective intervention. The intervention is easily adaptable with insignificant cost, making it attractive for Minority Engineering Program (MEP) and other success program whose aim is to increase students' engineering self-efficacy. The goal of this textbook is to provide first-year engineering students with a firm grounding in the fundamentals of chemical and bioprocess engineering. However, instead of being a general overview of the two topics, Fundamentals of Chemical and Bioprocess Engineering will identify and focus on specific areas in which attaining a solid competency is desired. This strategy is the direct result of studies showing that broad-based courses at the freshman level often leave students grappling with a lot of material, which results in a low rate of retention. Specifically, strong emphasis will be placed on the topic of material balances, with the intent that students exiting a course based upon this textbook will be significantly higher on Bloom’s Taxonomy (knowledge, comprehension, application, analysis and synthesis, evaluation, creation) relating to material balances. In addition, this book also provides students with a highly developed ability to analyze problems from the material balances perspective, which leaves them with important skills for the future. The textbook consists of numerous exercises and their solutions. Problems are classified by their level of difficulty. Each chapter has references and selected web pages to vividly illustrate each example. In addition, to engage students and increase their comprehension and rate of retention, many examples involve real-world situations. While the percentage of undergraduate engineering degrees awarded has increased over the past decade, it has been outpaced by the overall growth in bachelor degree attainment. With this, the amount of enrollment in engineering programs has increased, but still a significant number of engineering students choose to drop out or pursue other educational paths. Universities and policy makers are motivated to increase the retention of engineering students to graduation. This thesis explores the quantitative data that makes up a first year engineering student's profile. The data is used to develop an ordinal logistic regression model to predict 2nd year student retention. Ideas to improve retention are discussed with a focus of applying Lean Manufacturing techniques in conjunction with the proposed prediction model. Data from a college of engineering within a public land-grant research university is used to test for significance as indicators for freshman retention. Data used in this study is from 2010 and 2011 freshman engineering cohorts. Using collected student data, a prediction model is developed that assesses the probability of a first year engineering student either i) returning to engineering in their second year, ii) leaving engineering but remaining at the university, or iii) leaving the university altogether. Then, using concepts from lean manufacturing and quality management this prediction model is incorporated in a proposed engineering education quality system.This study creates a prediction model to identify students that are likely to be: retained in engineering, switch majors out of engineering, and drop out of the university. This prediction model is then incorporated into the proposed engineering education quality management system to assist with identifying; where and when students may not persist in engineering curriculum, and ideas to promote student persistence using the prediction results. This research study aimed to expand our understanding of the factors that influence student persistence in engineering. The unique experiences of engineering students were examined as they transitioned into and navigated their first year of college at a public research university in California. Most students provided similar responses with respect to the way they experienced the transition to college and social life. There was, however, wide student response variation regarding their experience of academic life and academic policies, as well as in their level of pre-college academic preparation and financial circumstances. One key finding was that students'

experiences during the first year of college varied widely based on the extent to which they had acquired organizational and learning skills prior to college. The study used a mixed methods approach. Quantitative and qualitative data were collected through an online survey and one-on-one interviews conducted with freshman students near the end of their first year of college. The theoretical foundations of this study included Astin's Theory of Student Involvement and Tinto's Theory of Student Departure. The design of the study was guided by these theories which emphasize the critical importance of student involvement with the academic and social aspects of college during the first year of college. Introduction to Engineering Design is a practical, straightforward workbook designed to systematize the often messy process of designing solutions to open-ended problems. From learning about the problem to prototyping a solution, this workbook guides developing engineers and designers through the iterative steps of the engineering design process. Created in a freshman engineering design course over ten years, this workbook has been refined to clearly guide students and teams to success. Together with a series of instructional videos and short project examples, the workbook has space for teams to execute the engineering design process on a challenge of their choice. Designed for university students as well as motivated learners, the workbook supports creative students as they tackle important problems. Introduction to Engineering Design is designed for educators looking to use project-based engineering design in their classroom. This work has been selected by scholars as being culturally important, and is part of the knowledge base of civilization as we know it. This work was reproduced from the original artifact, and remains as true to the original work as possible. Therefore, you will see the original copyright references, library stamps (as most of these works have been housed in our most important libraries around the world), and other notations in the work. This work is in the public domain in the United States of America, and possibly other nations. Within the United States, you may freely copy and distribute this work, as no entity (individual or corporate) has a copyright on the body of the work. As a reproduction of a historical artifact, this work may contain missing or blurred pages, poor pictures, errant marks, etc. Scholars believe, and we concur, that this work is important enough to be preserved, reproduced, and made generally available to the public. We appreciate your support of the preservation process, and thank you for being an important part of keeping this knowledge alive and relevant. Excerpt from The Elements of Electrical Engineering: A First Year's Course for Students The present volume being based upon courses of lectures given by me during the last few sessions to classes of students desirous of qualifying as electrical engineers, and my aim having been to treat the subject as far as possible on easy and non-mathematical lines, I am hopeful that the work will prove acceptable to the numerous students who are to be found attending evening and other courses of instruction at Polytechnics and Technical Schools. To those who propose taking up the serious study of Electrical Engineering, and intend obtaining more than a surface knowledge of the subject, I would strongly advise that a concurrent course be taken in the science of Electricity and Magnetism, which underlies all practical applications to Electrical Engineering ; and to those whose time for study is strictly limited, this science course may be found sufficient for the first year. I have avoided a mathematical treatment as far as possible, and the numerical problems have not been worked out to a greater degree of accuracy than is required for practical work. In no case is an example given requiring more mathematics than is taught in the first stage of that subject. About the Publisher Forgotten Books publishes hundreds of thousands of rare and classic books. Find more at www.forgottenbooks.com This book is a reproduction of an important historical work. Forgotten Books uses state-of-the-art technology to digitally reconstruct the work, preserving the original format whilst repairing imperfections present in the aged copy. In rare cases, an imperfection in the original, such as a blemish or missing page, may be replicated in our edition. We do, however, repair the vast majority of imperfections successfully; any imperfections that remain are intentionally left to preserve the state of such historical works. I am very much aware that it is an act of extreme rashness to attempt to write an elementary book about structures. Indeed it is only when the subject is stripped of its mathematics that one begins to realize how difficult it is to pin down and describe those structural concepts which are often called' elementary'; by which I suppose we mean 'basic' or 'fundamental'. Some of the omis sions and oversimplifications are intentional but no doubt some of them are due to my own brute ignorance and lack of under standing of the subject. Although this volume is more or less a sequel to The New Science of Strong Materials it can be read as an entirely separate book in its own right. For this reason a certain amount of repetition has been unavoidable in the earlier chapters. I have to thank a great many people for factual information, suggestions and for stimulating and sometimes heated discussions. Among the living, my colleagues at Reading University have been generous with help, notably Professor W. D. Biggs (Professor of Building Technology), Dr Richard Chaplin, Dr Giorgio Jeronimidis, Dr Julian Vincent and Dr Henry Blyth; Professor Anthony Flew, Professor of Philosophy, made useful suggestions about the last chapter. I am also grateful to Mr John Bartlett, Consultant Neurosurgeon at the Brook Hospital. Professor T. P. Hughes of the University of the West Indies has been helpful about rockets and many other things besides. My secretary, Mrs Jean Collins, was a great help in times of trouble. Mrs Nethercot of Vogue was kind to me about dressmaking. Mr Gerald Leach and also many of the editorial staff of Penguins have exercised their accustomed patience and helpfulness. Among the dead, l owe a great deal to Dr Mark Pryor - lately of Trinity College, Cambridge - especially for discussions about biomechanics which extended over a period of nearly thirty years. Lastly, for reasons which must surely be obvious, l owe a humble oblation to Herodotus, once a citizen of Halicamassus. Excerpt from The Elements of Electrical Engineering: A First Year's Course for Students Within a remarkably short space of time electrical engineering has been so largely and widely developed that it now stands in the very forefront of engineering industries. We find electricity everywhere supplanting the older forms of power, and it bids fair to revolutionise the older systems of traction in the near future. Already many railways are working, or are about to be worked, electrically, while many more are in course of construction on the same lines. About the Publisher Forgotten Books publishes hundreds of thousands of rare and classic books. Find more at www.forgottenbooks.com This book is a reproduction of an important historical work. Forgotten Books uses state-of-the-art technology to digitally reconstruct the work, preserving the original format whilst repairing imperfections present in the aged copy. In rare cases, an imperfection in the original, such as a blemish or missing page, may be replicated in our edition. We do, however, repair the vast majority of imperfections successfully; any imperfections that remain are intentionally left to preserve the state of such historical works. This work has been selected by scholars as being culturally important, and is part of the knowledge base of civilization as we know it. This work was reproduced from the original artifact, and remains as true to the original work as possible. Therefore, you will see the original copyright references, library stamps (as most of these works have been housed in our most important libraries around the world), and other notations in the work. This work is in the public domain in the United States of America, and possibly other nations. Within the United States, you may freely copy and distribute this work, as no entity (individual or corporate) has a copyright on the body of the work. As a reproduction of a historical artifact, this work may contain missing or blurred pages, poor pictures, errant marks, etc. Scholars believe, and we concur, that this work is important enough to be preserved, reproduced, and made generally available to the public. We appreciate your support of the preservation process, and thank you for being an important part of keeping this knowledge alive and relevant. This dissertation consists of a set of three studies examining two skills important to the engineering community of engineering practice (ECoP): spatial and creative skills. The overall purpose was to understand what repertoires of practice undergraduate students utilize as newcomers to the ECoP through the design of a package. The first study examined how assessments of object manipulation skills compared with one another and across gender. The study focused on, How does gender and spatial skill compare across object manipulation assessments?, which included evaluating correlations between mental rotations and spatial visualization assessment scores. Participants completed the Revised Purdue Spatial Visualization Test: Rotations (Revised PSVT: R). Results indicated significantly higher scores for males than females. In addition, mental rotations and spatial visualization results were significantly correlated with one another between and across assessments for male, but not female participants. The second qualitative study explored what introductory prospective engineers know and think about creativity in engineering to understand their implicit theories of design creativity. The study investigated, In what ways do inbound and peripheral legitimate participants in the field of engineering, conceptualize creativity within product design and the design process? Findings revealed varying conceptions of creativity in product design and the design process. The third study integrated spatial and creative skill scores to investigate possible patterns among males and females, and focused, In what ways does first-year engineering students' spatial skill level relate to creativity in design? Findings suggested participants with high creative product rank scores utilized AutoCAD, generated many ideas, did not modify designs, and were more likely to consider only one design. When spatial and creative data were merged, for comparison, three findings emerged. Although a small sample size, high creativity was synonymous

with highly correlated spatial visualization scores. There were no significant differences in average creative scores between genders, but males did score at the highest levels while females did not. Overall the set of papers contributes to the limited inquiry into domain-specific spatial and creative skills associated with the field of engineering education. Overall findings have implications for pre-college teachers, college level engineering instructors, and policy makers. Excerpt from Elementary Physics for Engineers: An Elementary d104 Book for First, Year Students Taking an Engineering Course in an a Technical Institution Conduction. Thermal conductivity. Examples and applications of conductivity. The safety lamp. Conduction in liquids. Convection in liquids. Hot water circulation. Convection in gases. Ventilation and heating by convection. Radiation. Reflexion and absorption of heat-energy. Transmission and absorption of heat-energy. Radiation from different surfaces at equal temperatures. Flame radiation. Dew formation. About the Publisher Forgotten Books publishes hundreds of thousands of rare and classic books. Find more at www.forgottenbooks.com This book is a reproduction of an important historical work. Forgotten Books uses state-of-the-art technology to digitally reconstruct the work, preserving the original format whilst repairing imperfections present in the aged copy. In rare cases, an imperfection in the original, such as a blemish or missing page, may be replicated in our edition. We do, however, repair the vast majority of imperfections successfully; any imperfections that remain are intentionally left to preserve the state of such historical works. The author has been very selective about what topics to cover in this short step by step manual for first year engineering students. The first eleven chapters cover what you must know. This is based on personal experience as a petroleum engineer. The reader needs little or no programming experience. The best part is you can learn to program in Python for FREE! The Python programming language and the professional PyCharm Community user interface are free downloads. All that is required is a Windows computer with 8GB RAM. (Most 4GB computers can be inexpensively upgraded to 8GB.)Chapters 12 thru 16 cover topics that you may need, or are good to know if reading other programmer's Python code. Chapters 17 thru 20 contain more advanced Python examples of practical applications in engineering. The manual comes with a companion website that contains all the code for the manual. The programs have all been tested and can be copy and pasted from the website to the PyCharm Community user interface on your computer.Python is a very versatile language and has applications in gaming, web development, machine learning, AI, science, finance, business, and engineering.Python is user friendly. The purpose of this hermeneutic phenomenological study was to describe the lived experiences of women engineering majors who transitioned to community colleges and persisted to the second year. Guiding this study was Schlossberg’s transition theory as it explains the transition to first-year engineering student and Tinto’s theory of student departure. The study used purposeful, criterion sampling to identify the participants who met the following criteria: full- or part-time female engineering student who completed the first year of study, as defined by the completion of 30 credits, and persisted into the second year of study at a community college. Data were collected through protocol writing, semi-structured interviews of 10 participants using open-ended questions, and a focus group. The study applied van Manen’s reflective-interpretive approach to hermeneutic phenomenology. Data analysis required the use of epoche and reduction, thematic analysis, conceptual analysis, reading the text, and insight cultivators. Through data analysis, the broad themes of social experiences and academic experiences emerged as students moved into, through, and out of the community college engineering program. Participants described social experiences illustrating the underrepresentation of women, sexism, and microaggressions in engineering; diversity in the community college population; and relationships with and support from family, faculty, staff, and friends. They also described academic experiences that highlighted differences between high school and college; group projects and hands-on learning; the classroom environment; difficult course content and learning from failure; and completion, transfer, and academic and personal development. “Take-aways” are the prevalence of underrepresentation, sexism, and microaggression and the importance of persisting through and learning from failure. A Textbook of Engineering Physics This book is written to introduce computer simulations to undergraduate college students, freshmen to seniors, in STEM fields. The book starts with concepts from Basic Mathematics: Geometry, Algebra and Calculus, Properties of Elementary Functions (Polynomials, Exponential, Hyperbolic and Trigonometric Functions) are studied and simple differential equations representing these functions are derived. Numerical approximations of first and second order differential equations are studied in terms of finite differences on uniform grids. Computer solutions are obtained via recursive relations or solutions of simultaneous algebraic equations. Comparisons with the exact solutions (known a priori) allow the calculations of the error due to discretization. After the students build confidence in this approach, more problems where the solutions are not known a priori are tackled with applications in many fields. Next, the book gradually addresses linear differential equations with variable coefficients and nonlinear differential equations, including problems of bifurcation and chaos.Applications in Dynamics, Solid Mechanics, Fluid Mechanics, Heat Transfer, Chemical Reactions, and Combustion are included. Biographies of 50 pioneering mathematicians and scientists who contributed to the materials of the book are briefly sketched, to shed light on the history of these STEM fields.Finally, the main concepts discussed in the book, are summarized to make sure that the students do not miss any of them. Also, references for further readings are given for interested readers.