

Creation and Implementation Plan for a Sales Engineering Minor
at California Polytechnic State University, San Luis Obispo

*A Senior Project submitted in partial fulfillment of the requirements for the degree of
Bachelor of Science in General Engineering*

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Graded By: _____ Date of Submission: _____

EXECUTIVE SUMMARY

The profession of Sales Engineering (S.E.) offers engineers a unique opportunity to fuse their technical background with communication and business skills in order to seek a rewarding alternative to the typical engineering career path. The shortfall of this niche industry is the lack of formal academic programs that seek to develop the skills necessary to prepare engineers for the field. At this time only two sales engineering minors exist in the nation, one at Iowa State University and the other at the University of Florida. The process for this senior project was to clearly identify the scope of a competitive sales engineering minor for California Polytechnic University, San Luis Obispo. The final decision on the courses included in the minor being suggested were rigorously scrutinized to fulfill requirements from multiple sources interviewed and researched, sources such as: industry contacts close to Cal Poly, engineering students, and finally, Cal Poly faculty and administration interested in the success of the minor. Industry contacts were all given a standard open-ended survey aimed at defining Sales Engineering and the gathering of input on what academic areas should be focused on. The course areas mentioned most prominently were business and communication. Finance was also mentioned as one area in particular that many engineering graduates have no solid foundation in. In addition to industry input, Cal Poly students were asked about what they would like to see in a S.E. curriculum. The results of this survey were transcribed into metrics and analyzed. The results indicated an echo of the focuses industry wanted to see, both in business and communication skills, with communication skills being the main focus. The two existing minors in Iowa and Florida were also used as references to improve upon. The goal at this stage was then to create multiple curriculum options for Cal Poly and to thoroughly analyze the strengths and weaknesses of these options. Multiple tools were used to execute this stage, including; Affinity Diagrams, Cause & Effect Ishikawa Diagrams, Flowcharts, Force Field Analysis, Interrelationship Digraphs, Matrix Diagrams, Prioritization Matrices and Radar Charts.

Financial considerations were taken into account as well, crafting a minor that works well within Cal Poly's current offered curriculum; introducing only two new courses. The final curriculum proposed includes the creation of a 4-unit Sales Engineering seminar in addition to the current IME 401 course. The other course creation is a Finance course for non-business majors. The rest of the 29unit minor consists of course options that develop skills in the areas of Business and Communications from the existing catalog.

Another aspect to gauge the success of this project was to generate excitement and support for the proposed minor. It was determined that the best method to do this would be to create a Sales Engineering Club on campus. In the spring of 2009, the first official meeting was kicked off by Joshua Checkis and Clint Hebrew with a representative team from Trane coming to give a presentation. From that point on, the club has grown to just under one-hundred members and counting. The industry and student commitment in conjunction with contributions to this project are closely aligned to the success of the club. The club has focused on educating Cal Poly's engineering students on the benefits of a career in Sales Engineering, developing communication and business skills for their members as well as generating significant industry support behind the concept of a Sales Engineering minor.

ACKNOWLEDGMENTS

A host of students, Cal Poly Admin, and industry contacts contributed to this project; however, a few went above and beyond to improve the quality and depth of the content discussed. In no particular order, I would like to extend by gratitude to them: Dr. Larry Phillips from Northrop Grumman Electronic Systems for his insight and extensive response to the industry survey, Brady Stevens for representing the Sales Engineering Clubs chair board in the student survey, Karen Bangs for her help as the advisor to this project, Dr. Zahed Sheikh for suggesting strategy to insure administrative buy in for the project, and of course the Sales Engineering Club members who have worked hard to build momentum around this minor, accruing industry connections and mobilizing the student body.

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INTRODUCTION

To introduce this project, questions have been answered that will aid in identifying the purpose, scope and methods involved during this six month venture.

What is this report about?

This report is about a response to the industry need for quality Sales Engineers coming out of universities. The report involves an immense amount of research seeking to define exactly what Sales Engineering is, how it should be presented in an academic setting, and finally, the process of making a minor a reality at California Polytechnic University.

How did the idea for this project originate?

The need for an academic curriculum to produce Sales Engineers comes ultimately from observations in industry. It was noted that engineers graduating colleges around the United States were not qualified to sell the product they knew how to design. Locally at Cal Poly, the idea for a Sales Engineering minor originated from Karen Bangs in the Industrial Manufacturing Engineering Department (IME), Zahed Sheikh in corporate relations, and Cliff Barber in the Industrial Technology Department working together to raise support for academic pursuits. A Sales Engineering course (IME 401) was created and taught by Karen Bangs, while Zahed Sheikh worked with Trane Inc. to organize funding for a Sales Engineering Club. Initial funding for the club was cleared and it began in the spring of 2009. The ultimate mission of the club includes the desire to see the minor created at Cal Poly and all of the club's efforts ultimately work towards that goal.

What is the problem that needs to be solved?

The major hurdle to seeing a sales engineering minor materialize at Cal Poly is the fact that the area of Sales Engineering is relatively unknown and undervalued among academic circles. With only two formal minors in existence and a handful of clubs within the United States, common practices and techniques for developing successful Sales Engineers are just now being created. Training programs such as the comprehensive 6 month programs that companies such as Rockwell Automation and Trane use are great starting points to use for drafting up an academic curriculum. They only tell part of the story however, being specific to their niche industries, information solutions and HVAC respectively. There exist other business programs around the nation that have concentrations in sales, which also includes aspects of what would make a successful Sales Engineering Program. The other nuance to Sales Engineering is that most companies require a bachelor in engineering or a technical background to be hired. This further erodes the scene where the majority of design-focused engineering programs have no overlap in the most important skill required for a Sales Engineer to be successful, that skill being able to clearly communicate and respond to people. This presents the current path that is now used to break into the Sales Engineering profession. An engineer is often times hired to a company to fulfill a non-sales related

role and, after going through job training or seeking a transfer, they can enter into the area of Sales Engineering. There is no academic path for an engineer to be properly trained and industry ready for a Sales Engineering position upon graduating college. The goal is to create that academic path through the use of a minor.

What needs to be accomplished to solve this problem?

In order to see the minor become a reality at Cal Poly, there will need to be industry support, student interest, and administrative cooperation. Each of these three required stakeholders will need different motivations to buy into the minor. Industry contacts need to know that the minor is crafted with them in mind before they are willing to invest financially. In other words, the resulting skill sets developed in the engineers will need to fulfill the needs of industry, resulting in benefit for investment. To do this, surveys distributed to industry contacts close to Cal Poly are necessary as well as analysis of those surveys. The evaluation phase of the project will include revisions of courses due to industry comments. Course materials and techniques used in the created courses will need to be defined and altered using analysis of various sources such as sales training programs, existing sales engineering minors and Cal Poly's history of a learn-by-doing approach. Adopting a standard of bringing in corporate contacts to the Cal Poly campus for one on one interviews, public forums, and speaking events will aid in including an "industry voice" to create the proposed curriculum. There will need to be buy-in from Cal Poly administration, gained primarily through generating student excitement in the minor as well as financial considerations. This minor would be available to all engineering students at Cal Poly and so while the goal is to use the IME department as the host for the minor, all engineering departments will be required to have bought into this concept.

What do you intend to complete as part of this project?

This project will include in-depth analysis of current courses offered for integration with a new S.E minor at Cal Poly. The method for selecting courses will be from research done through various decision selection tools, input from stakeholders and a financial analysis of the options. A full Statement of Work will be included in the report, indicating a direction for the minor to improve upon once a foundation has been set. Finally, an implementation plan will be constructed to note major milestones to be completed in a timely manner.

What deliverables will result from your work?

The deliverables of this project will include a proposed sales engineering minor curriculum, financial justification document as well as an implementation plan.

How will you meet each of your objectives?

This project was guided and organized via the systematic approach. This method had been used by the author several times before with success in major projects and it was concluded that it would work well in this senior project. Breaking up the work into seven phases allowed the creation of seven major milestones, or gates, to track progress. This allowed a constant update throughout the project to make sure the work could be completed on time and on scope. Objectives in this project are closely tied to the satisfaction from stakeholders interested in creating the minor. Due to this, constant feedback and suggestions were requested from administration, students, and industry contacts. The logic behind this process of continuous improvement was due to the desire to create a curriculum that would foster excitement and financial commitment from all parties involved.

What will not be included in the scope of the project?

The scope of this project does not guarantee that a minor will be implemented upon completion. That outcome would be most desired, however, a realistic analysis of the economic situation in California this year suggests that the this project will instead act a stepping stone towards the minor; focusing on setting a foundation for coursework as well as generating excitement among stakeholders.

What main tasks will you perform on the way to completing the project?

The main tasks to be performed are aimed at implementation of the S.E. minor in response to research and input from both academia and industry. Surveys will be created to gather information from administration, students and industry contacts. Analysis of all gathered information will be done, helping to identify the scope of what Sales Engineering is and what skill-sets will be developed through the minor. Based on this research and interviews, a curriculum will be suggested as well as financial justification for the courses included. A literature review of past minor implementations and curriculum proposals will be included. Following this, an implementation plan will be drawn up, outlining the major steps involved in seeing the minor offered at Cal Poly in a realistic timeframe.

BACKGROUND

As technology grows and becomes more complex, it becomes more and more apparent that only individuals with technical backgrounds in engineering or related fields are able to fully understand the products. This creates problems in area of sales, when salespeople attempt to educate their potential customers on the features and benefits of complex products. The result is an increasing trend towards using Sales Engineers to aid Sales Representatives in explaining the value certain complex products will give clients. According to the Bureau of Labor Statistics, Sales Engineers interact with research and development, engineering and production departments to evaluate how products or services can get designed or altered to suit customer needs. Part of a Sales Engineer's job is also to interact with the client and provide guidance on how best to use those product and services within their own business. "Sales engineers sell and consult on technologically and scientifically advanced products. They should possess extensive knowledge of these products, including their components and processes. Sales engineers then use their technical skills to demonstrate to potential customers how and why the products or services they are selling would suit the customer better than competitors' products." ¹

There exist many similarities in the two professions of Sales and Sales Engineering. Each is responsible for pursuing the client's intrigue in certain products and both must maintain customer satisfaction during and after the sale. Commonly, salespeople and sales engineers work together in a team to identify customer potentials, evaluate needs and then close the deal. This relationship allows salespeople to focus on the marketing and sales aspects of the process, while sales engineers hone in on the design alterations and implementation logistics. The idea is that sales engineers have the technical background and the communication skills to facilitate communication between the client and an engineering design team. They are in essence the bridge between the client and the technical designers within a company.

Typically salespeople use a selling technique known as the "benefits and features" method. This, in a nutshell, goes over the features of a certain product and then immediately pairs each feature with a benefit that the client would experience from it. An example is when a cell phone comes with a speakerphone option. The feature is the speakerphone, but the benefit could be allowing multiple people in a room to communicate to the one person on the other end of the line. It is often mentioned that clients "don't buy based on features, but instead they want to hear about how the products features will benefit their business in the short and long term." Basically, the idea is they need to be able to put down on paper a justification for investing in certain products; and listing benefits and possible cost saving from those benefits allow them to do just that.²

Conversely, sales engineers use a type of selling technique known as the "Consultative style." This style attempts to work with the client, helping them identify their problems and needs and then

¹US Dept. of Labor, 2007.

²Douglas, 2000.

using products or services to address the issues found. This style of selling naturally leads to longer lasting relationships, where the sales engineer is seen not as a salesperson but as a trusted advisor to the company. Clients want to work with people of integrity and responsibility that have their best interest in mind, instead of working with someone trying to scam them into buying something they don't want or need.³ An accurate description of a sales engineer comes from Steve Johnson.

“Sales engineers (SEs) are the technical glue of a technical sale. Sometimes called "systems engineers," "pre-sales support," or "field consultants," SEs act as the sales team's technical encyclopedia during the sale, representing the technical aspects of how the product solves specific customer problems. They perform technical presentations for the product. They own the demonstration script for the product.”⁴

The majority of sales engineers have graduated with a degree in engineering at the bachelor level. This is the only real trend for training or qualifications for sales engineers before they are hired at a company. There is a severe lack of formal academic avenues that allow individuals to seek out a career in Sales Engineering. Many new hires will require extensive training via sales programs or on the job training. This leads to the question as to why there are not many minors and no majors though out the United States that focuses on preparing prospective sales engineers for their career choice. In 2006, there were 76,000 engineers that held the position of Sales Engineer; however that number is far too low due to the lack of finite definition of the term Sales Engineer. Many engineers are currently working in this position under a different title and those individuals are not reflected in that number. According to the Bureau of Labor Statistics, sales engineering positions will increase at around 9% between 2006 and 2016. This number, however, does not take into account the impact from rising interest around the nation for implementation of Sales Engineering minors and majors. Industry hiring practices in their sales divisions may drastically change due to a formal academic avenue for sales engineers in the near future.

It should be noted that this is the first project introduced at Cal Poly to create and organize an implantation plan for a Sales Engineering minor. While this project is unique in that aspect, a case study of a previous minor implementation can be found below.

³ McNamara, 2008.

⁴ Johnson, 2009.

LITERATURE REVIEW

The information phase and literature review consisted of various methods to attain relevant data to help narrow down the options for the scope of a Sales Engineering minor at California Polytechnic University. These methods included; online research, literature reviews, surveys, and interviews. Feedback from other universities, industry contacts, Cal Poly administration and Cal Poly students proved vital in identifying options from diverse view points.

Research on Sales, Business and Leadership Books

One of the most popular Sales books recommended to SEC through industry is *The Little Red Book of Selling*, by Jeffrey Gitomer. This book notes practical thought mentalities and daily practices that will develop successful sale's abilities. A repeated slogan throughout the text is "People don't like to be sold, but they love to buy." (Gitomer, 5) The author notes that in the sales industry, companies will spend money on training programs that focus completely on educating sales representatives on the benefits of certain products and how to demonstrate those benefits to potential clients; meanwhile leaving out psychological aspects of sales. The book is structured by breaking up the Gitomer's main points into 12.5 principles of Sales Greatness.

The first principle deals with personal motivation in sales. He mentions that often times people get into slumps in sales noting; poor belief systems, poor work habits and outside pressure as main sources. The method for fighting back against such times involves a deep seeded personal motivation, and not looking to managers for inspiration. In moving forward with action, it is vital to integrate time management into the scenario. They successful salespeople work hard and smart; adopting habits that aid in competing tasks before they are due. Sales preparation is the focus of continuous debate throughout the book. Gitomer notes learning about client's history, company culture and current projects are essential to the preparation process. A portion of the book goes over branding strategies to emphasize the idea that "It's not who you know, it's who knows you" (Gitomer, 54) that leads to a successful career in sales. Practical application of methods are included such as development of a personal professional website, speaking at public forums free of charge and spending excess amounts of money on a well designed business card.

Networking is a topic brought up by Gitomer in principle 5, stating that "Networking is life skills and social skills combine with sales skills." (Gitomer, 84) Key steps in progressing a salesperson's networking skills involves, developing poignant 30-second commercial about oneself, devote a percentage of every weeks work time towards networking and then plan what events to be involved in. The Chamber of Commerce business event is seen as one of the most effective events to network at, providing significant opportunity to meet executives with buying power.

Asking the correct questions during a sales pitch is a key skill to hone. Gitomer sums up his strategy with 7 points, "Ask prospect questions that make him evaluate new information, ask questions

that qualify needs, about improved productivity, profits or savings, about company or personal goals, that separate you from competition, make customer think before giving a response, to create a buying atmosphere.” (Gitomer, 113) These types questions allow salespeople identify the desires and fears of the clients across the table. Once the fears have been brought out into the open, the perceived risks can be interpolated. Gitomer makes special reference to the definition of risk; “A risk of purchase is some mental or physical barrier, real or imagined that causes a person to hesitate or re-think ownership.” (Gitomer, 153)

A book used often in MBA programs, including Cal Poly’s, to aid education on the topic of teamwork and leadership is *The Five Dysfunctions of a Team*, by Patrick Lencioni. The book takes a narrative perspective and follows an executive leadership transition in a hypothetical high tech company. The conclusion of the book is that the five major sources of trouble for teams are absence of trust, fear of conflict, lack of commitment, avoidance of accountability and inattention to results. (Lencioni, 188) The book describes trust as “confidence among team members that their peers’ intentions are good, and that there is no reason to be protective or careful around the group.” (Lencioni 195) In business there can exist a mentality that one is out for himself and knocking down that stereotype is important to aid in group function. Human nature is involved with this concept; most people choose career paths in order to achieve individual goals. The only way to properly accomplish trust within a group then, is to make certain each person’s incentives are aligned to the benefit of the group as a whole.

The second dysfunction, fear of conflict, addresses a common mistake that many leaders make, that being the attempt to eliminate all conflict within a group. The reality is that long last relationships in people’s lives such as marriage and friendships require productive conflict in order to progress and survive. (Lencioni, 202) The challenge is then to identify the difference between productive and negative conflict. Productive conflict can work towards refining alternatives to reach the best solution. Allowing conflict to be used as a tool also improves the focus of meeting, providing an arena for people to debate, minimize political concerns and think critically over issues pertinent to the project goals. Finally, the role of the leader in this scenario is discussed, providing insight into the traps typically fallen into. Lencioni writes, “One of the most difficult challenges that a leader faces in promoting healthy conflict is the desire to protect members from harm.” (Lencioni, 206) Leaders must acknowledge value in conflict and strive to resist temptations to smooth over relations between team members.

Lack of commitment from team members finds its roots in two major causes, “the desire for consensus and the need for certainty.” (Lencioni, 207) The reality is, most people are opinionated, stubborn and certain that they are correct. This is not necessarily a bad thing however, if they are willing to be satisfied with being heard and understood and then able to move on for the benefit of the team. True consensus is an imaginary concept and when it appears to arise in teams, there is more than likely concerns to suspect political persuasion or group think. Successful team members are able to buy into well thought out solutions even if they conflict with their own ideas. This process involves all team

members contributing and being heard in brainstorming or decision making situations, and then rallying behind the decision that has won the most votes. Commitment can then be achieved in the face of differing opinions and productive conflict.

The fourth dysfunction, avoidance of accountability, is a plague on most groups, based primarily on the reluctance of team members to engage in direct confrontation. The author describes accountability as “the willingness of team members to call their peers on performance or behaviors that might hurt the team.” (Lencioni, 212) This creates a sense of urgency in team members to complete tasks on time and with high quality deliverables. The alternative would be to face the concern and verbal comments from team members whom they trust. This is a healthy motivation factor; seeking the approval of peers instead of the wrath from a manager.

The final dysfunction involves an inattention to results from team members. This comes about for mainly two reasons, the focus on either team or individual status. This creates a perceived value for belonging to a team that does not revolve around the actual goals and objectives set forth by the project plan in the beginning. A common solution to avoid such an issue is continued revisits to scope of work documents, identifying deliverables and insuring all major tasks work stay on scope of project.

Geoffrey Moore’s *Crossing the Chasm* presents a model for technology’s progression in the marketplace as a path unique from other consumer goods. According to Moore, what really makes high-tech a hard sell, in contrast to more analog products, is the adoption trends that are inherent in high-tech.

As new high-tech is brought into the marketplace, it is difficult to forecast its sales by traditional methods because there are segments of “adopters” that are different from more traditional marketing segments. Not separated by age, gender, or occupation, these segments are rather based around the actual technology that your product utilizes. These segments are, in order by adoption: Innovators, Early Adopters, the Early Majority, the Late Majority, and the Laggards. Innovators, by their nature, are actively searching for new technologies and are willing to pay a premium for cutting-edge tech, despite its flaws and regardless of what function it is performing, before it gets to the mainstream market. The Early Adopters are people who can visualize a benefit for the new technology without being presented one, and are often willing to go for new or beta tech products in the interest of seeing their visions come to fruition. Moore notes that these early adopters are key in opening up any high-tech marketing segment. The Early Majority are driven by practicality; that is to say, that while they are willing to try something relatively new, they prefer to use the Early Adopters as “guinea pigs” to test a new product for performance and to demonstrate that this product is not simply a passing trend. They need to see tangible and proven benefits as well as have some references as far as the strength and longevity of the company presenting the product before they are willing to spend any money on it. The Late Majority will wait until a product is an established standard in the marketplace, such as a cell phone, before they

are willing to buy it. These two majority groups are the largest segments in the adoption life-cycle, and it is reaching these majorities that constitutes “crossing the chasm.”

When marketing high-tech, noting when your product is reaching these segments should dictate what marketing strategy is being used at the time to properly ride across the chasm. At the point of “crossing,” a company will likely see a drop in sales as a product makes a transition from being sold based on specs and possibilities to one based on performance and benefits. It is important to acknowledge this not as a sign of failure of the product or of the sales/marketing team, but rather as a signal to switch gears on how the product is marketed, as it is being brought into the mainstream. For this reason, Moore suggests a strategy for bringing a product to market and uses D-Day as an analog for it. This analogy prescribes that a “beachhead” must be carefully chosen before crossing the chasm, a very precise, strategic place in the market to establish oneself before moving on to other market segments. This choice is based on the benefits that you will present to the consumer. It is worth noting that at this point in the life-cycle, you are no longer explicitly selling a product, but rather, the benefits that the product provides to the consumer, as demonstrated by existing users. Your burden of proof shifts from one of one of specifications, benchmarking, and trade press, to one of revenues, sales numbers, market share, and third-party support. (Moore, 163) The product is now being sold as a “whole product,” one that includes not only the item itself, but also the features, benefits, accessories, and product support both from within the company and outside of it.

Moore’s description of the product life-cycle is interesting in that it makes a point in illustrating that high-tech is a type of sale that does not conform to more typical marketing strategies. Knowing and being able to understand what is happening to a new product as it is adopted in the marketplace is key to being able to “cross the chasm” successfully and glean the maximum benefit from a product for the company.

Research on past Senior Projects

The senior project archive were found within Cal Poly’s Library was limited in resources that were applicable to this project. One past project that did yielded valuable information was one that focused on identifying a need for a Facility Management Minor within the College of Business. The research paper was created by Gerald Novara, an Industrial Technology student who graduated in 1997 and is entitled “Facility Management Minor”. This study gave insight on how to approach industry contacts and extract valuable information. A list of simple and clear questions provided, aided in the question structure for the survey in this project. The thought process on the suggestion of courses to include in the minor also served as a foundation to work from. The procedure of identifying skills sets desired by industry and then seeking courses to directly develop those skill sets was inspired by this project.

INFORMATION PHASE

Research on existing Sales Engineering minors

The purpose of this section of the report is to analyze the existing minors at various universities across that nation in order to better understand the added benefit to Cal Poly as well as note standards that can be improved upon. The area of sales engineering is relatively new to the formal structure of college education and thus only the University of Florida currently maintains a cohesive minor. Iowa State University is in the process of creating a minor and has already created two courses that will be included.

University of Florida⁵

Description of minor: The minor in sales engineering requires 16-19 credit hours and an overall GPA of 2.8 in all course work for the minor. Any engineering major is eligible.

Graduates with this minor are regarded highly by recruiters for industries seeking sales engineering staff. The minor provides the academic background for careers in sales and managerial and entrepreneurial pursuits. Graduates are more effective communicators and they are trained to promote and to market new technologies and related products.

The curriculum enhances the engineering discipline with courses in communications, business, management and accounting. There is a core requirement of seven to eight hours, a communication skills elective requirement of three hours and a management skills elective requirement of six to eight hours.

The minor includes a Sales Engineering seminar that was constructed for the purpose of increasing the quality of the minor. Lectures and discussions on practice-oriented sales engineering topics are the focus of the seminar.

Department of minor: Industrial and Systems Engineering

⁵ University of Florida, 2004.

Table 1: Scope of Florida Minor

Core Courses

AEB 3341 Selling Strategically	3
EGN 4930 Sales Engineering Seminar	1
ACG 2021C Introduction to Accounting (4) or AEB 3144 Introduction to Agricultural Finance (3)	3-4

Communications Skills (1 course required)

SPC 2600 Introduction to Public Speaking	3
AEE 3030C Effective Oral Communication	3
ENC 2210 Technical Writing	3
ENC 3250 Professional Communication	3
ENC 3254 Professional Writing in the Discipline	3
SPC 2300 Introduction to Personal Communications	3
SDS 4410 Interpersonal Communication Skills	3

Electives (2 courses required)

MAN 3025 Principles of Management	4
BUL 4310 The Legal Environment of Business	4
MAR 3023 Principles of Marketing (4) or AEB 3300 Agricultural and Food Marketing (3)	3-4
EIN 4354 Engineering Economy or CGN 4101 Civil Engineering Cost Analysis or ECH 4604 Synthesis and Specification of Economic Production	3

Analysis of Scope: The core courses of the minor include two sales oriented courses and then a choice option between accounting and finance. The only added course for the minor is the “Sales Engineering Seminar,” the rest being pulled from existing departments. This created seminar is a single unit in class weight. This offers up the conclusion that the University of Florida did not have the funds or was not willing to go through the logistics to create a comprehensive course devoted to developing skills specifically aimed at Sales Engineering. Business topics such as marketing, finance and accounting can be taught from the vantage point of a professional in Sales. This gives students and ability to receive relevant information regarding various scenarios that present themselves in the workplace as information and decisions are transferred across departments. The required course AEB 3341 appears to be a “stand in” course for what would ideally be a well planned and coordinated Sales Engineering course. It is noted that it is more than possible to get through the minor without taking any formal academic course in oral communication or public speaking. This can be accomplished through focusing on written communication via ENC 3250, or ENC 3254. There is only a single communication course requirement; emphasizing the importance of sales skills and business skills over communication skills. The electives involved with the major range from Management to Engineering Cost Analysis. This also creates the opportunity for an individual to go through the minor without any academic experience in finance or cost analysis; instead focusing in areas such as accounting and business law. The decision to restrict students into taking either accounting or finance runs against the standard business progressions at Cal Poly. Within the Orfalea College of Business, marketing is always a prerequisite for finance. This concludes that, according to Cal Poly’s belief, the two subjects are interlinked in educational progression, choosing one or the other would create a gap in a cohesive business education. Marketing is not a requirement for the minor, although two options are available under electives. This runs contrary to the input from the majority of Industry, where a foundation in marketing is a necessity for anyone interested in succeeding in the area of sales. Marketing principles allows students to prepare for standard practices used in sales such as product branding, market research and prioritization based on market segments. The majority of the business courses included in the minor are plucked from either within the college of Engineering or the college of Agriculture. Examples of this are AEB 3144 Introduction to Agricultural Finance (3), AEB 3300 Agricultural and Food Marketing (3), EIN 4354 Engineering Economy and CGN 4101 Civil Engineering Cost Analysis. This gives off a distinct feeling that this minor is attempting to keep topics within the scope of an engineering view point. The use of Agricultural Finance is also borderline irrelevant to the study of Sales Engineering. The Agricultural Industry has standard practices that are not synced up with classical business finance. Upon pursuing an inquiry into this matter with the University of Florida no response was offered as to why a finance course from of the college of Business was not offered. This leads this analyst to assume that there was a lack in coordination and cooperation between the administrations of the Sales Engineering Minor and College of Business. Prerequisites could have been the source of the issues, but compromises should have been reached to insure the highest level of quality education.

Iowa State University

Description of minor⁶: Iowa State currently offers courses relevant to their Sales Engineering minor through the department of Industrial and Manufacturing Systems. The university notes that engineers are finding themselves in roles closely in contact with sales or are hired as sales engineers directly after graduation. To prepare students for meeting this challenge they recognize the need to pair problem solving skills with the ability to sell an idea.

Department of minor: Industrial and Manufacturing Systems Engineering

Scope of minor: The courses offered in the department include IE 450(Technical Sales for Engineers I) and IE 451 (Technical Sales for Engineers II) and these courses provide the appropriate background and skill set to pursue this lucrative career path. A formal minor in sales engineering is currently under development. The department also has established a Sales Engineering Club to allow students with these interests to develop these skills through networking and industrial field trips. Course outlines can be found in appendices A and B.

Analysis of Scope: (Appendix A/B for course outlines) The two courses created for the minor help to narrow the focus of topics being taught to Sales Engineering-relevant topics. The course IE 450 starts with the introduction to basic sales skills and the sales cycle; including an emphasis on “closing the deal.” It should be noted that the method used to teach this is the “Dale Carnegie Sales Process.” This application of the method is directly tailored to technical sales, the niche area in sales that sales engineer’s work in. Introductions in areas such as Marketing, Relationship Building, and Executive Buy-in are addressed in the following weeks.

An issue reported by industry contact Larry Phillips mentioned the need to spend time with the right people in a company. A scenario that is common for new Sales Engineers is that they attempt to work with or sell a product or process to a person within a company that does not actually have purchasing power. This creates a hang-up in actually closing the deal, as this person is then left to convince his higher-ups to invest in the product/process without the help from the Sales Engineer. Often, this person is unable to successfully close the deal on their own, leaving it idle for a time and then it is left for dead. The course addresses this common issue at the beginning of education so students will note the importance of finding the right contact when going for a sale.

Week 6 goes back to the sales cycle basics; Needs Analysis, Evaluation Strategies, Objection Handling and finally, Closing the Deal. This type of sales cycle is commonly used in transactional sales; where the salespeople and client have a relatively short contact phase and then no long-term bond is forged. There is need to understand this cycle as not every client a Sales Engineer will work with will be

⁶ Iowa State University, 2009.

a long-term client; and the ability to use the consultative style for selling might not be appropriate. A full array of sales skills will need to be in the Sales Engineers arsenal.

The course moves into a business introduction, emphasizing financial justifications and pricing negotiation. The emphasis is for Sales Engineers to understand the entire sales process, not just having the skills to give an effective presentation, but to know ahead of time if that presentation is even worth doing from a financial perspective, or from a strategic perspective.

Time management tools and skills are some of the most important skills a Sales Engineer can acquire. Salesforce.com mentioned multiple times in their input response that they are hired to educate professionals in time management more than any other area. The field of sales requires knowledge and decision making across multiple fields of expertise and identifying what area requires attention at any given time is a vital ability.

The final topic of the first seminar moves into practical information such as methods for branding a name, sales pay plans and company organizational structures. Many sales books go over the need for salespeople to be able to brand themselves. In the book, "Little Red Book of Sales" there is an entire chapter on developing strategies to brand oneself. Strategies range from increasing accessibility to one's name through advertising, to setting yourself up as a mentor or advisor in sales to the general public; the latter being done through public speeches, presentation and through publications.

The second Sales Engineering course takes on a much more hands on approach, with a fourteen-week project that introduces teams of students to industry applications. They are teamed up with a partner company and asked to take on a sales project for them. This allows students to go through the process of analyzing a product, get experience identifying target customers, setting up sales presentations and then aid in the financial follow through to close the deals. This project gives students an opportunity to see real world application of the topics lectured in the first Sales Engineering Course and at the same time offers a chance to forge industry contacts.

The education then moves into a focus on technical sales and the complications and strengths of selling with partners on complex products. How sales teams work together to fully demonstrate the benefit of products to customers requires an orchestration and understanding of team infrastructure.

During week five, another look at time management is introduced, this time focusing on how best to manage and rearrange responsibilities for a Sales staff. This gets into a management focused discussion. Understanding software that documents steps taken that are proven to work to get a deal closed is vital in setting company standards. Many computer programs and server based services such as Salesforce.com can be used to maximize efficiency in the flow and clear communication of data. Iowa appears to have a strong relationship with Salesforce.com, a partnership that Cal Poly also shares.

Week ten moves into identification of customer needs and pairing those with feature/benefit lists of current products. The idea is to analyze situations where it is not clear if a new product line is required to satisfy the customer, if minor adaptations to current models will suffice, or if the customer's needs are not within a company's ability to fulfill. It is important for a Sales Engineer to know when to back out of a possible contract and when to pursue one.

Week eleven focuses on financial justifications for projects in respect to internal alternatives as well as analysis of the competition's product lines. Once initial justification is cleared, strategies for negotiating price to meet quotas are gone over. There exist many methods in which Sales Engineers can introduce and then negotiate pricing. This part of the sales process is often not until the end, and any client that wants to talk price first is normally not a good client to divert resources to. The ideal situation is that the client first understands the benefit of the product or service to their business's future, and then after the benefit is clearly communicated and accepted, the topic of price can be brought up. In week thirteen International Sales is brought up and unique issues are noted such as, licensing, changes to infrastructure and regional customs.

Student Survey Analysis (Copy of full survey located in appendix E)

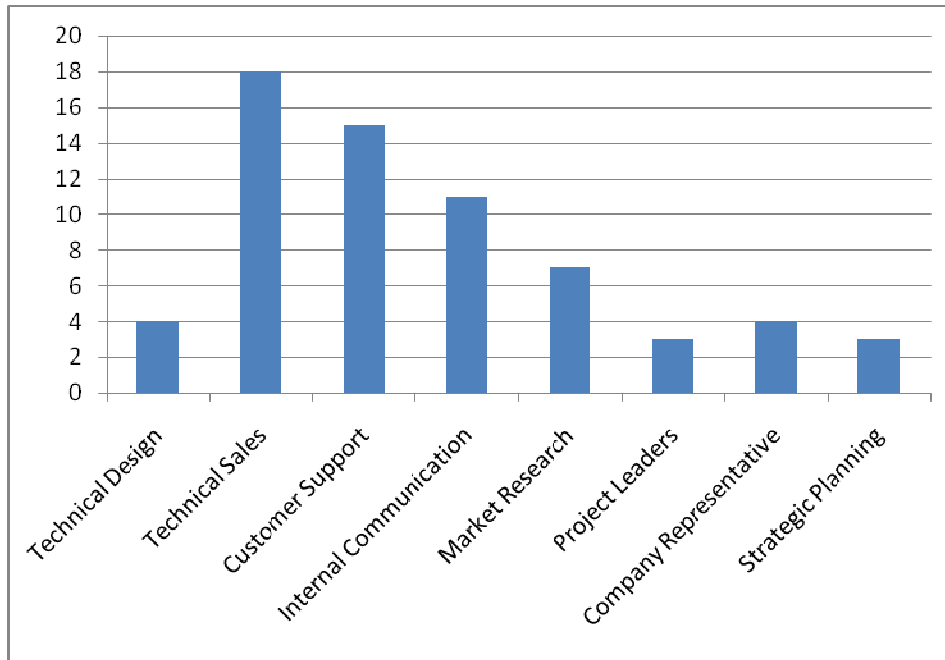
Purpose: The purpose of this survey is to gather information from current Cal Poly students that have the greatest likelihood of interest in applying for the minor. This sample was taken from Cal Poly's Sales Engineering Club during a weekly general meeting. All participants were read the same instructions:

When you receive the survey please keep it face down on the desk in front of you. You will have 5 minutes to complete the survey. Please use the full time. Your contribution is important. Please no talking, discussion or getting up. All answers given are anonymous. Thank you for your time.

No one saw the survey before the meeting and the room was kept quiet during the entirety of the five minutes. The sample size is 30. The results of these surveys will be used to compare and contrast with the results from the industry surveys. The goal of this would be to find any disconnects in views or expectations between perspective students and established industry professionals.

Question (1) - What role do you believe Sales Engineers fill as a professional in a company?

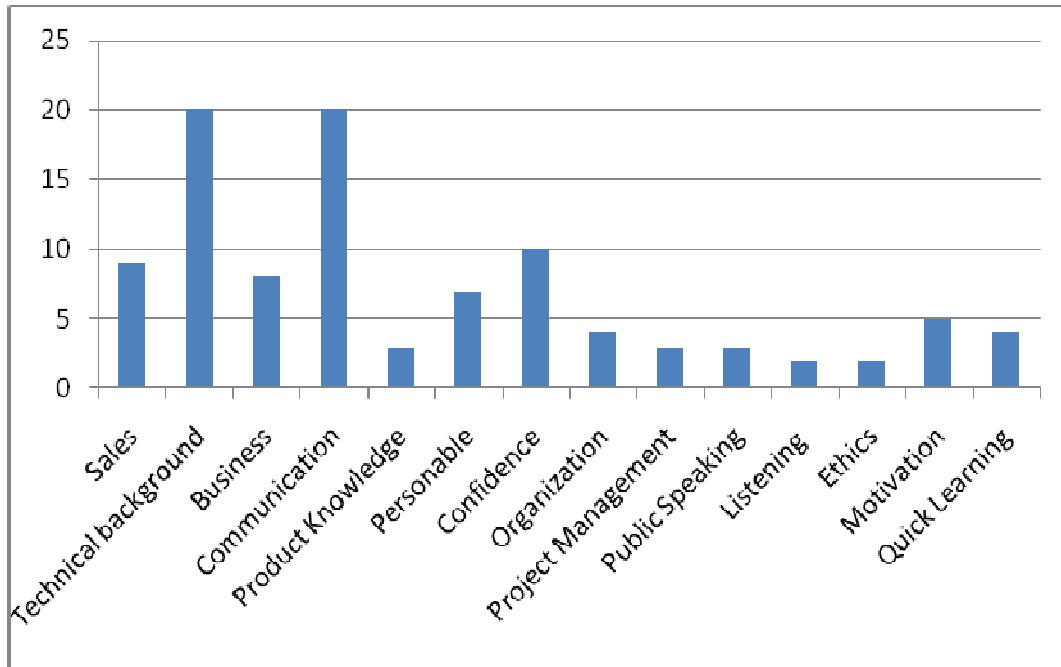
Figure 1: Student Survey Results to Question 1



Analysis: The options of technical sales and customer support are directly linked to the sales process within most companies and the essence of the consultative style of selling. Internal communication is a separate role however, that is used often within larger companies. The Sales Engineer is used as a bridge between technical design teams and customers; facilitating communication and maintaining customer satisfaction. It is interesting to note the perception from students on how varied Sales Engineering roles can be, some responsibilities even bleeding into longterm company strategy; a responsibility typically given to company executives. A few individual comments on surveys also revealed an understanding that sales engineers typically aid salespeople or salesteams by providing them with technical knowledge and presentation support; this could account for the variety of roles indicated; specifically technical design and market research. Overall, it should be noted that this sample of students from the Sales Engineering Club had a keen understanding of the multidisciplinary facets required in the role of Sales Engineer.

Question (2) - What skill set(s) would you expect a productive Sales Engineer to have?

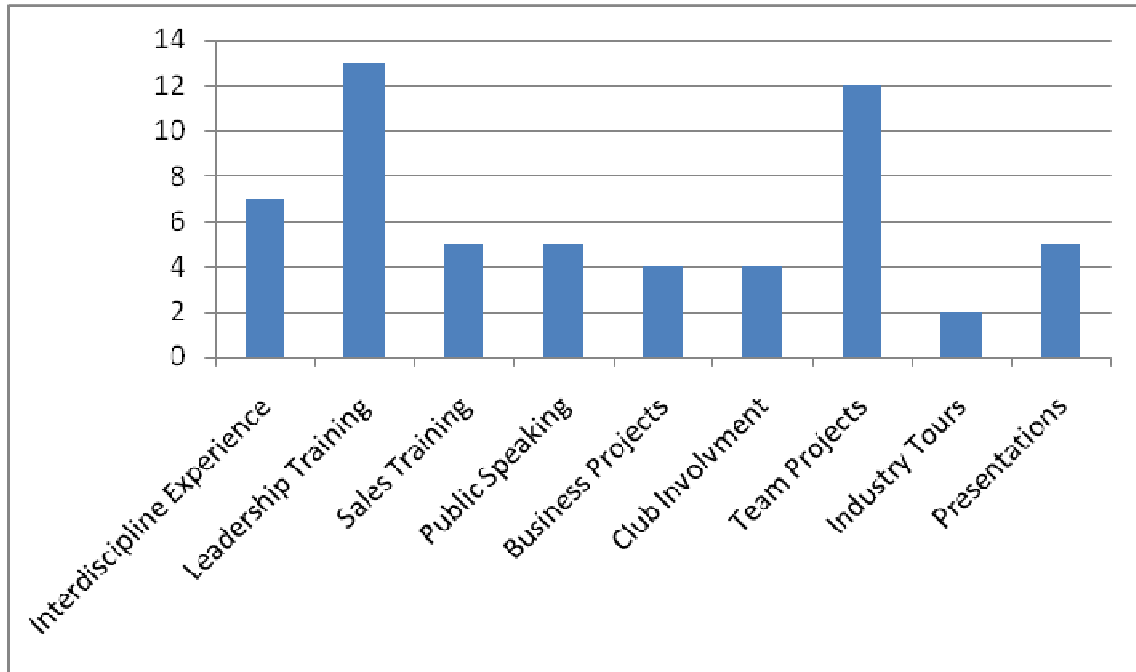
Figure 2: Student Survey Results to Question 2



Analysis: The two most prominent skill-sets of acquiring a technical background and learning good communication skills are also common themes mentioned in SEC. Students also recognize the need for sales engineers to know sales tactics and the sales cycle, as well as maintain a confident aura. There is a wide array of options as shown above, ranging from personal conduct to emphasis on public speaking abilities, all of which point to the wide variety of skills that a sales engineer may be required to have at various companies. This list also indicates the lack of focus from the perspective of students on what makes a good sales engineer; the profession being relatively new and still in its defining stages. It should be noted that the skill set of listening is brought up often in conversations regarding necessary abilities for salespeople. Don Mcnamara says it well; "If we listen hard enough and with great attention, our prospective client will tell us what we need to know in order to inform them of how what we do solves a problem, fills a need and returns value for our services. Listening, clarifying and asking pertinent questions of your client are a timeless style of capturing the prospects attention and garnering support for the eventual proposal." It appears that students do not realise the importance of developing keen listening skills when engaging with potential clients and this is an issue the minor will attempt to address.

Question (3) - What academic experiences would you deem most valuable for preparing a future Sales Engineer for industry?

Figure 3: Student Survey Results to Question 3



Analysis: The interesting thing to note about these academic experiences is that many of them can be combined into a single exercise. The top three choices, team projects, leadership training and interdisciplinary experiences, can be worked on at the same time. This is a valuable strategy when creating a course curriculum as limited time and scope often eliminate desired content. Students appear to value group work and leadership abilities with strong reverence, the ability to craft a concise presentation can be introduced at the climax to projects in courses. Leadership training is among the highest noted facet to developing a successful sales engineer by industry. It is reassuring that students feel the same. Managing client accounts is a major responsibility for many sales engineers and as such, an ability to drive the motivation of those that you are working with, confront changing environments and adhere to budget/time constraints are common time issues to overcome.

Industry Survey Analysis (Full copy of survey in Appendix E)

1. What are the most noticeable personality characteristic(s) you find in productive Sales Engineers around you or yourself?

Summary and analysis of Northrop Grumman (Full response in Appendix D): Larry Phillips' analysis of personality characteristics found in Sales Engineers focused around the Wilson Social Styles concepts. The two personality types noted were a cross between the conventional perception of most engineers in the analytical focus and then that of an effective communicator in the expressive focus. He attached a matrix of strengths and weaknesses, and then noted an important aspect to the weaknesses. Below is a brief excerpt from his response:

“I am very aware of the communications styles of those around me, and there is a wide variety of styles found in successful Sales Engineers, but two seem to predominate: Expressive Analytics and Analytic Expressives. This blend of analytics focus on “the right solution” and the Expressive’s open communication style works very well in the channel selling or counselor selling environment most Sales Engineers function in (as opposed to the tradition concept of a “Salesperson,” which is a transactional selling situation). In general, when engineers with these social style characteristics are provided with basic business training (including basics of business development, capture leadership, customer interaction training, and proposal development) as a foundation for their professional skills, the potential impact of the inherent weaknesses of the styles is greatly mitigated, and the strengths usually come to the forefront.” (Larry Phillips)

Table 2: Strengths/Weaknesses for Expressive Analytics

STRENGTHS	WEAKNESSES
Creation of solid solutions that rely on facts and logic	Potential to be overly critical and “picky” about elements included in the potential solution
Use of multiple competencies and capabilities within the company to solve problems, which makes solutions both practical and persuasive	Strong potential to overemphasize data and information gathering to the point of being indecisive
Professional enjoyment found in discovering new ways to solve persistent problems	Often are judgmental and moralistic in their communications and discussions
Competent at working out all the details of the problem and solution, and then leading the team to the “right solution”	Pressures of time and/or incomplete data are occasionally frustrating, resulting in personal dissatisfaction with implemented solution
Ability to create excitement and team/customer involvement in discussions	Can be seen as overly excitable when conflicting opinions are presented
Persuasively explain their visions and ideas Can inspire and motivate others	Might be so unrealistic as to be considered impractical to implement
Will create effective teams	Personal feelings might impact personnel chosen to work on the project

A common theme from industry is the use of the consultative sales methods for Sales Engineers. This method tends to allow Sales Engineers to step in as an advisor to the customer, rather than a simple salesperson. The lay term for the “expressive analytic” could be an engineer with personality. This emphasizes the duality in what a Sales Engineer need to be able to accomplish; interacting with clients as well as critical problem solving.

Summary and Analysis:

“The most noticeable characteristics are solid communication and leadership skills combined with a competitive and entrepreneurial drive to succeed. The most productive and successful sales engineers are creative, self-motivated and able to effectively build long-lasting relationships with both internal & external customers.” (Trane) Again the emphasis on communication and leadership skills are paramount abilities noted from industry time and time again. An interesting addition to Trane’s response focuses on the entrepreneurial reference. The Sales Engineering Club at Cal Poly has taken the desire to instill an entrepreneurial passion in their members as a cornerstone in the goals of the club. Use of a CAPSIM business simulation was used in the fall of 2009 as a tool to further this goal. The simulation allowed students to take a bird’s eye view of running a company, making decisions in R&D, production, marketing and finance. The entrepreneurial spirit seems to run hand in hand with the profession of Sales Engineering. A related characteristic noted from Trane is self motivation. This characteristic parallels the student survey results that noted motivation and confidence as significant personality characteristics from a sales engineer. In the book, “Little Red Book of Selling,” Jeffrey Gitomer notes the importance of self-motivation through the ups and downs of selling. There will be times that sales fall through at the last minute, and the trick is to remain positive and learn from mistakes made and move past them, rather than losing motivation or the drive to excel.

2. What skill-set(s) would you expect a productive Sales Engineer to have upon being hired?

Five skill sets were reoccurring in the response from industry: Communication skills, Time Management, Problem-Solving, Business Savvy, and Listening. Below is a brief summary and analysis of the topics as shared by industry.

Summary and Analysis of Communication Skills:

The focus of this section centered on the hybrid interaction between the two areas of technical design and communication skills. Comments from multiple companies (Rockwell Automation and Northrop Grumman) that the design and problem solving skills required for most Sales Engineering positions can be acquired through a combination of completing a typical engineering degree and the first few years of on the job training/experience. The needed communication skills tend to be the shortfall for most prospective Sales Engineers, however, the term “communication skills” can point to a wide array of abilities, but Larry Phillips’ three-prong definition will be used to outline what is meant. These include: “the ability to listen and comprehend, to adapt to the customer’s communication style, and finally the ability to NOT be upset or defensive when a customer with a lot of problems flies off the handle, and begins to vent.” These skills required simulations to develop and improve each individual’s method, simulations that are not offered within engineering curriculums. This creates the common issue in industry where engineers are unable to effectively create long-lasting relationships with clients and ultimately lose them due to an inability to identify customer needs and then deliver solutions that directly respond to those needs. (Larry Philips) Trane further comments on the need to hone and

perfect communication skills; “Communication skills are also a must-have as well as development of interpersonal skills such as conflict management and leadership.” (Trane) (Full response in Appendix D)

Summary and Analysis of Time Management skills:

The current (common) path to become a Sales Engineer in industry is to start as an engineer and then prove your abilities in the areas of communication and sales to start the crossover. This creates a situation where many of the skills that required honing are done so through a trial and error process. Salesengineering.com notes that this often creates a problematic situation as without formal training it is more than likely that out of date methods or inefficient habits arise. Salesengineering.com is a consulting company that works to increase the effectiveness of Sales Engineers in industry. Time management is one of the cornerstones of their consulting strategy; aiding industry worn professionals in developing skills that would have been taught in an academic setting. (Appendix D)

Summary and Analysis of Problem Solving skills:

Trane notes the need for creative problem solving skills: “Important skill-sets include a strong technical aptitude with a problem-solving mindset and significant business savvy. An ability to think outside the box to design unique engineering solutions based on customer needs is essential.” Most engineers are drilled in problem solving scenarios throughout their undergraduate. This prepares them to address technical problems that arise from products; however, a more subtle form of problem solving takes place in interrelationship issues. They can be problems caused by miscommunications and differing of opinions that many engineers do not have sufficient abilities to handle. The need to transfer their problem solving skills across the spectrum of business is needed to succeed as a sales engineer.

Summary and Analysis of Business Savvy:

Trane also mentioned in the survey feedback and in personal interviews the desire for new hire sales engineers to possess a foundation in business knowledge. “A business minor is beneficial but not required. An understanding of finance is important.” (Trane) Trane has come to visit the Sales Engineering Club at Cal Poly twice in the last six months and a significant topic that is brought up both times was the necessity to understand finance. Unfortunately due to prerequisite requirements, it is difficult for an engineering major to enroll in any finance course offered at Cal Poly. This issue is addressed in further detail later in the report.

Summary and Analysis of Listening Skills:

This skill set notices a significant discrepancy in emphasis between industry and students. Many guides to the consultative style of selling note listening as one of the most important skill sets to acquire. The ability to listen is paired with identification of customer needs, successfully fielding objection and developing on the spot strategy plans to name a few responsibilities. (Don McNamara, 2009)

3. What academic experiences would you deem most valuable for preparing a future Sales Engineer for industry?

Response from Northrop: "In my opinion, the academic key is to blend basic business, communications and marketing classes into the engineering curriculum...the focus on technology, math and science inherent in a "standard" engineering curriculum needs to be expanded to include marketing, customer interaction, customer relationship management, and basic business classes."

Response from Trane: "Sales engineering / sales process training, engineering economics, business, finance and communications courses are valuable. Courses focused around the financial and business acumen needed by sales engineers may be better suited than standard courses. In addition to coursework, extra-curricular activity, especially in leadership positions, is valued as well as internship and/or co-op experience. " (Appendix D)

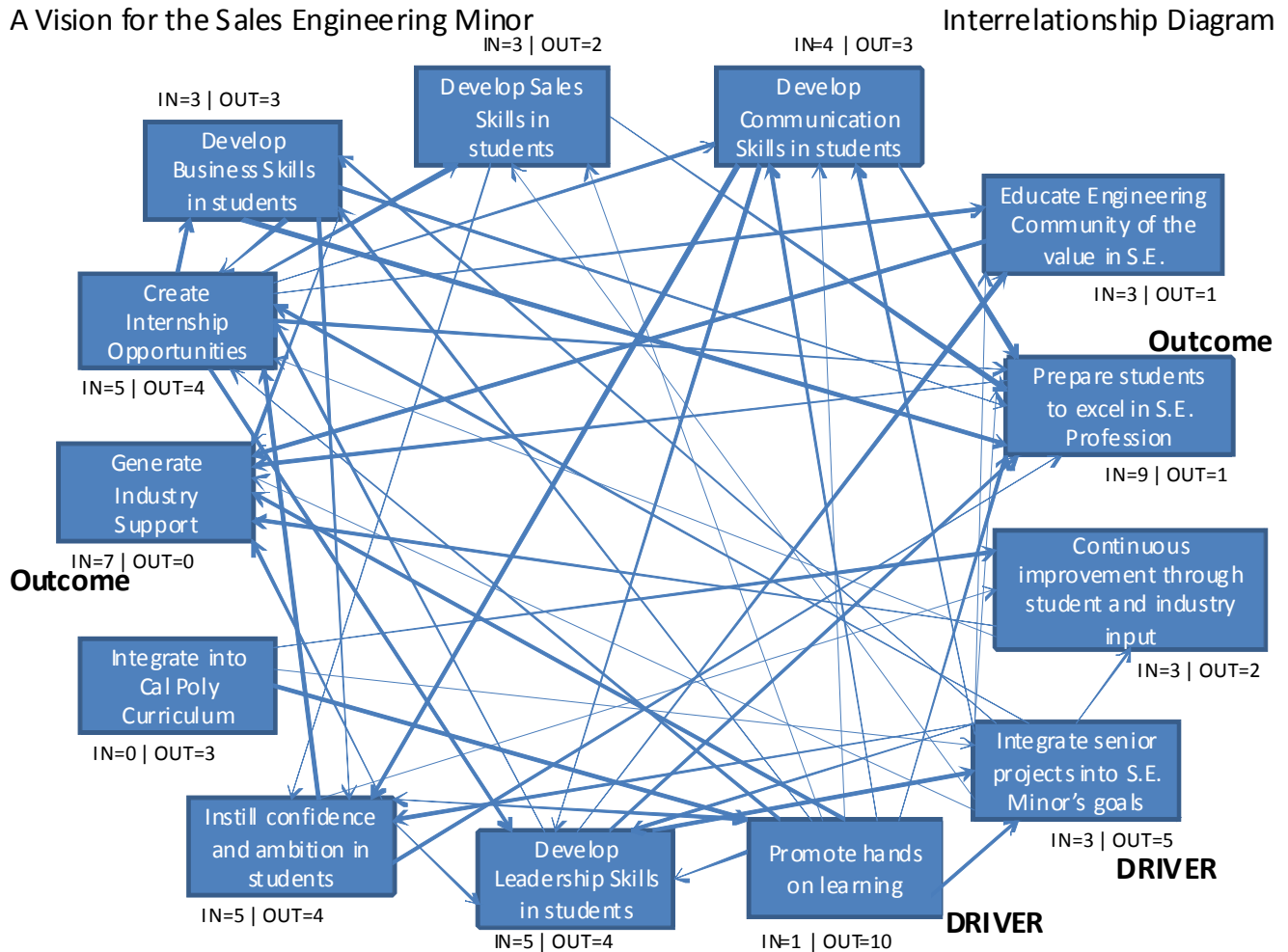
Analysis: Based on interviews with industry, it appears that there is an emphasis on business and communication courses to include in a sales engineer minor. Some companies explained their desire to see a focus in marketing and customer relations, while others would appreciate requiring finance courses, educating student to interact using business savvy terms. A common problem with design engineers is that they are very effective in creating products that have creative features but that have no relevance as to what the customer actually wants. Engineers will typically get involved in projects, making decisions based on what they think is best, rather than a customer centered product design process. Northrop mentioned another problem is that design engineers will not incorporate design for manufacturing concepts, mainly because of a lack in understanding of cost analysis. Sales Engineers need to have a grasp of the full spectrum of design, production and finance in order to gage if a customer's proposal is feasible. Sales Engineers that can quickly realize when there is an impossibility between what the customer is asking for and what his company can deliver will save extensive amounts of time for both parties involved. He can intelligently suggest alternative avenues to proceed down in order to address customer needs in a feasible way. The alternative to this is that design teams, finance departments and production departments have to struggle with needless intercommunication; coming to the solution that they can't give what the customer wants. This reduces customer satisfaction and ultimately will reduce customer loyalty if such problems continue.

Trane also mentions the strong desire to see prospective sales engineers participating in internship and co-op opportunities. This will no doubt be a cornerstone in the goals for the sales engineering program, to develop relationships with industry to supply a direct link between students and companies; giving students that take the minor a competitive advantage in landing such positions. The Sales Engineer Club at Cal Poly is already working on their industry connection; inviting a host of companies each year to give presentations at the Cal Poly campus. The network that is being developed by S.E.C. will be shared with the minor.

DESIGN

The design phase of this project is focused on the creation of the minor itself on a macro level, creating such characteristics as the mission statement, goals, and outlining the chain of command.

Figure 4: Interrelationship Diagram for S.E. Goals



Analysis of Diagram: This chart went over all the major goals for a Sales Engineering minor based on criteria developed from the literature review and information phase. Cause and effect relationships can be observed through the use of such tools. This specific chart indicated that substantial drivers in the process will be promoting hands on learning experiences and integrating senior projects into the S.E. Minor. The two most noticeable outcomes are

preparing students to excel in the S.E. Profession and to generate industry support for the minor.

A scope of work document was created to outline the significant aspects of the proposed Sales Engineering Minor. The final draft of this S.O.W document is crafted based on the information stage of the project, taking ideas from the full spectrum of information sources. Additional project management tools such as a risk management analysis and a communication plan have been drafted to minimize potential problems. An overview of Cal Poly's and the IME Department's current culture and its implication for the minor is included to evaluate the transition into the current academic environment. Finally, an implementation summary and flow chart shows the tactical steps suggested to introduce the minor.

Scope: The project plan is to identify the Curriculum of a Sales Engineering Minor based on industry requirements, financial considerations and student input and to present a detailed implementation plan in order to bring the minor into existence.

Deliverables:

- 1) Sales Engineering Minor Curriculum
- 2) Financial Analysis of Minor Implementation
- 3) Flow Chart for Implementation

Mission of S.E. Minor: To develop the necessary skills in Cal Poly's engineering students to allow them to perform the duties required of the Sales Engineering profession with excellence.

Goals and Objectives for S.E. Minor:

- 1) Educate students in industry standard sales methods.
 - a. Obtain information regarding sales training programs
 - b. Create Academic Advisory Board to insure quality implementation
 - c. Adapt training programs to university relevant course work
 - d. Hire or Train professors to adequately teach
- 2) Develop and refine student's communication skills; oral and written.
 - a. Foster support from Communication Department at Cal Poly

- b. Require communication courses within minor scope
 - c. Require presentations and public speaking in projects
- 3) Educate students in the basics of relevant business areas that Sales Engineers will work with, including; Marketing, Accounting and Finance.
 - a. Foster support from the Business Department, to address prerequisite issues.
 - b. Promote interdisciplinary coursework
 - c. Coordinate comprehensive consulting projects that interact with industry
 - d. Endorse senior projects that follow product development, production and sales.
- 4) Instill good leadership behaviors and practices.
 - a. Insure that all projects involve effective team centered education
 - b. Simulate industry scenarios through quarter long group projects
 - c. Suggest courses that focus on leadership and management principles
- 5) Create long term relationships with Industry contacts; leading to continuous improvement in the minor and financial sponsorship.
 - a. Work with the Sales Engineering Club to gather sponsors for the minor.
 - b. Continue to give back value to the industry contracts through preparation of the best Sales Engineers in the country.
 - c. Provide opportunity for companies to interact with students; providing gateways for internship and career opportunities.
 - d. Encourage student tours, industry guest speakers and a continued commitment to use the academic advisory board as a resource for improvement of the minor.

Situation Analysis

University Culture⁷: “Cal Poly is a nationally ranked, four-year, comprehensive public university located in San Luis Obispo, California. The emphasis of the University is a “learn by doing” educational experience for its more than 18,000+ students. The purpose of academic programs at Cal Poly is to fulfill the university mission of pursuing and transmitting skill, knowledge and truth. Cal Poly's academic programs support the university's unique comprehensive, polytechnic mission and should all be assessed periodically to ensure that they meet student and societal needs. Cal Poly should provide the necessary resources to ensure the highest quality of service to its students to facilitate their progress throughout all phases of their educational careers.”

IME Department Culture⁸: The mission statement of the IME department is “To educate students for successful and distinguished careers in industrial engineering, manufacturing engineering, and related fields using a learn-by-doing approach that stresses integrated processes, appropriate technologies, and enterprise competitive advantage.” The major objectives include: Immediate Practice, Solid Engineering Foundation, Broad Education, and Lifelong Learning.

Analysis of Current Culture: The culture specifically in the IME department at Cal Poly stresses the importance of a comprehensive education; one that allows engineering students to gain insight and technical knowledge in the areas of business and management. The department in many ways follows the same principles of what an engineer would require to succeed in technical sales, and thus it was selected as the department to sponsor the Sales Engineering Minor. Leadership skills are strongly encouraged and fostered in the IME curriculum, along with courses that provide students with a foundation in economics. What is lacking in the IME department however a passion to instill communication skills in their students. The courses include projects that incorporate presentations, however not to the extent to which would benefit Sales Engineering in industry. Emphasis on analyzing ones personal speaking technique and listening abilities are a necessity in honing student communication skills. Another area that needs to be addressed is the lack of focus on finance. This area of business requires a course fully devoted to it, based on industry input. The conclusion is that Sales Engineering falls within

⁷California Polytechnic State University, SLO, 2009.

⁸ IME Dept. California Polytechnic State University, SLO, 2009.

the scope of Cal Poly’s IME department; however, focusing on certain areas relevant to technical sales will be necessary to insure a successful minor.

Cal Poly Image⁹: For the 17th year in a row, Cal Poly has been rated the best public-master's university in the West by U.S. News & World Report, in its 2009 America's Best Colleges guidebook. This year, Cal Poly’s College of Engineering was named the No. 1 public engineering program in the nation in the magazine's Best Undergraduate Engineering Programs - for schools whose highest degree is a bachelor's or master's. A number of College of Engineering programs also ranked high in the Best Undergraduate Engineering Programs in their individual specialty categories. Cal Poly's industrial/manufacturing program was named the No. 1 program in the nation. Cal Poly is a university that has a unique relationship with some of the largest companies in the world, allowing its students and graduates selective access to internships and job opportunities. Being a leader in the engineering community allows Cal Poly institutions to pave new academic paths that come with inherent validity, based on the degree of excellence industry has come to expect from this university. This unique position allows Cal Poly to pull weight with companies, giving the Sales Engineering Club an advantage in seeking sponsors for the minor.

Organizational Structure: The goal is to give administrative authority to a professor in the IME department to oversee the Sales Engineering Minor. This administrator would be responsible to the IME department’s chair, who is then responsible to the dean of Engineering.

Table 3: Communication Plan for S.E. Minor

What Information	Target Audience	When?	Method of Communication	Provider
Yearly Goals update	Advisory Board, Dean	Semi-Annual	Face to Face Meeting	S.E. Admin
Course Creation/Change Update	Advisory Board, Dean	Semi-Annual	Face to Face Meeting	S.E. Admin
Course Status Updates	S.E. Admin	Quarterly	E-mail	S.E. Faculty
S.E. Club Update	S.E. Admin	Monthly	E-mail	SEC President
Industry Sponsorship Updates	Dean	As Needed	E-mail	S.E. Admin

⁹ California Polytechnic State University, SLO, 2009.

Access to Resources: Perhaps the most impressive resource the minor has backing it is the support of the Sales Engineering Club. (Appendix G for more information) This club includes just under one-hundred students committed to honing the skills they will need as a Sales Engineer in industry. The club has multiple sponsors financially backing it, all of whom are very interested in seeing a S.E. minor at Cal Poly. The students are also veterans at pulling in industry support at this point and are willing to devote their time and abilities to securing full funding for the minor. This would be a major step forward, creating the scenario where Cal Poly would not put up any additional funding to host the minor, but instead would just take care of the logistics and maintenance of the minor. A few of the admin and faculty within Cal Poly have also noted their desire to become stakeholders in the minor. This starts to already paint the picture of the three source stakeholder outline of Cal Poly Admin, Cal Poly students and industry sponsors.

The industry that is currently supporting the Sales Engineering Club will have a strong likelihood in a willingness to financially support a related minor.

Pending a commitment from the IME department, the use of one of Cal Poly's most prestigious engineering departments would be available to organize logistics and fuel administrative support.

Zahed Sheikh, Director of Corporate Relations & Project Based Learning Institute at Cal Poly is the highest ranking administrator to currently give his full commitment and support in seeing this minor come to reality. He will be vital in moving forward in securing additional administration buy-in.

Karen Bangs, IME professor put together the Sales Engineer course at Cal Poly (IME 401) and is the advisor the Sales Engineering Club. She has proved to be a valuable resource for the club; providing insight and vision based on years of industry experience and her position as advisor for the Society of Women Engineers; one of Cal Poly's largest and effective clubs.

Strategy: The basic strategy as the minor moves forward toward its launch can be described in one word: differentiation. This is the strategy that the Sales Engineering Club has used, to great success. There are no minors currently on campus that focus on giving engineers both communication and business skills. A sales engineering minor will present an attractive method for breaking engineers out of their comfort zone, and develop skills that will allow them to successfully interact with all departments in a company. This minor will set itself in an elite status, boasting its ability to graduate engineering students with a firm grasp on how products

are sold, ranging from design through production and finally sales. Their education will allow them to see the big picture in how companies operate, from A to Z.

Figure 5: Priority Matrix for S.E. Minor Implementation

	TIME	PERFORMANCE	COST
CONSTRAIN			X
ENHANCE		X	
ACCEPT	X		

Analysis: The number one barrier to allowing this minor to become a reality is the economic considerations for implementing it. The university will require significant industry support in funding the academic expenses involved. To field a minor that will work within the current structure of courses at Cal Poly, introduction of custom/new courses will need to be kept to a minimum to reduce cost. Cal Poly prides itself on being the best university for undergraduate studies in Engineering in the country and as such the performance or quality of the minor will need to be enhanced; adopting a mentality of continual improvement with each year. The quality of the minor is of particular interest to industry contacts that are excited about seeing this minor become a reality. They have voiced detailed opinion on what should be covered in the courses and exactly what skill to develop most. It is the time aspect of the project that is most able to be “accepted.” While there is a strong desire to see this minor offered by Cal Poly

in the near future, it is acceptable to push deadlines back, due mainly to cost issues. The field of Sales Engineering is a relatively new concept in industry and it is in its infancy stages among academic circles. The excitement is growing though, seen by the willingness from industry to fund Sales Engineering Clubs throughout the nation. It is noted that there is a process to adhere to however, and that the speed in which a minor is introduced at Cal Poly is dependent on external factors such as student interest, industry support and admin cooperation. Although cost is the factor that could prove limiting, it should be noted that the Public Relationship Committee within the Sales Engineering Club is working to fully fund the minor. The goal is to generate extensive sponsorship for the minor, well past the estimated cost. This would allow cost to become a non-factor in the decision process and instead, time would be constrained; moving to implement the minor as soon as possible while keeping the performance at the highest level of excellence.

Figure 6: Risk Analysis for S.E. Minor Implementation

Risk Management Matrix					
Scale: 1=low 5=high					
Risk Event	Likelihood	Impact	Detection Difficulty	When	Sum
Failure to Generate sufficient Student Interest	1	4	2	Minor Signup	8
Failure to secure Admin Buy In	3	5	3	Creation Phase	45
Failure to Secure Needed Financial support	2	4	4	Sponsorship phase	32
Poor Teaching from Faculty	2	2	4	Quarter Evaluation	16
IME Department will not host minor	3	2	3	When Assigned	18
Cannot find S.E. minor Admin	1	3	4	Creation Phase	12
Added Seminar not cleared for creation	4	2	3	Creation Phase	24
No support from Business/Communicaiton Department	2	3	4	Creation Phase	24
Financial Support Taken Away	2	4	5	When Applicable	40

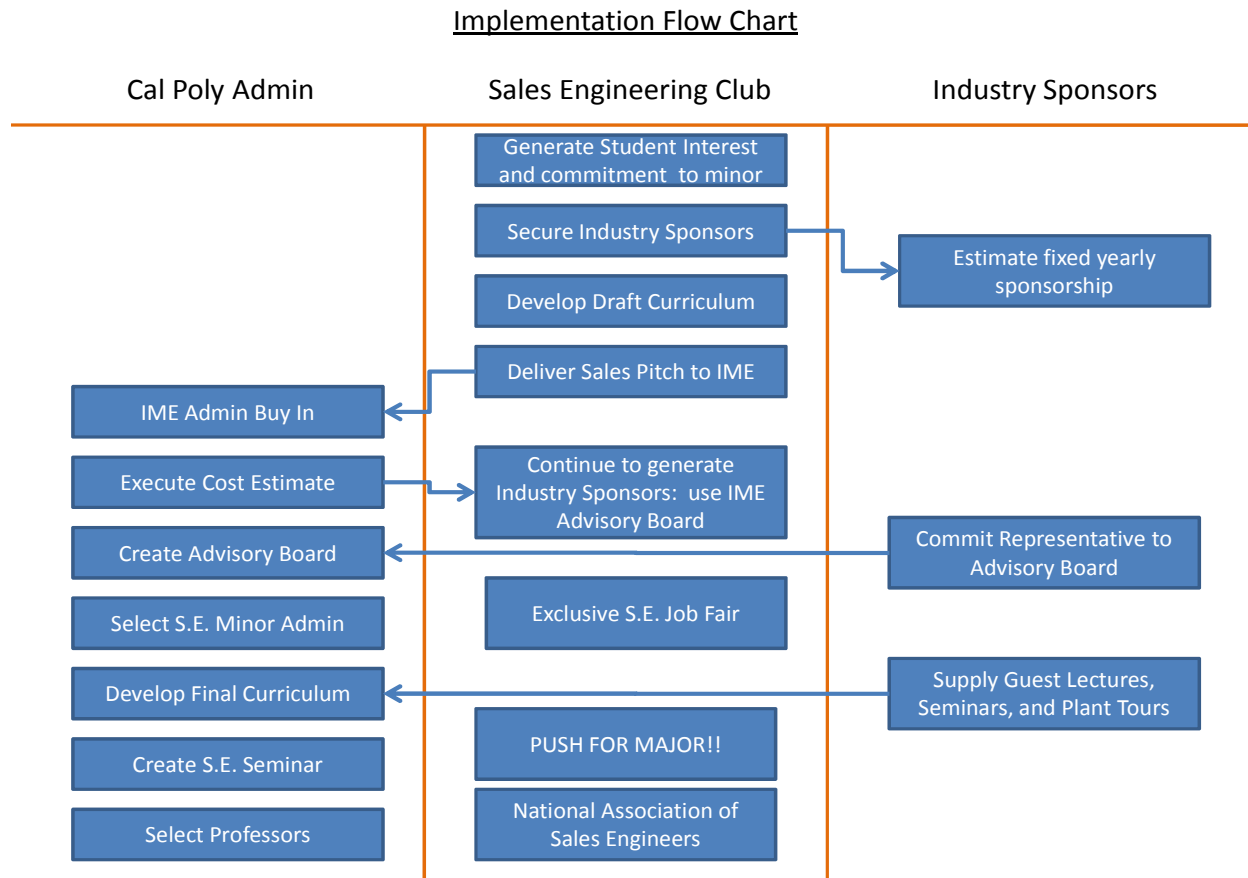
0-25 is minor risk
26-39 is moderate risk
40+ is major risk

Risk Reponse Plan				
Risk Event	Response	Contingency Plan	Trigger	Who is Responsible
Failure to Generate sufficient Student Interest	Reduce	Put Funds Into Marketing	Lack of Signups for Minor	Sales Engineering Club
Failure to secure Admin Buy In	Reduce	Seek IT or Business Admin	Engineering not in support of minor	Sales Engineering Club
Failure to Secure Needed Financial support	Reduce	Divert more SEC resources	Minor not fully sponsored	S.E. Admin
Poor Teaching from Faculty	Reduce	Increase Training	Poor Evaluation Reports	S.E. Admin
IME Department will not host minor	Reduce	Use GENE Department	No support from Dean	Sales Engineering Club
Cannot find S.E. minor Admin	Trasfer	Seek IT or Business Admin	No admin in Creation Phase	IME Dean's Office
Added Seminar not cleared for creation	Avoid	Replace with existing course	Course not created or cleared	S.E. Admin
No support from Business/Communicaiton Department	Reduce	use no prerequisite courses	Departments not willing to compromise	S.E. Admin
Financial Support Taken Away	Avoid	Generate support above cost	Company takes away support	S.E. Admin

Implementation:

The Sales Engineering Club is at the center of this strategy, pulling in two of the major stakeholders required to see this minor launch, the students and industry contacts. The other piece of this puzzle is to gain a commitment from the IME department to host this minor. It will be noted that there exist many similarities between the skills required for of sales engineers and industrial engineers; making the IME department a natural choice for hosting the minor. When confronting the administration it is vital to indicate an ability to fund 100% of the minor's costs. With financial consideration out of the way, the IME department will simply be in charge of maintaining the quality and logistics of the minor. Both Karen Bangs and Zahed Sheikh will be used as resources in the official sales pitch to the IME department. S.E.C. will continue to grow its member base, which currently stands at just under one hundred. They will be the force that continues to educate the campus as to what Sales Engineering is and will work to increase the reputation of the club through competing in competitions and continually hosting community service events. All marketing for the minor will be executing via the club. The club will also be responsible for introducing their current sponsors with the IME department and facilitating the extension of the industry sponsorship. The Sales Engineering Club will also work with the academic advisory board for the IME department and seek financial support from those companies. As the creation stage for the minor progresses, a Sales Engineering Academic Advisory Board will be formed, including admin from the IME department and companies that have significant financial support in the minor. This board will work with the Sales Engineering Club; the official entity that represents the student views, to continuously improve the minor. As the final curriculum is being evaluated, an effort to include all three stakeholders in the decisions is necessary. The result will be a minor that has achieved a unique position as one of three existing academic programs in the nation that is devoted to preparing engineers for a career in sales engineering. Below is a flow chart of the implementation plan.

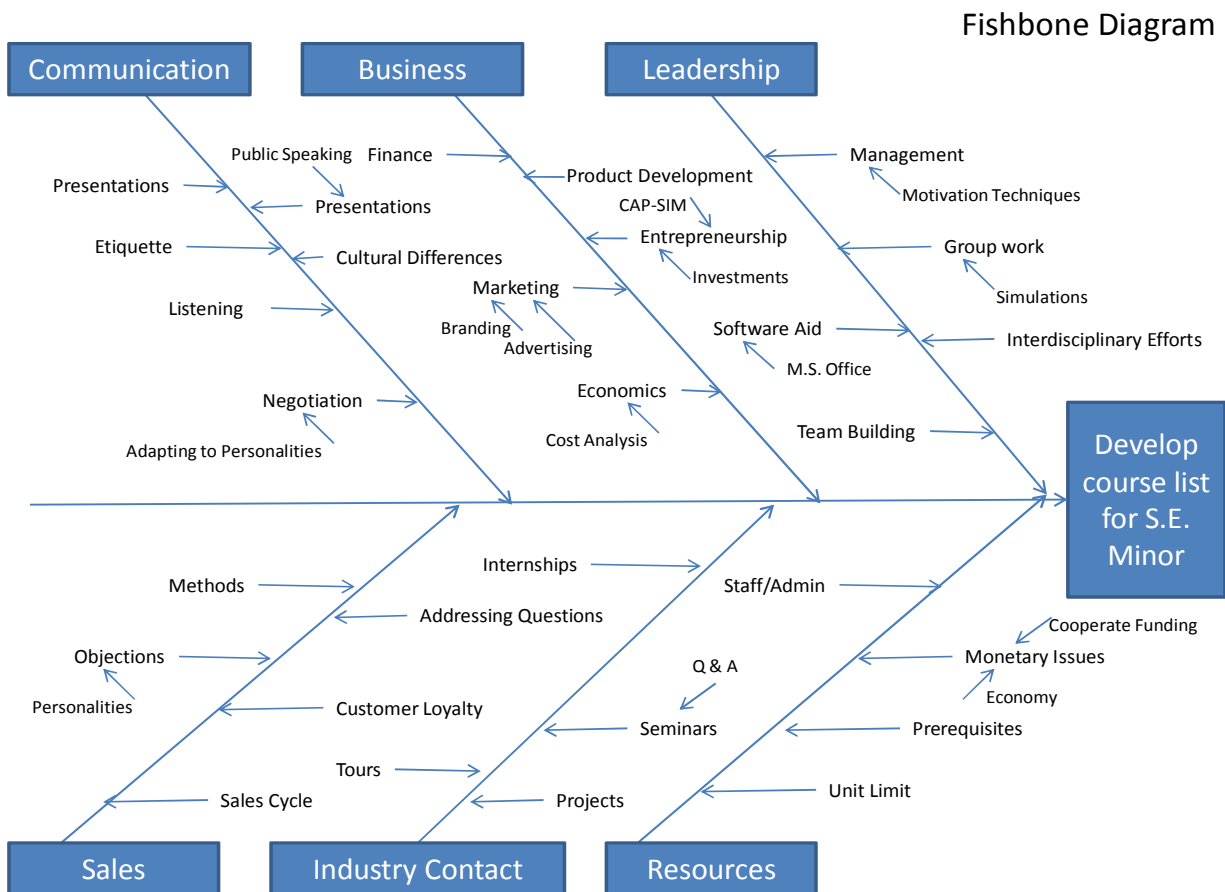
Figure 7: Flow Chart for S.E. Minor Implementation



METHODS

The Function Phase of this report formulates multiple scope options for the minor based on goals and objectives laid out in the Creation Phase. Class options are weighted using a process involving a Fishbone Diagram that utilizes the scope of work description in the Creation Phase and Priority Matrices that compares each class against a set of weighted skill sets identified in the Information phase. The idea is to start with analyzing the input taken from stakeholders and identifying the major skill sets to focus on. Following this, it is vital to understand the relationship between each skill sets and to identify driving forces that will lead to successful and relevant development in the students. This allows a formation of an initial course list to choose from. Ranking each course based on the focus of its content is then conducted, providing insight into which courses will further the goals and objectives of the minor the best. Finally, once a final course selection has been completed, various curriculum scenarios can be created. This will allow Cal Poly Admin, students, and industry contacts to choose between scenarios that host differing strengths and weaknesses with the aid of radar charts.

Figure 8: Ishikawa (Fishbone) Diagram for S.E. Minor Course Selection



Analysis of Diagram: This chart was an initial tool to aid in the collection and organization of research done. Areas for study are included as desired from industry, job opportunity as desired from students and resource limitations as desired from the administration. All these factors will go into the development of a relevant course list for the minor.

Course Screening Process

The use of a priority table (below) was introduced to systemically rank courses applicable to the S.E. profession. Categories were selected based on extrapolation from the information stage and courses were graded by a scale from 1-5; 5 representing the highest correlation between category and course. (Appendix F for full course descriptions)

Table 4: Priority Table for S.E. Minor Course Selection

SKILLS	Communication	Business	Leadership	Sales	Prerequisite Compatibility	Weighted Total
Course Number	<u>3</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>1</u>	
IME 301	1	3	1	2	5	20
IME 303	3	2	5	2	3	30
IME 312	1	4	1	1	5	20
IME 314	1	3	3	2	5	24
IME 319	3	2	2	2	5	26
IME 320	2	2	2	2	5	23
IME 322	3	2	2	2	5	26
IME 342	2	3	4	2	5	29
IME 401	4	3	2	5	5	37
IME 404	2	5	3	3	5	33
IME 409	2	5	2	2	2	26
IME 417	3	4	4	2	3	32
IME 421	3	4	4	2	3	32
IME 437	3	2	3	2	2	25
IT 326	3	3	3	3	5	32
IT 371	2	4	4	2	3	29
IT 381	3	4	4	4	5	38
IT 403	3	3	2	3	2	27
IT 406	5	3	3	5	2	39
IT 407	4	3	4	5	2	38

COMS 201	5	2	3	2	5	34
COMS 301	5	4	2	2	5	36
COMS 311	5	2	2	2	5	32
COMS 315	5	3	3	3	5	38
COMS 322	5	2	4	4	5	40
COMS 413	5	3	2	2	3	32
COMS 416	5	2	2	2	5	32
COMS 421	5	2	2	2	5	32
BUS 212	2	5	2	2	5	29
BUS 214	2	5	2	2	5	29
BUS 342	2	5	2	2	2	26
BUS 346	4	5	3	3	5	39
BUS 402	3	5	3	3	3	34
BUS 433	2	5	2	2	4	28
BUS 436	3	5	3	3	4	35
BUS 446	3	5	2	2	4	31

Analysis:

Courses were given a weighted total and the following scale descriptions apply:

Weighted Total of (35+): Extremely applicable for the S.E. minor (Green)

Weight Total of (30-34): Very applicable the S.E. minor (Yellow)

Weighted Total of (bellow 29): Moderately applicable the S.E minor. (White)

Communication skills are weighted as the most important skill-set to educate and develop based on input from industry contacts and students. Working on building a solid foundation in business knowledge and understanding sales methods come in as the next priorities; leadership skills making a noted impact in course selection as well. Due to the bias towards developing communication skills, courses found in the Communication Major at Cal Poly rate high; specifically, COMS 301 (Business and Professional Communication). This course not only focuses on the development of communication skills, but it does so by directly addressing common business conduct and requirements. A specific ability that was mentioned by Salesforce.com was the need to project positive and motivating oral communication when dealing with clients. A Sales Engineer can be seen as a “project manager of a clients accounts”

(Evan Forrest, Rockwell Automation) and as such, the need to take on leadership responsibilities such as motivating action is a necessity.

Larry Phillips of Northrop Grumman gave insight into the importance of a S.E. developing his/her own communication style and then honing and adapting methods/skills on an individual basis. To use the Wilson Social Styles as an example, it is obvious that the communication strengths of an analytic driver would be very much different than those of an expressive driver. In order to identify ones person strengths, an environment that fosters exploration in the social science of Communication is necessary.

The Sales Engineering Club has had close ties with Trane Inc. a respected leader in the HVAC industry. Tyler Clemmer came as a guest speaker in the Spring of '09 and mentioned the strong desire for entry level Sales Engineers to have taken at least one Finance course. This sparked interested in those present and the Sales Engineering Club's leadership team did research on the Finance courses Cal Poly had to offer. An immediate problem arose, as the prerequisites for the desired courses required in depth statistics and accounting skillets that were not taught in the Engineering curriculum. This has led to the conclusion that in order to accommodate industry's desire for Sales Engineers to have an academic background in Finance a new "Finance for non-business major" course will be necessary.

The courses that came out with the highest ratings from the priority chart were those that focused on both Sales and Communication were IME 401, IT 407, IT 406, IT 381 and COMS 322. The unfortunate issue with IT 406 and IT 407 is that prerequisites could eliminate them as a viable option for the Sales Engineering Minor. It is possible for a deal to be made between the future S.E. minor admin and the IT admin to allow S.E. students to participate in the courses. If a deal is not reached however, a new Sales Engineering seminar course would aid dramatically in increasing the quality of the minor; replacing IT 406 and also serving as an advanced course that could follow after IME 401. This discussion will be continued in the "results" section of the report.

Below is a table that reflects the course options for free electives that scored the highest on the priority chart. All curriculum suggestions have elements of required and elective courses and as such it is important to have a list for student to pick from, allowing them to customize their minor experience focusing on areas such as: communication, business, leadership, or sales. These are suggested electives, however, most minors allow students to submit proposals to allow additional courses to count towards minor progression. The courses

in the priority table above should be seriously considered to count towards electives for the minor.

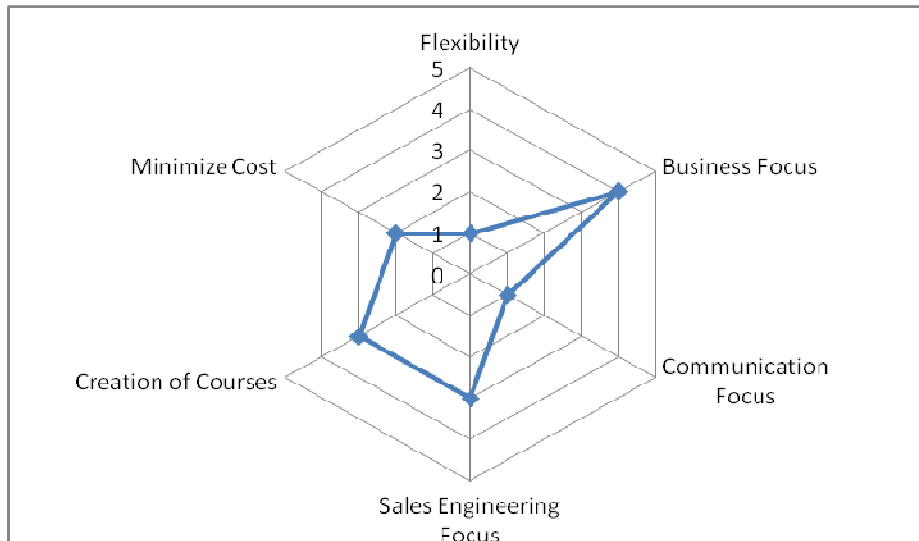
Table 5: Elective Class Options for S.E. Minor Course Selection

SKILLS	Communication	Business	Leadership	Sales	Prerequisite Compatibility	Weighted Total
Course Number	<u>3</u>	<u>2</u>	<u>2</u>	<u>2</u>	<u>1</u>	
IT 381	3	4	4	4	5	38
IT 406	5	3	3	5	2	39
IT 407	4	3	4	5	2	38
COMS 301	5	4	2	2	5	36
COMS 315	5	3	3	3	5	38
COMS 322	5	2	4	4	5	40
BUS 346	4	5	3	3	5	39
BUS 436	3	5	3	3	4	35
IME 303	3	2	5	2	3	30
IME 404	2	5	3	3	5	33
IME 417	3	4	4	2	3	32
IME 421	3	4	4	2	3	32
COMS 201	5	2	3	2	5	34
COMS 311	5	2	2	2	5	32
COMS 413	5	3	2	2	3	32
COMS 416	5	2	2	2	5	32
COMS 421	5	2	2	2	5	32
BUS 402	3	5	3	3	3	34
BUS 446	3	5	2	2	4	31

The next step, after choosing relevant courses, is to analyze the various curriculum options available. Minors across Cal Poly have a significant range in how they are organized. Some only allow a very small course list to count towards the minor, while others give a large course pool to choose from. Minors always have some required courses that are considered the cornerstones of the educational experience for the students as well as a pool of electives that allow a personalized experience. Below are various curriculum scenarios, each with strength and focus that may attract different stakeholders vested in this minor.

CURRICULUM OPTIONS

Figure 9: Radar Diagram for Curriculum A



Option A: Minor Breakdown

REQUIRED UNITS: 28-29units

Required Sales Engineering Courses/Seminars (6units)

Intro: IME 401 – 2 units

Advanced: Created Seminar (Description to be created) – 4 units

Required Communication Courses (4units)

Pick 1 COM course from those listed above – 4 units

Required Business Courses (12units)

Topics to cover: Accounting, Finance and Marketing

Business 212 – 4 units

Created Finance course for S.E. Minor – 4 units

Business 346 – 4units

Required Elective Courses (6-7units)

Combination of IME, BUS, COMS courses

Examples: Project Management, Design, Leadership, Public Speaking

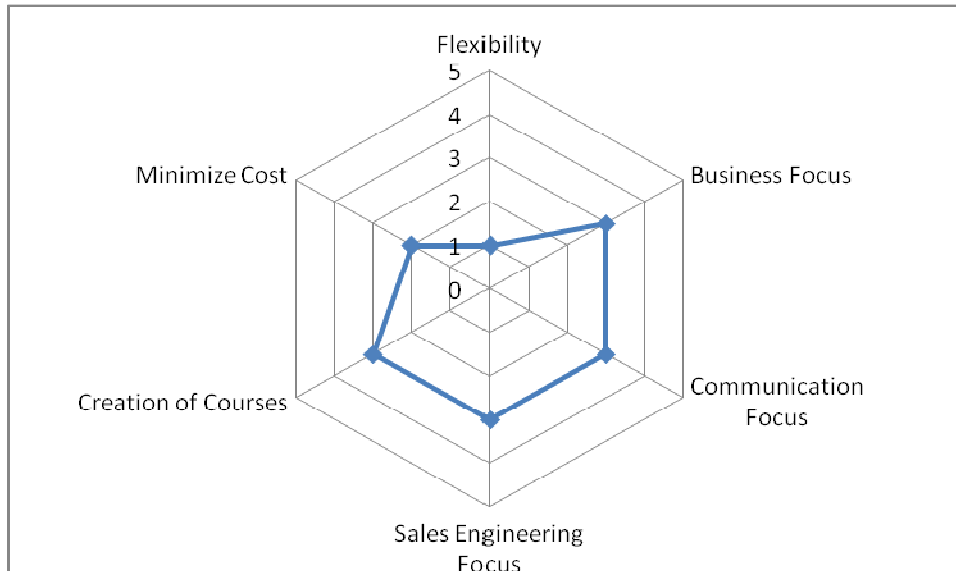
Strengths:

- 1) Rigidity in courses required
- 2) Heavy focus on developing business skills
- 3) Custom Sales Engineering and Finance course offerings

Weaknesses:

- 1) Lack of Communication courses required
- 2) Custom courses increase cost to Cal Poly

Figure 10: Radar Diagram for Curriculum B



Option B: Minor Breakdown

REQUIRED UNITS: 28-29units

Required Sales Engineering Courses/Seminars (6units)

Intro: IME 401 – 2 units

Advanced: Created Seminar (Description to be created) – 4 units

Required Communication Courses (8units)

COMS 301 – 4units

Pick 1 COM course from those listed above – 4 units

Required Business Courses (8units)

Topics to cover: Accounting, Finance and Marketing

Business 212 – 4 units

Created Finance course for S.E. Minor – 4 units

Required Elective Courses (6-7units)

Combination of IME, BUS, COMS courses

Examples: Project Management, Design, Leadership, Public Speaking, Business

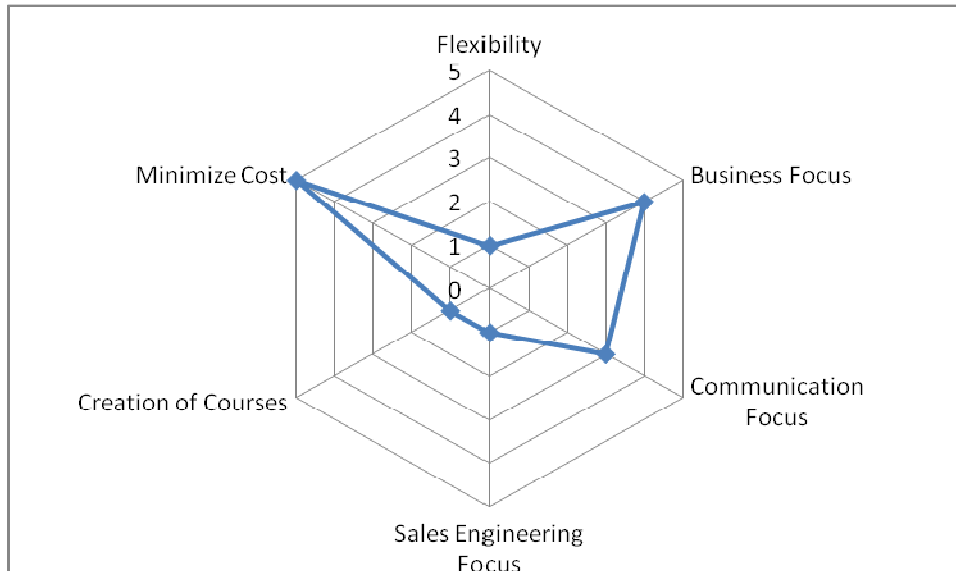
Strengths:

- 1) Rigidity in courses required
- 2) Equal focus on developing communication and business skills
- 3) Custom Sales Engineering and Finance course offerings

Weaknesses:

- 1) Custom courses increasing cost to Cal Poly

Figure 11: Radar Diagram for Curriculum C



Option C: Minor Breakdown

REQUIRED UNITS: 28-29units

Required Sales Engineering Courses/Seminars (2units)

Intro: IME 401 – 2 units

Required Communication Courses (8units)

COMS 301 – 4units

Pick 1 COM course from those listed above – 4 units

Required Business Courses (12units)

Topics to cover: Accounting, Finance and Marketing

Business 212 – 4 units

Business 346 – 4units

Created Finance course for S.E. Minor – 4 units

Required Elective Courses (6-7units)

Combination of IME, BUS, COMS courses

Examples: Project Management, Design, Leadership, Public Speaking, Business

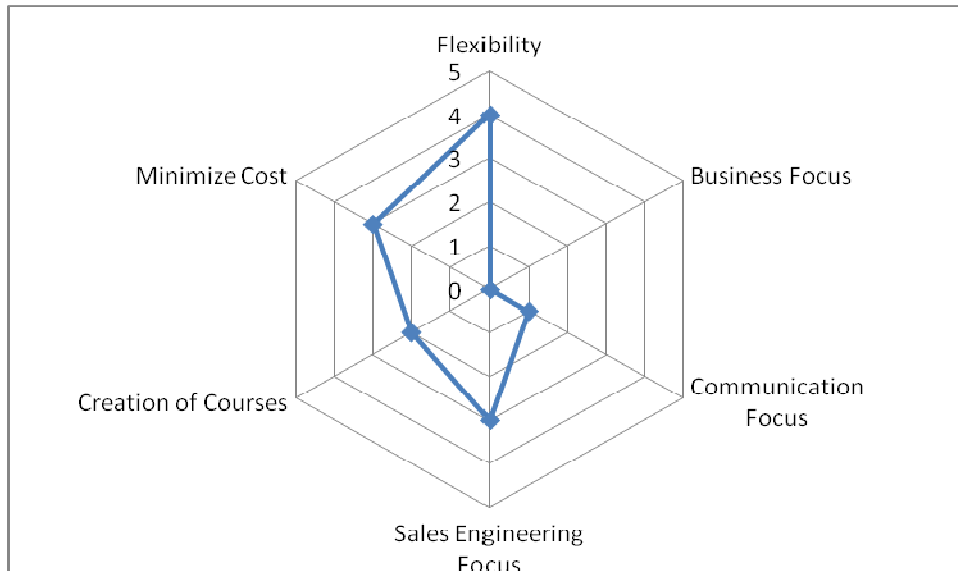
Strengths:

- 1) Rigidity in courses required
- 2) Heavy focus on developing business skills
- 3) Custom Finance course offered
- 4) COMS 301 Required

Weaknesses:

- 1) Only Sales Engineering course offered is IME 401
- 2) Custom course increase cost to Cal Poly

Figure 12: Radar Diagram for Curriculum D



Option D: Minor Breakdown

REQUIRED UNITS: 28-29units

Required Sales Engineering Courses/Seminars (6units)

Intro: IME 401 – 2 units

Advanced: Created Seminar (Description to be created) – 4 units

Required Communication Courses (4units)

Pick 1 COM course from those listed above – 4 units

Required Elective Courses (18-19units)

Combination of IME, BUS, COMS courses

Examples: Project Management, Design, Leadership, Public Speaking

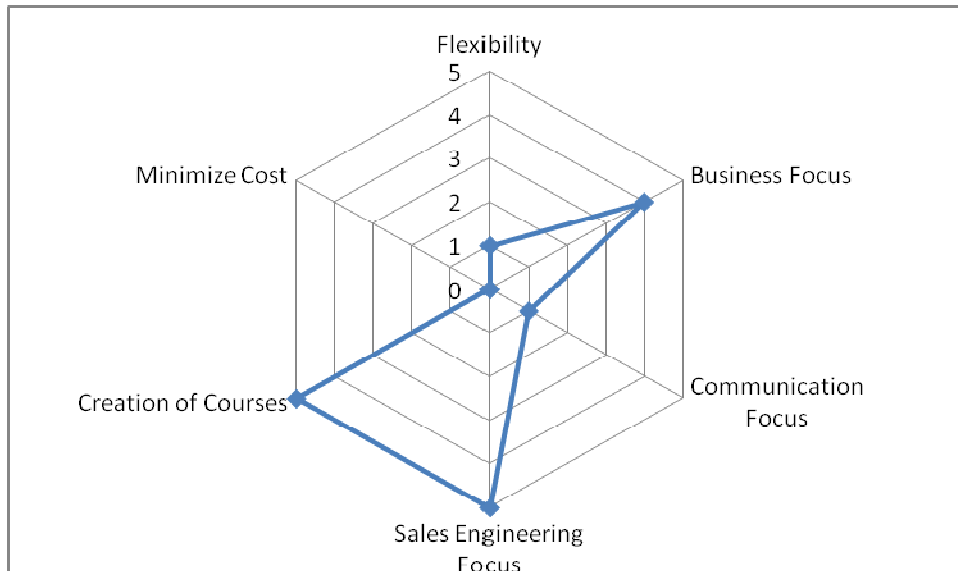
Strengths:

- 1) Flexible course requirements
- 2) Custom Sales Engineering course offerings

Weaknesses:

- 1) Lack of Communication courses required
- 2) Lack of Business courses required
- 3) Custom courses increase cost to Cal Poly

Figure 13: Radar Diagram for Curriculum E



Option E: Minor Breakdown

REQUIRED UNITS: 28-29units

Required Sales Engineering Courses/Seminars (6units)

Intro: IME 401 – 2 units

Advanced: Created Seminar (Description to be created) – 4 units

Required Communication Courses (4units)

Pick 1 COM course from those listed above – 4 units

Required Business Courses (12units)

Topics to cover: Accounting, Finance and Marketing

Created Accounting Course for S.E. – 4 units

Created Finance course for S.E. – 4 units

Business 346 – 4units

Required Elective Courses (6-7units)

Combination of IME, BUS, COMS courses

Examples: Project Management, Design, Leadership, Public Speaking

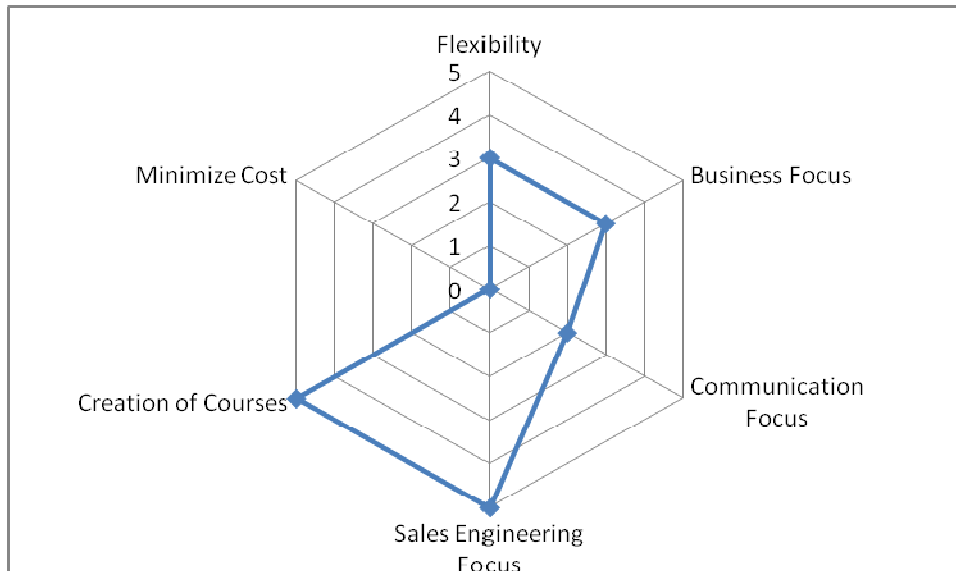
Strengths:

- 4) Rigidity in courses required
- 5) Heavy focus on developing Sales Engineering skills
- 6) Custom Sales Engineering, Finance, and Accounting course offerings

Weaknesses:

- 3) Lack of Communication courses required
- 4) Custom courses increase cost to Cal Poly

Figure 14: Radar Diagram for Curriculum F



Option F: Minor Breakdown

REQUIRED UNITS: 28-29units

Required Sales Engineering Courses/Seminars (6units)

Intro: IME 401 – 2 units

Advanced: Created Seminar (Description to be created) – 4 units

Required Communication Courses (4units)

Pick 1 COM course from those listed above – 4 units

Required Business Courses (12units)

Topics to cover: Accounting, Finance and Marketing

Created Accounting Course for S.E. – 4 units

Created Finance course for S.E. – 4 units

Required Elective Courses (10-11units)

Combination of IME, BUS, COMS courses

Examples: Project Management, Design, Leadership, Public Speaking

Strengths:

- 7) Mild Flexibility in courses required
- 8) Heavy focus on developing Sales Engineering skills
- 9) Custom Sales Engineering, Finance, and Accounting course offerings

Weaknesses:

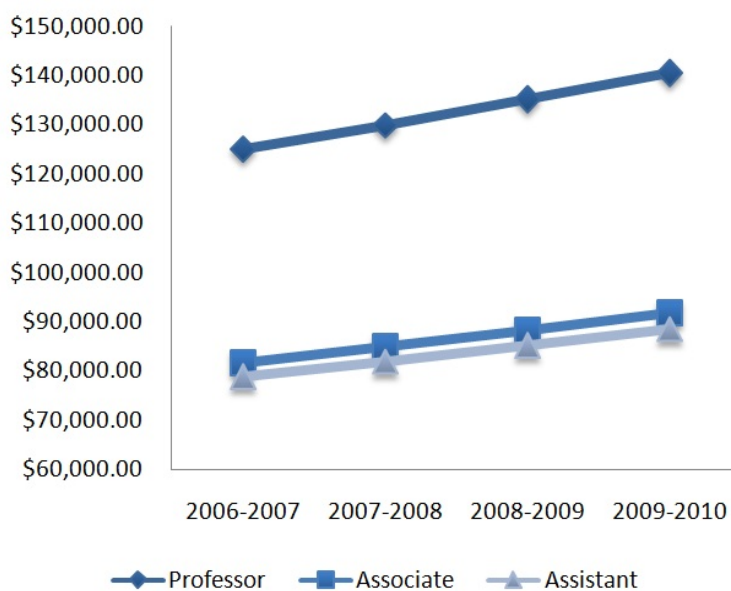
- 5) Lack of Communication courses required
- 6) Custom courses increase cost to Cal Poly

COST ANALYSIS

Cost estimates are based off of previous implementations of minors at Cal Poly. The actual cost of materials for created courses will require further investigation as those courses are created. It is estimated that the workload added by the minor will be equivalent to adding a single professor. This is due to change depending on student reenrollment in the minor. The estimate is also based on the addition of two courses; the sales engineering seminar and the finance course for the minor. Depending on the level of experience the professor has, the costs for adding him or her will increase. There are also scenarios where the additional workload is minimized, using courses that are already being taught. This would require class size to increase however. It is recommended that roughly \$200,000 in annual commitment be raised from industry before the initial pitch to the IME department. This will cover costs for professor salary and provide an adequate buffer to compensate additional admin responsibilities and materials for classes.

This graph below is based on information gathered on professor salaries in the CSU system.¹⁰ Even if a new professor is not hired, compensation will be required for existing professors that take on responsibilities with the minor. The estimated cost increase from labor would be roughly \$90,000 a year, as a professor with a doctorate is not required to teach sales engineering related courses.

Figure 15: CSU Professor Salary Increases



¹⁰California Post-Secondary Education Commission, 2007.

DISCUSSION/RESULTS

Were the results as expected? Why or why not?

The course options at Cal Poly allowed for far more legitimate minor curriculums to be developed than previous thought. The restrictions from prerequisites for many of the courses that would add value to the minor and its educational goals did not cause as much conflict as anticipated, leading to alternative scenarios that provide emphasis on various areas of study. As far curriculum content, the results that were selected as priority educational foundations did not vary much from the information gained from research. Although the area of Sales Engineering is relatively new, there exist common trends and view points throughout industry and the university system on what is needed to develop skills sets necessary for success. Those area have been echoed throughout this report; those being business, communication, sales, and leadership.

Is the design a good one?

The designs of the various curriculums focus directly on building up the skill sets generated from the information phase. It will be a task for the three stakeholders to determine exactly what curriculum to decide upon. For this to successfully be done, an academic advisory board will need to be created for the minor, bring all the stakeholders together at bi-annual meetings to launch and continuously improve the minor. The options are laid out, and critical discussion on what areas to emphasis is the next step. Communication skills rank the highest in priority, however, should that correlate with requiring multiple communications courses, or should that require all courses to have an element of communication education? Questions such as these will be addressed by the board. The designs fall within the typical format for a Cal Poly minor, requiring 28-29 units and also combining required and elective courses. The course selection is filled with a spread of 200-400 level courses, focusing heavily in the 300 and 400 level range.

Were your cost, quality, or productivity estimates on track?

Cal Poly's reputation as one of the best engineering schools in the nation is reflected in the minor curriculum. It would be possible to compromise in areas such as business by using courses that focus on agricultural finance, but instead the emphasis is on taking business courses directly from the business department or raising the funds to create a class directly for the S.E. minor. This trend is seen throughout the minor suggestions. Another example is creation of the S.E. seminar, instead of integrating IT sales courses. The ability to convince Cal Poly admin to such aggressive tactics will be to fully fund, through industry support, all costs

associated with the minor. The Sales Engineering Club is currently at work on this aspect of the project implementation.

How should the design or theory be changed based on results?

The design of the curriculums placed a weighted bias towards seeking approval from industry. This was due largely to increasing the feasibility of seeing the minor implemented in the near future, which will require industry sponsorship. Ultimately, as Cal Poly gains insight into what methods prove successful with university students, the curriculum can be altered to best educate and prepare future sales engineers.

Were any unusual conditions present?

This area of education, providing communication, business and sales skills to engineers is new and therefore, there are not many established, successful examples to pull from. The existing minors at other universities made considerable compromises in the quality of courses chosen in order to improve integration hurdles; a practice that is not recommended for Cal Poly's Sales Engineering minor. Cutting edge is a phrase to describe the creation and integration of a minor such as this; requiring creative thinking to come up with even feasible solutions, let alone an optimal one. These conditions created a situation where much of the design process was focused on careful considerations of existing academic infrastructures, department relations and cost analysis.

Were any results difficult to interpret?

One of the limiting factors to the design was prerequisites. These are particularly hard to analyze as often times departments are able to barter deals for their students to waive certain prerequisites. An issue that arose was some courses that were easier to implement scored higher than courses that had more relevance to the goals of minor. This then became an argument between implementing courses that were feasible vs. courses that would increase the quality of the minor. Courses such as IT 407, a sales oriented Industrial Technology course, would make an excellent elective or even an alternative for creating the S.E. seminar however, it comes with significant prerequisite conditions. When the academic advisory board moves to choose a curriculum, they will have to take into account the ability to waive prerequisites before making a final decision.

Are there some questions that remain unanswered?

As this senior project focused on research, a project management document and an implementation plan, there are many questions left unanswered as S.E.C. moves this project into its sponsorship and implementation phase. An initial goal of \$200,000 a year would aid in securing IME buy in for the minor, however, how else companies can contribute to the minor will be necessary to determine. If the IME department falls through as the host of the minor, it is suggested that the General Engineering Department be considered as there has been minor interest in the idea of Sales Engineering from the admin in that department.

Based on the results, what do you predict for the future?

There is a willingness from industry to financially support efforts to instill engineers with communication and business skills, as proved by the sponsorship the Sales Engineering Club has raised to this date. Securing the required financial commitment is by far the limiting factor in this implementation process. Once the costs can be covered, the Cal Poly administration should be more willing to take a stake in the project.

Interest in the minor has also increased within the student body at Cal Poly, specifically those within S.E.C. This will be necessary to continue the momentum. It should be noted that another senior project that will focus on the sponsorship and implementation phase of this project is already in the works. Phil Coleman, S.E.C's vice president is currently drafting up a proposal.

When this minor is a fully functioning avenue for students to seek a profession in the sales engineering profession, there should be an increase in companies that seek sales engineers out of Cal Poly. Currently, Cal Poly has privileged status from such companies as Rockwell Automation, Trane, and Johnson Controls in hiring graduates. The goal would be to increase awareness in industry that Cal Poly is producing the most prepared perspective sales engineers in the nation.

CONCLUSION

Problem Statement: Currently there is no academic avenue for perspective engineers to enter the field of Sales Engineering. Development and implementation of a minor will require buy in and input from three major stakeholders: university administration, university students and industry sponsors.

Objectives: Formulate the goals, curriculum and implementation plan for a sales engineering minor.

Solution Approach:

- 1) Conduct research on the topic of sales engineering and the creation of minors through books, articles, previous senior projects, industry interviews and student surveys.
- 2) Translate and organize that information to create the scope of work for the creation of a sales engineering minor.
- 3) Systematically review Cal Poly's curriculum and identify courses for integration with the sales engineering minor.
- 4) Develop curriculum breakdown to further the minor's goals.
- 5) Work with Sales Engineer Club to start implementation phase, securing student interest and industry sponsors.
- 6) Deliver initial sales pitch to IME department at Cal Poly to host minor

Suggested Curriculum to use for Minor: **Option A: Minor Breakdown** (Refer to Method Section)

Highlights of Curriculum:

- 1) Creation of sales engineering seminar 300 level - (4units)
 - a. Suggested that the Iowa State's sales engineering seminar be used as a reference. Course outline is attached in appendices.
- 2) Required foundation in business education: accounting, finance, and marketing
- 3) Creation of finance course for non business majors, 300 level - (4units)

It is the conclusion of this report that Cal Poly has the necessary course infrastructure to host a sales engineering minor that meets the expectations of industry and students. It is suggested

that two courses be added however, an advanced sales engineering seminar and a finance course to increase the quality of education the minor will offer students. The Sales Engineering Club will be instrumental in the implementation of the minor, bring together and mobilizing all stakeholders necessary as outlined by the implementation flow chart.

All expectations and objectives originally outlined in the introduction were completed for this senior project.

Education value of this project: This project has been valuable in refining and learning project management and leadership skills. Application of standard procedures for project planning such as creating the statement of work, risk management analysis and communication plan has increased awareness of what is required out in industry. The creation and building of the Sales Engineering Club has been an enormously rewarding experience, improving skills such as motivation and holding people accountable. Learning lessons in smart delegation and fluid communication has progressively increased the ability of the club to host large events with guest speakers from industry. The information stage of the project gave experience talking to industry veterans, learning how to ask intelligent questions and get the most out of interviews. The knowledge that was gain during this process will aid in a future career in Sales Engineering or Project Management.

What to do differently for next time: The importance of the information stage cannot be overlooked. It sets the tone for the project, giving shape to goals and objectives. The unfortunate situation in this project timeline was it involved a long break in the middle of the summer of '09. This broke up the information stage and the design process of the project which segmented the flow of progress. This situation was undesirable and executing the project without break would be suggested for next time. The other point of frustration with the project was to gather information and suggestions from the current Cal Poly administration. Red flag and brick wall were put up everywhere there were attempts to seek information on implementing minors within the school. It appears there is a severe lack of knowledge in this area among deans and associate deans; with no thought to a standardize process. Attempts were made to contact over six Cal Poly administrators with no solid results. In the end, information provided by personal contacts within the faculty and professors were vital in filling in gaps. If done again, it would be beneficial to use a professor's leverage and schedule a meeting with them and an administrator to insure a quality face to face meeting; one that yields relevant information.

BIBLIOGRAPHY

- Gitomer, J. (2005). *Little Red Book of Selling*. Texas: Bard Press Austin.
- Lencioni, P. (2002). *The Five Dysfunctions of a Team*. San Francisco: Jossey-Bass.
- Moore, G. (1991). *Crossing the Chasm*. New York: HarperBusiness.
- Novara, G. (1997). Facility Management Minor. Cal Poly Senior Project
- Environmental Studies Working Group. (2003). *Proposal For an Interdisciplinary Environmental Studies Minor at Truman State University*.
- United States Department of Labor. (2007). *Occupational Outlook Handbook, 2008-09 Edition*, Retrieved April, 2009, from <http://www.bls.gov/oco/ocos123.htm>
- Douglas, L. (2000). *Marketing Features Vs. Benefits*. *The Entrepreneur*, Retrieved June, 2009, from <http://www.entrepreneur.com/magazine/homeofficemagcom/2000/december/34942.html>
- McNamara, D. (2008). *The Power of Consultative Selling*. *The Sideroad*, Retrieved June, 2009, from http://www.sideroad.com/Sales_Techniques/consultative-selling.html
- Johnson, S. (2009). *The Role of Sales Engineer in Technical Sales*. *Pragmatic Marketing*, Retrieved June, 2009, from <http://www.pragmaticmarketing.com/publications/magazine/2/5/0410sj>
- University of Florida. (2004). *Sales Engineering Minor. 2004-2005 Undergraduate Catalog*, Retrieved April, 2009, from <http://www.registrar.ufl.edu/catalogarchive/0405catalog/colleges/engineering/programs.html>
- Iowa State University. (2009). *Sales Engineering Course Options*. Retrieved September, 2009, from <http://www.imse.iastate.edu/academics/sales-engineering-courses.html>
- California Polytechnic University. (Updated: 2009). *University Strategic Plan*. Retrieved June, 2009, from <http://www.president.calpoly.edu/plans.asp?pid=1>
- IME Department, California Polytechnic University. (2009). *Mission and Objectives*. Retrieved June, 2009, from <http://ime.calpoly.edu/mission/>
- California Polytechnic University. (Updated: 2009). *Nationally Known*. Retrieved June, 2009, from <http://www.calpoly.edu/simplythebest/simplythebest.html>
- California Postsecondary Education Commission. (2007). *Faculty Salaries at California's Public Universities, 2007-08*. Retrieved October, 2009, from <http://www.cpec.ca.gov/completereports/2007reports/07-15.pdf>

Appendix

Appendix A - Course Outline for Iowa State's Sales Engineering Seminar - Fall

Appendix B - Course Outline for Iowa State's Sales Engineering Seminar – Spring

Appendix C - Copy of Industry Survey

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Appendix A- Course Outline for Iowa State's Sales Engineering Seminar

IE 450X Technical Sales for Engineers (Elective) -**Fall 2009**

Course Description

IE 450X. Technical Sales for Engineers (3) CR. F. Prereq: IE 305

The course presents a formal technical sales process and provides significant opportunities for students to practice the various verbal and written components of that process. Specific attention is given to the Sandler and Dale Carnegie sales approaches with a sole emphasis on commercial selling of technical products. Industry partners will also present to, and judge the performance of, students during the course. Students will learn how to apply fundamental marketing and finance skills for the purpose of defining market segments for technical products and in establishing an economic justification of value.

Course Outline

Each section contains a reading assignment, and most sections include both a verbal class presentation and a written outline of the topics discussed in that presentation.

NOTE: the chapter format for the hardcover book is 16/14 which means that 16 is the chapter in the 2nd Edition and 14 is the chapter in the first edition.

- Week 1 - Introduction to Sales
- Week 2 – The Sales Process
 - Dale Carnegie Sales Process Framework as applied to Technical Sales
 - Sandler Sales Process Framework within Technical Sales
 - Mastering Tech Sales (1-Why Sales, 2-Sales Process)
 - Close the Deal (-Prepare for Success, 2-Master TIPPS)

- Week 3 – Marketing Basics, Lead Generation and Prequalification within industrial accounts.
 - Mastering Tech Sales (3-Lead Qualification)
 - Close the Deal (3-Know your Market, 4-Finding Buyers)

- Week 4 – Relationship Building, Requirements Gathering and Successful Engagement in large enterprises
 - Mastering Tech Sales (6-Successful Customer Engagement, 8-Dash to Demo)
 - Close the Deal (6-Bond and Build Rapport)
 - Dale Carnegie Gold Book (in Slides section of webct)

- Week 5 – Identifying Decision Makers and Decision Making Processes within large corporations
 - Mastering Tech Sales (16/14-Executive Connection)

- Close the Deal (5-Analyzing Buyers)
- Week 6 – Identifying Business Pain and Addressing Objections Up Front
 - Mastering Tech Sales (5-Needs Analysis, 11/9-Evaluation Strategies, 15/13-Objection Handling)
 - Close the Deal (7-Determine the Pain, 10-Selling in new Millennium)
- Week 7 – Sales Closing Techniques (soft sell) and Post Sale Activities for committee-based multi-tier decision making groups.
 - Mastering Tech Sales (7-Perfect Pitches, 13/11-Sanity after the Sale)
 - Close the Deal (8-Get the Sale, 11-Weak Closing)
- Week 8 – Midterm Review and Presentations
- Week 9 – RFQ and RFP Process for Technical Projects (high tech, custom installations)
 - Qualifying RFP's and Evaluating Electronic RFP's
 - Preparing winning RFP responses
 - RFP Strategy
 - Mastering Tech Sales (4-RFP Process)
- Week 10 – Market Identification and Segmentation of High Technology
 - Creating a matrix of product attributes and client requirements
 - Mastering Tech Sales (19/17-Competitive Tactics)
- Week 11 – Financial Justification of larger technical projects
 - Defining economic value and return
 - Creating project cash flows and computing ROI
 - Weighted factor analysis techniques for technical evaluation
 - Developing cash flow analysis and payback comparisons on a unit based method
 - Risk based analysis of pricing strategies
 - Performance based pricing of projects
 - Factoring inflation into long-term projects
- Week 12 – Pricing and Negotiation Strategy
 - Tying it all together into an effective sales presentation
 - Tactics for negotiating with clients
 - Mastering Tech Sales (12/10-Negotiation and Pricing)
- Week 13 – Time Mgmt + Sales Automation Tools (salesforce.com, ACT, CRM)
 - Using sales automation to create accurate sales forecasts

- Using sales automation to manage accounts based on priorities
- Mastering Tech Sales (26/23- Time Management)

- Week 14 – Branding and Pay for Sales Engineers
 - Branding yourself
 - Pay plans
 - Organizational structure
 - Mastering Tech Sales (14/12-Getting Started, 17/15- U in Technical Sales, 19- Organizational Structure, 20 Compensation) Note that compensation is only in the old book. I will make a photocopy of this for users of the new book.

Course tours and Speakers

Throughout the course, we will have a series of engineering sales managers and sales people who will share their experiences and engage the students in oral essays and case study oriented quizzes.

Course Project

At the beginning of the course, each student will select a technical product for which they will be preparing a sales approach for during the entire course. The sales approach will be targeted to a commercial client for that product (as opposed to an end user). The final project will involve a detailed sales presentation script and powerpoint presentation, which will include a technical attribute analysis and competitive review oriented towards their target market. In addition, a complete financial analysis complete with inflation adjusted cash flows will be generated and presented. Finally, students will be required to present this sales approach to the class for which they will be graded by the instructor, their peers and likely a few industry observers. As such, the grading of this project will include the verbal delivery, visual powerpoint presentation, and sales script report.

20% presentation - does the RFP look professional. Is it well structured with section headings and consistent fonts. Does it include graphics (pictures, charts, tables, etc).

20% financial justification - is the justification oriented to the client's payback. Is it convincing, and does it reference other sources for the background data. Are the costs (up front and downstream, well identified).

20% - Core product strengths properly positioned in light of customer RFP requirements. In particular, have these been quantified (as applicable) and compared appropriately to alternatives (Competitive and otherwise)

15% - Likely Objections addressed clearly.

25% class presentation and powerpoint - Was the RFP response presentation delivered professionally. Was the delivery convincing (i.e. set up the problem, address likely objections, appropriately position

against competition, highlight corporate/product strengths, relate to specific customer issues/deliverables in the RFP).

Prerequisite

IE 305 Engineering Economics (or equivalent Finance Course)

Textbook

Mastering Technical Sales-second edition, by John Care and Aron Bohlig, Artech House Publishers, 2008.
ISBN: 978-1-59693-339-2

Close the Deal, by Sam Deep and Lyle Sussman, Basic Books Publishers, 1999, ISBN 978-0-7382-0038-5

Course Objectives

Upon successfully completing this course, students will:

1. Be able to implement the a relation based technical sales process
2. Learn how to utilize the software tools necessary to support the sales process.
3. Learn how to prospect new accounts and leverage existing relationships
4. Learn how to make sound technical value justifications for customer solutions.
5. Have stronger presentation skills (written/verbal) to focus on addressing hidden objections, answering the RFP and closing the sale.

Topics Covered

1. Relation based Technical Sales process,
2. Sales automation software
3. Prospecting and account development
4. Fundamental Market analysis and Segmentation
5. Responding to RFQ/RFP's in written and verbal form.
6. Developing technical value propositions and competitive positioning
7. Evaluating organizational decision processes and people,
8. Technical marketing strategies
9. Sales closing (management) strategies (low, to no pressure)

Appendix B- Course Outline for Iowa State's Sales Engineering Seminar - **Spring 2009**

IE 451X Technical Sales for Engineers II (Elective)

Course Description

IE 451X. Technical Sales for Engineers II (3) CR. F. Prereq: IE 450X

Case studies and experiential lessons on the development and application of technical sales strategies. Specific topics will include developing pricing and distribution strategies, managing a sales staff and channel, developing sales teams and global sales plans, bid and negotiation strategies, time management skills, and implementing sales automation technologies.

Course Outline

Each section contains a reading assignment, and most sections include both a verbal class presentation and a written outline of the topics discussed in that presentation. During this semester you will be reviewing your company's sales process and making recommendations for improvement on a topic-by-topic basis. Your final project presentation will involve a component of the sales process for which you were directly responsible for designing/implementing.

- Week 1 – Course Overview and Definition of Sales Projects
 - Work with me over this week to help determine your client.
 - Identify for them what is required.
 - You need to study their current sales/marketing process with respect to the following topics.
 - You need to be responsible for a particular area of their sales process that they want your help to improve

- Week 2 – Sales Team Management
 - Mastering Tech Sales (19-Org Structures, 20-Compensation, 22-Hiring Winners)
 - Review of your company's corporate sales structure.

- Week 3 – Distribution and Licensing (focus on domestic)
 - Mastering Tech Sales (16-Selling with Partners, 21-Building the Infrastructure)
 - Review of each company's current distribution network. Detailed analysis by volume, source, year-to-year variability.

- Week 4 – Trip to Kansas City (Feb 6th)

- Week 5 – Time Management for Sales Staff (review of your company’s resources)
 - Mastering Tech Sales (23-Time Management for SE’s)
 - Auditing sales management software, phone records, emails (inbound/outbound) and correlating this to sales success.

- Week 6 – Sales Automation Software
 - Detailed Review of ACT and Salesforce.com

- Week 7 – Sales Automation Software.
 - Detailed review and audit of your company’s sales automation software systems (including data flow diagrams, roles and responsibilities).
 - Definition of your upcoming proposed changes to their system

- Week 8 – Midterm Exam

- Week 9 – RFQ and RFP Process for Technical Projects (high tech, custom installations)
 - Qualifying RFP’s and Automating Electronic RFP responses
 - RFP Strategy
 - Present a review of your company’s RFP development and response process.

- Week 10 – Market Identification and Segmentation of High Technology
 - Create a matrix of product attributes and client requirements for your company’s main products
 - Discuss new market opportunities for both a mature and an emerging product.

- Week 11 – Financial Justification of larger technical projects
 - Define economic value and return for your company and present their ROI technique
 - Perform a comparison of competitive products in your company’s market (search for competitive ROI info)

- Week 12 – Pricing and Negotiation Strategy
 - Small workshop on negotiation strategy
 - Present the Pricing Strategy for mature and emerging products at your company
 - Discuss tactics for negotiating with clients

- Week 13 – Distribution and Licensing (international Sales)
 - Present your company’s international sales model and how it evolved.

- Recommend changes to this system, evaluate under/over performing regions relative to market opportunity.

- Week 14 – Final Project Presentations

Course tours and Speakers

Throughout the course, we will have a series of engineering sales managers and sales people who will share their experiences and engage the students in oral essays and case studies.

Course Project

At the beginning of the course, each student will select a technical product for which they will be designing a detailed sales program for during the entire course. You will be working with the actual company and assisting them with multiple facets of their sales program. The final project will involve a detailed sales presentation of the sales program. Finally, students will be required to present this sales approach to the class for which they will be graded by the instructor, their peers and the client that they are working for. As such, the grading of this project will include the verbal delivery, visual powerpoint presentation, and sales design report.

20% presentation - does the report look professional. Is it well structured with section headings and consistent fonts. Does it include graphics (pictures, charts, tables, etc).

20% financial justification - is the justification oriented to the clients payback. Is it convincing, and does it reference other sources for the background data. Are the costs (up front and downstream, well identified).

20% - Core product strengths properly positioned in light of customer requirements. In particular, have these been quantified (as applicable) and compared appropriately to alternatives (Competitive and otherwise)

15% - Is key objective of project met. Are results usable and will they deliver value.

25% class presentation and powerpoint - Was the presentation delivered professionally. Was the delivery convincing (i.e. set up the problem, address likely objections, appropriately position against competition, highlight corporate/product strengths, relate to specific client issues/deliverables).

Prerequisite

IE 450x Technical Sales for Engineers

Textbook

Mastering Technical Sales 2nd Edition, by John Care and Aron Bohlig, Artech House Publishers, 2008. (First edition is okay as well). ISBN: 978-1-58053-345-4 for first edition.

Course Objectives

Upon successfully completing this course, students will:

1. Students will have the ability to develop effective national and global sales campaigns
2. Will design strategies of distribution methods, pricing, and market segmentation.
3. Students will gain knowledge in managing a sales staff and sales channel.
4. Will gain skills involving bid strategy, persuasion, negotiation, time management
5. Students will implement a trial (or actual) sales automation system (or system component)

Topics Covered

1. Approximately 1/2 of the course will be devoted to experiential lessons on the development and application of technical sales strategies by working on industry provided cases.
2. The remainder of the class is dedicated to the following topics:
 - a. Advanced market segmentation and client value analysis
 - b. Product/service pricing strategies
 - c. Managing sales people, teams and channels
 - d. Distribution strategies, and global sales channel development
 - e. Bid strategies/persuasion/negotiation
 - f. Time management skills
 - g. Implementing sales automation technology

Appendix C- Copy of Industry Survey

Hello _____,

California Polytechnic University, San Luis Obispo (Cal Poly) is considering implementing a Sales Engineering minor on campus in the near future.

To aid in crafting a minor that covers topics that are both competitive and relevant, feedback from the local and nationwide companies that currently use Sales Engineers is being requested.

Your company has been selected because of the strong ties that it has with Cal Poly and your input/advice would be very much welcomed. Below is a list of questions that can be answered in any amount of detail that you feel is necessary; however, the more information gathered would hopefully generate a minor that focuses on producing students that are “industry ready.”

1. What are the most noticeable personality characteristic(s) you find in your most productive Sales Engineers?
2. What skill-set(s) would you expect a productive Sales Engineer to have upon being hired?
3. What academic experiences/courses would you deem most valuable for preparing a future Sales Engineer for industry.

Our research is focusing on these three questions and extracting/interpreting any response that is offered. That being said; any other information or suggestions that your company would graciously provide would be very much appreciated.

If this is a project that your company would like to be more involved in, Cal Poly has a very proactive Sales Engineering Club that hosts guest speakers throughout the year. This club is at the forefront in generating excitement and funds for the Sales Engineering minor. The club can also be used as a tool to reach Cal Poly Engineers that are already on a track towards Sales Engineering. If you are interested in more information, please contact them at info@calpolysec.com.

Thank you for your time.

Appendix D- Industry Survey Responses

Response from salesengineering.com

Major issue for many Sales engineers is time management.

The number one request we get for improving the pre-sales role is helping SEs manage their time better. We hear innumerable complaints involving the constant chaos and time crunch SEs find themselves in.

It's no wonder. For many professional fields, you go to school for formal training. Not so for a Sales Engineer. SEs figure out how to be an SE through on the job trial and error. We then become Senior SEs who are creatures of bad habits without realizing it. With lack of formal training, the SE role is fraught with inefficiency and ineffectiveness.* And so, time becomes our #1 enemy.

Here are some helpful hints for SEs to better manage time:

- **Envision the Goal, and Have a Plan:** These are tightly intertwined. "In the absence of clearly defined goals, we become strangely loyal to performing daily acts of trivia." "If you don't know where you're going, it's a lot harder to get there." In fact, in our program, we teach an engineering technique for defining a least-cost path to achieve a technical decision, and key to that technique is first envisioning the end goal, and then planning from there. Always ask yourself, "How can I win faster?"
- **Just Say No:** As an SE, you get demands for time from sales reps, customers, your manager, tech support, engineering, product management, family — all over the place. You cannot possibly keep everybody happy all the time. Prioritize activities based on revenue potential, customer satisfaction, funnel cleanliness, reclamation of time, etc. When a new demand for your time arises, prioritize it accordingly, and if you have to say "No", explain your case that you have other higher priorities. Always ask yourself, "Is this a good use of my time?"
- **Know What You Must Know:** Some inefficiency is the result of not having all the information necessary to make an informed decision. To save time, filter which deals to work on. What information do you need to prioritize the deals that *deserve* your time? As a team, develop a qualification checklist that everybody will use for every deal. The consistency and completeness will go a long way in improving effectiveness and team alignment on prioritizing time and deals. Always ask yourself, "Do I know what I must know?"

Response from Northrop Grumman Electronic Systems

1. What are the most noticeable personality characteristic(s) you find in productive Sales Engineers around you or yourself?

This is interesting. As an advocate, practitioner, and trainer of the Wilson Social Styles concepts, I am going to answer this question using the Wilson Social Style Index.

I am very aware of the communications styles of those around me, and there is a wide variety of styles found in successful Sales Engineers, but two seem to predominate: Expressive Analytics and Analytic Expressives. These two subsets of the Social Style construct are very close to the center of matrix, and although it would at first appear that they would be diametrically opposed, they are actually very compatible, due to their proximity to the intersection of the ask/tell and task/people dimensions measured by the index. This blend of analytic’s focus on “the right solution” and expressive’s open communication style works very well in the channel selling or counselor selling environment most Sales Engineers function in (as opposed to the tradition concept of a “Salesman,” which is a transactional selling situation). Since these two basic styles have rather different focuses, we can create a strength/weakness chart of the styles as shown below:

STRENGTHS	WEAKNESSES
Creation of solid solutions that rely on facts and logic	Potential to be overly critical and “picky” about elements included in the potential solution
Use of multiple competencies and capabilities within the company to solve problems, which makes solutions both practical and persuasive	Strong potential to overemphasize data and information gathering to the point of being indecisive
Professional enjoyment found in discovering new ways to solve persistent problems	Often are judgmental and moralistic in their communications and discussions
Competent at working out all the details of the problem and solution, and then leading the team to the “right solution”	Pressures of time and/or incomplete data are occasionally frustrating, resulting in personal dissatisfaction with implemented solution
Ability to create excitement and team/customer	Can be seen as overly excitable when

involvement in discussions	conflicting opinions are presented
Persuasively explain their visions and ideas Can inspire and motivate others	Might be so unrealistic as to be considered impractical to implement
Will create effective teams	Personal feelings might impact personnel chosen to work on the project

In general, when engineers with these social style characteristics are provided with basic business training (including basics of business development, capture leadership, customer interaction training, and proposal development) as a foundation for their professional skills, the potential impact of the inherent weaknesses of the styles is greatly mitigated, and the strengths usually come to the forefront.

2. What skill-set(s) would you expect a productive Sales Engineer to have upon being hired?

I would prefer someone who displays the communication style of either of the two subsets discussed above as an initial filtering point. Beyond that, the commitment to doing what is needed (within the competency set and capabilities of the company they are representing) to effectively respond to the customer’s needs and wants is essential. The skill sets needed to do this are NOT the technical skill of an engineer. In fact, some of the most successful business developers in the aerospace industry are not now and never have been engineers...The real skills needed are well honed COMMUNICATION SKILLS not technical or engineering skills. The three key communications skills I need to see are listed below.

The ability to listen and comprehend is first and foremost on this list. A person who gets stuck in “send mode” during a discussion and is trying to “convince” a customer of the value his/her company brings to the problem being discussed by force of words is NOT what is needed...Someone who listens carefully and actively, shows interest and understanding of the customer’s dilemma and pain, and does NOT attempt to create a “spot solution” based on their engineering skills is the real starting point for effective communication and interaction with a customer.

Next, the ability to adapt to the customer’s communication style (a skill identified as “versatility” in the Wilson System) and make them comfortable with you as a potential confidant and problem solver is essential. If you can make the potential customer comfortable with you, you have automatically

predisposed the customer to “like” you. This also predisposes the customer to view you as potentially trustworthy. This last element is absolutely essential, if you are going to be able to get the customer to tell you what his/her problem REALLY is, as opposed to what they tell all the other business developers that visit them.

Finally, the ability to NOT be upset or defensive when a customer with a lot of problems flies off the handle, and begins to vent. This happens all the time in my business. Frustrated program managers need and/or want specific actions taken or achieved or delivered, and will explode when they are not able to have their expectations met. Dealing with angry customers is actually a skill that can be cultivated and effectively applied when needed.

So, if I was to create a checklist of the attitudes/skills I would want to see in a prospective new hire as a Sales Engineer or Business Developer, it would include:

- Friendly and open communication style
- Positive attitude
- Listening skills
- Clear communication skills
- Versatility to adapt to customer needs and accept change as a way of life
- Skill at establishing and maintaining personal relationships
- Ability to accept RISK when necessary
- Team building
- Desire to provide benefit to the customer(s)

That last one is often hard, because it is easy to confuse company policies with customer service. Honesty when dealing with customers is what is necessary. Don't make promises you can't meet, or recommendations you can't support.

3. What academic experiences would you deem most valuable for preparing a future Sales Engineer for industry?

In my opinion, the academic key is to blend basic business, communications and marketing classes into the engineering curriculum.

The focus on “pure” engineering skills and problem solving does not necessarily expose someone to the way that business is actually conducted, but emphasizes how to “create things” in response to needs and wants (pain points) identified by customers. This concept of “solution creation” is incredibly important, but understanding how the introduction and application of new technologies, processes or innovations must be done within the constraints of an established business model in order to be successful in the market is essential. There are many “cool solutions” that simply were never accepted because the smart engineer who built or discovered them simply expected features of the new product/process/technology to speak for themselves in the established market. Academic understanding of how business models are applied in a market place is normally something that an engineering student is either not interested in or does not have the space in his/her class schedule to insert.

The same applies to academic understanding of communications and marketing techniques. It is only a 50% solution if you know how to be a “creative, problem solving engineer.” The other 50% is understanding how to communicate to the existing market that you have skills and competencies that are of interest and can be used to assist in solving existing problems.

Anyway, that’s the academic side of the question. On the “life experience” side, I would recommend that interested students get internships, but not in engineering roles. Internships at Marketing companies, or with the Business Development element of an engineering-based company are what would be needed.

Now a few additional comments:

I am continually surprised by the number of highly skilled engineers that either do not understand how to or have no interest in “external communication” with potential markets and customers. Customers always buy benefit, not features. But if we are unable to effectively and consistently communicate that benefit statement to the targeted market and customer segment, the benefit will not be accepted.

A classic example of an engineering solution that was not effectively marketed is the Stirling engine. Invented in 1816, it operates on the thermodynamic principle of hot gas expanding and cold gases contracting. It requires very small amounts of external energy to operate. In fact, moderate sunlight is

often enough to make the engine work. The Stirling is an example of an external combustion engine since all the engine's heat flows in and out through the engine wall. But the benefits of the Stirling engine were not effectively communicated and marketed, and even though it could be considered a "better mouse trap," the market paradigm of steam and internal combustion engines was not disrupted. It has only recently re-emerged as potential source of energy in response to concerns over price for fuel for internal combustion engines, and social concerns about climate change caused by exhaust from those internal combustion engines. But the benefits of the Stirling have not changed. It is still the same low maintenance, high output design it was when invented 193 years ago.

Another, more recent example would be the Segway. This is a revolutionary transportation concept that has simply not yet lived up to its potential. They are normally only seen being used by shopping mall security guards or (in DC, anyway) as the basis for novelty tours for sightseers.

So, if I were recommending a curriculum specifically for specialization in Sales Engineering, the focus on technology, math and science inherent in a "standard" engineering curriculum needs to be expanded to include marketing, customer interaction, customer relationship management, and basic business classes.

In closing, let me add that I really enjoyed speaking with your group, both during the formal presentation, and later informally over dinner. I would welcome the chance to work with you again, if there is anything I can do for you.

Finally, if there is any way that I can assist in the creation of Sales Engineering as academic pursuit (as a minor, a potential major, or just a set of electives in the engineering curriculum) at Cal Poly, let me know. I think this is a very important aspect of the engineering community that is consistently undervalued and/or misunderstood.

Thank you for asking me to respond to your questions. This was fun!

Larry Phillips

Dr. L. M. Phillips

Northrop Grumman Electronic Systems

Manager, Capture Strategy

Capture Leadership Center

410-765-6890 (O)

410-294-1725 (C)

Response from Trane

1. What are the most noticeable personality characteristic(s) you find in your most productive Sales Engineers?

The most noticeable characteristics are solid communication and leadership skills combined with a competitive and entrepreneurial drive to succeed. The most productive and successful sales engineers are creative, self-motivated and able to effectively build long-lasting relationships with both internal & external customers.

2. What skill-set(s) would you expect a productive Sales Engineer to have upon being hired?

Important skill-sets include a strong technical aptitude with a problem-solving mindset and significant business savvy. An ability to think outside the box to design unique engineering solutions based on customer needs is essential. We hire engineers from any engineering discipline. A business minor is beneficial but not required. An understanding of finance is important. Communication and leadership skills are also a must-have as well as development of interpersonal skills such as conflict management and leadership.

3. What academic experiences/courses would you deem most valuable for preparing a future Sales Engineer for industry.

Sales engineering / sales process training, engineering economics, business, finance and communications courses are valuable. Courses focused around the financial and business acumen needed by sales engineers may be better suited than standard courses. In addition to coursework, extra-curricular activity, especially in leadership positions, is valued as well as internship and/or co-op experience.

Appendix E- Copy of Student Survey

California Polytechnic University, San Luis Obispo (Cal Poly) is considering implementing a Sales Engineering minor on campus in the near future.

To aid in crafting a minor that covers topics that are both competitive and relevant, feedback from interested Cal Poly students is being requested.

Below is a list of questions that can be answered in any amount of detail that you feel is necessary.

4. Are you interested in becoming a Sales Engineer? (circle) YES NO

5. What roll do you believe Sales Engineers fill as a professional in a company?
 - a)
 - b)

6. What skill-set(s) would you expect a productive Sales Engineer to have?
 - a)
 - b)
 - c)
 - d)

7. What academic experiences would you deem most valuable for preparing a future Sales Engineer for industry. (i.e. Leadership, group projects, interdisciplinary interactions, etc)
 - a)
 - b)
 - c)

Appendix F- Catalog Description of existing Cal Poly courses relevant for consideration

IME 301 Operations Research I (4)

Systems modeling methodology, mathematical model formulations, linear programming, graphical and simplex methods. Duality and sensitivity analysis. Transportation, transshipment and assignment models. Introduction to goal programming and elastic constraints. Computer applications. 3 lectures, 1 activity. Prerequisite: MATH 244.

IME 303 Project Organization and Management (4)

Design and implementation of a major industrial/business systems project. Project planning considerations. Motivational and influence techniques used in project management. Scheduling techniques with risk assessment. Resource leveling and management under constraints. Reducing project duration. Monitoring progress with earned value analysis. Project audit and closure. Planning and implementation of a project. Application of project management software. 3 lectures, 1 laboratory. Prerequisite: Junior standing, IME 314 or equivalent.

IME 312 Data Management and System Design (4)

Design and management of industrial databases and reporting systems. Relationships of financial accounting databases and production systems. Efficient data entry and reports, queries, macro function, and Internet based database applications. 3 lectures, 1 laboratory. Prerequisite: CSC 232.ME

IME 314 Engineering Economics (3)

Economic analysis of engineering decisions. Determining rates of return on investments. Effects of inflation, depreciation and income taxes. Sensitivity, uncertainty, and risk analysis. Application of basic principles and tools of analysis using case studies. 3 lectures. Prerequisite: MATH 241.

IME 319 Human Factors Engineering (3)

Analysis of factors influencing the efficiency of human work. Data on the physical and mental capacities of persons, the physical environment, work organization, and the problem of aging. Design of machines, operations, human computer interface and work environment to match human capacities and limitations, including the handicapped. Multidisciplinary team project. 3 lectures. Prerequisite: PSY 201 or PSY 202 or consent of instructor, and junior standing.

IME 320 Human Factors and Technology (4)

Analysis of cognitive, sensory and physical limitations and capabilities of operators and users of technology, both hardware and software, in working and living environments. Analysis of pertinent databases for a proactive approach to designing user-centered industrial products

/systems, consumer products, and work environment. 4 lectures. Prerequisite: Junior standing and completion of GE Area B requirements. Fulfills GE Area F.

IME 322 Leadership and Project Management (2)

Theory and practice in leadership and project management skills for engineering design teams. Basic issues related to, and tools used for, managing projects and concepts comprising project management. Emphasis on situations requiring resolutions and management decisions by groups representing various elements of an enterprise. 2 lectures. Prerequisite: Junior standing in an engineering program, and one course in engineering design, or consent of instructor.

IME 342 Manufacturing Systems Integration (4)

Analysis and design tools for production planning, control, and simulation of manufacturing systems. Use of systems modeling software. Overview of ergo-nomics and facilities design. 3 lectures, 1 laboratory. Prerequisite: MATH 241 and IME 223 or consent of instructor. Recommended: STAT 321.

IME 401 Sales Engineering (2)

Concepts and principles of engineering in sales. Role of the professional engineer in the analysis, design, development, production, and final application of a product or system required by the buyer. 2 seminars. Prerequisite: Senior standing in engineering, or consent of instructor.

IME 404 Engineering Economic Decision Management (3)

Quantitative approaches to engineering and management problems. Time value concepts, breakeven and replacement analysis, optimization techniques for scheduling. Project cost estimation, resource management and risk analysis. Use of computer software packages. For non-majors only. 3 lectures. Prerequisite: Junior standing.

IME 409 Economic Decision Systems (3)

Economic evaluation of information for complex decisions. Analysis of risks and uncertainties. Bayes theory and models. Decision theory, sequential decisions, and value of information applied to financial evaluation and control. Major project justification procedures. 3 lectures. Prerequisite: IME 239, IME 314, and IME 405, or consent of instructor.

IME 417 Supply Chain and Logistics Management (4)

Overview of key logistics and supply chain management concepts. Models and solution methods for the design, control, operation, and management of supply chains. Techniques that are used to analyze supply chains. Team projects in partnership with industry sponsors. 4 lectures. Prerequisite: IME 342, or IME 410 or consent of instructor.

IME 421 Manufacturing Organizations (3)

Theory and principles for manufacturing organizations. Competitive advantage. Strategic planning and operations management for organizations and teams in a rapidly changing environment. Engineering management concepts and practices. Team-based projects and cases. 3 seminars. Prerequisite: IME 314, PSY 201/PSY 202, or consent of instructor.

IME 437 Advanced Human Factors Engineering (3)

Team-based approach to human factors assessment of consumer and industrial products, systems, and information technology. Team building principles and techniques in human factors analysis. Usability analysis and ergonomics auditing through experimental methods. 2 lectures, 1 laboratory. Prerequisite: IME 319, IME 326 or equivalent.

IT 326 Product Evaluation (4)

Value engineering, product dissection and the study of reverse product engineering as they relate to product design for manufacturing; improved product quality; reduced usage of energy and materials; material recycling and reuse; product design and development, proving value to the customer and society. 3 lectures, 1 laboratory. Prerequisite: Completion of GE Area B3 via a college course in physics (PHYS), or PSC 101.

IT 371 Decision Making in Supply Chain, Services, and Project Management (4)

Introduction to supply chain, services, and project management decision making using information technology tools. Application of flowchart, project management network and spreadsheet software to process improvement, project planning, forecasting, and inventory management planning and control in manufacturing and service industries. Understanding current practices for decision making in manufacturing and service operations and project management. 4 lectures. Prerequisite: A grade of C- or better in: MATH 141 or MATH 221, and STAT 211 or STAT 252.

IT 381 Industrial Management (4)

Organization and functioning of management in industry. Planning, direction, and control of the business enterprise in terms of policy formation, organizational structure, finance, sales, procurement, plant location, facilities and production processes. 4 lectures. Prerequisite: Junior standing.

IT 403 Quality Systems Management (4)

Quality assurance as viewed from a systems perspective that includes cost, time, and process elements. Lean thinking applied as a problem solving approach to achieve continuous process improvement through the elimination of waste and the reduction of variability. 4 lectures. Prerequisite: IT 341 or IT 371 and STAT 217, or STAT 218, or STAT 251; Business majors must have formally declared their concentration to enroll.

IT 406 Industrial Sales (4)

Development of the technical competencies required in industrial selling and purchasing through the application of value stream mapping techniques and the philosophies and tool sets encompassing the discipline of process management as it relates to sales, marketing and

customer service in Industrial settings. Includes guests speakers and team-based projects with local business organizations, individual and team product presentations, with written proposals. 3 lectures, 1 activity. Prerequisite: BUS 346 and IT 341.

IT 407 Applied Industrial Product Design, Fabrication, and Sales (4)

An integrative experience replicating a manufacturer's business/production systems, including the design, fabrication, processing, quality-control, resource management, cost-control, marketing, sales and packaging functions. Focus of instruction methodology on the development of the student's comfort with ambiguity and change inherent in business/ production systems. Builds upon the foundational concepts developed throughout the Industrial Technology curriculum. 2 lectures, 2 laboratories. Prerequisite: BUS 346 and IT 326.

COMS 201 Advanced Public Speaking (4)

Further consideration of the principles of public address. Advanced practice in manuscript, extemporaneous, and impromptu speaking. 4 lectures. Prerequisite: COMS 101 or COMS 102.

COMS 301 Business and Professional Communication (4)

Communication skills and functions for all levels of organizational employees. Interviewing, oral briefings, motivational and conference speaking. 4 lectures. Prerequisite: COMS 101 or COMS 102.

COMS 311 Communication Theory (4)

Survey of human communication theories including interpersonal, small group, organizational, persuasion, nonverbal, intercultural, and media. Philosophical foundations for understanding communication from a social science perspective. 4 lectures. Prerequisite: Completion of GE Area A.

COMS 315 Intergroup Communication (4)

Survey of theory and research concerning language and communication between various social groups (e.g., age, sex, race, sexual orientation), with an emphasis on understanding the role verbal, nonverbal, and mass communication plays in identity formation and differentiating group members. 4 lectures. Prerequisite: Completion of GE Area A.

COMS 322 Persuasion (4)

Theory of persuasion with particular emphasis upon social psychological principles of influence. Analysis of various forms of persuasion, social influence and propaganda. 4 lectures. Prerequisite: Completion of GE Area A.

COMS 413 Advanced Organizational Communication (4)

Describing and measuring the organization's human message system. Planning and implementing communication training and development for the organization. New functions, careers and opportunities for the communication professional. 4 lectures. Prerequisites: Junior standing, COMS 301.

COMS 416 Intercultural Communication (4) USCP

Examination and clarification of cultural aspects of communication within and among ethnic groups. 4 lectures. Prerequisite: Completion of GE Area A. Fulfills USCP.

COMS 421 Gender and Communication (4)

Examination of gender in a variety of communication contexts. Concepts presented will help students understand the theory and practice of communication with members of the same and opposite sex. 4 lectures. Prerequisite: Completion of GE Area A and junior standing.

BUS 212 Financial Accounting for Nonbusiness Majors (4)

Introduction to financial accounting theory and practice with an emphasis on financial statement preparation and analysis. Not open to Business majors. 4 lectures.

BUS 214 Financial Accounting (4)

Principles of financial accounting for Business majors. The course prepares students to understand and interpret financial statement information. Financial reporting standards are explored to give students an understanding of how financial events are reflected in financial statements. 4 lectures.

BUS 342 Fundamentals of Corporate Finance (4)

Theory and applications of financing business operations. Financial management of current and fixed assets from internal and external sources. Analysis, planning, control, and problem solving. Some discussion of corporate social responsibility in the context of corporate objective functions. The use of technology in the form of financial calculators and/or spreadsheets. 4 lectures. Prerequisite: A grade of C- or better in all of the following: ECON 222, MATH 221, STAT 252, BUS 215.

BUS 346 Principles of Marketing (4)

Introduction of the marketing process: identifying target markets; developing and launching products or services; and managing pricing, promotion, and distribution strategies. Focus on leveraging technologies that result in innovation and impact marketing practice. Recognition that markets are global. Ethics and social responsibility in marketing decision-making. 4 lectures. Prerequisite: A grade of C- or better in the following: for Business Administration and Economics majors, ECON 222 and BUS 207; for Industrial Technology majors, ECON 201; for Recreation Administration majors, either RPTA 210 or RPTA 260; and for all other majors, either ECON 201 or ECON 222.

BUS 402 International Business Management (4)

Managerial concepts and techniques for analysis and decision making within international businesses. Environmental and organizational factors influencing multinational operations. Assessing international market opportunities and entry modes. Complexities of multinational management strategy, structure and systems, especially during initial stages of internationalization. Case studies and simulations. 4 lectures. Prerequisite: BUS 342, BUS 346, BUS 387 or consent of instructor.

BUS 433 International Finance (4)

Financial management of international business. International capital and money markets, international financial institutions, special problems in evaluating direct foreign investment, and financial techniques used in international business operations. 4 lectures. Prerequisite: BUS 342.

BUS 436 Entrepreneurial Finance (4)

Process of financing new and fast-growing firms. Readings on the venture capital process, from seed capital through the initial public offering. Valuation of firms seeking venture capital, and those planning their initial public offering. Valuing convertible securities. Real options valuation. 4 seminars. Prerequisite: BUS 342.

BUS 446 International Marketing (4)

Basic skills and tools needed to evaluate the cultural factors that impact the acceptance of products and services in markets around the world. Building of an understanding of global marketing strategy. 4 lectures. Prerequisite: BUS 346.

Appendix G- Sales Engineering Club Executive Summary

Executive Summary:

- Background

The Sales Engineering Club at Cal Poly has been formed to consistently provide employers with engineers that can communicate effectively, thus optimizing their recruiting efforts and ultimately saving them money on the training of new hires.

The Cal Poly Sales Engineering Club is growing rapidly: Since Spring 2009, we have accumulated a member base of 60+. Our member base consists of students working on a wide variety of engineering degrees. Internally, we encourage building interpersonal skills and competition through hands-on projects and activities. We also conduct various public speaking and sales training sessions to strengthen interpersonal and transactional skills. To create opportunities for advertisement and employment, we strive to host a variety of events that are flexible enough to meet the various needs of companies involved.

Employment of sales engineers is projected to maintain growth and stability through 2016. The driving force behind this growth stems from the increasing variety and technical nature of products and services being sold. Advancing technology combined with competitive pressures will force companies to improve and update product designs more frequently and to optimize their manufacturing and sales processes, and thus require the abilities of a sales engineer.

Club Objectives:

- Origin of Club

The Cal Poly Sales Engineering Club was started by Clint Hebrew and Joshua Checkis in April 2009, with local faculty support from Karen Bangs (IME department) and Zahed Sheik (Corporate Relations), and initial financial support from Trane. The motivation for this club stems from the lack of personable engineering graduates entering the workforce as sales engineers. With this in mind, the SEC is dedicated to raising awareness and interest in the technical and business aspects of engineering. The goals and aspirations for this club are continually evolving, but can be essentially broken down into three categories:

- *Personal Development*

- We encourage our members to continually strive to develop as individuals, thus furthering their advancement in all aspects of life. We continually strive to educate our members to be some of the most socially adept engineers graduating college. They will develop and grow as individuals, learning public speaking, listening, motivation, communication, and other social skills necessary for a successful career in sales engineering. These personal developments help

guide individuals down their own path, building a solid foundation for a promising future.

- *Ethical Development*
 - The SEC promotes the Engineering Code of Ethics, and asserts the need to have open, honest, communication and integrity at all times, regardless of any possible personal or professional gains. Ethics have always been one of the fundamental aspects of engineering, and as such, is at the center of the SEC belief structure.
- *Professional Development*
 - The SEC strives to teach club members the importance of relationships in the business world and their necessity within the field of sales engineering.
- *Technical Development*
 - Through our meetings with industry professionals, forums, presentations, and hands-on learning experiences, the SEC seeks to impart our members with the knowledge and confidence necessary to succeed in the world of technical sales.
- Mission statement
 - The members of the Sales Engineering Club, in order to further the goals and principles of our members, shall strive to raise awareness and interest in technical sales as a career path. By partnering with industry representatives, we will work to provide students with opportunities to network within the technical sales industries, as well as advance their personal sales skills to gain real world sales engineering experience.
- Current projects
 - As of October, 2009 the SEC has accumulated roughly 60 active members with complete executive and chair boards. SEC-led teams have already won an International FSAE competition and implemented a campus-wide CapSIM competition.
 - In years past, the Cal Poly Formula SAE team has built some of the most technologically advanced cars, but has struggled presenting them at competitions. Last year, Team Lead Matt Ales contacted the Cal Poly SEC to help represent them at their annual competition in Fontana. The SEC represented FSAE at the three day competition among 84 teams from around the world, winning the Presentation Competition for the first time in club history.
 - This year, the SEC implemented the first Cal Poly CapSIM Foundation Business Competition. During this eight week competition open to all majors, student teams are given a theoretical \$40 million dollar company to run for 8 years, with each week of real time constituting a year in the simulation. Each week, teams meet to make decisions that ultimately decide the success of their company. Participants actively make decisions that force them to fully understand the entire business process, from R&D and production to marketing and finance.

- Objectives

Not unlike the mission statement, the main goal of the SEC is to provide people with opportunities. This club will act as a catalyst to bring aspiring sales engineers and successful companies together in a mutually beneficial relationship.

- *Short range objectives*
 - Establish, educate and motivate a core group of officers and members to ensure the future success of the club.
 - Establish, grow, and maintain corporate sponsorship.
- *Long range objectives*
 - Use the club to facilitate the development and implementation of a sales engineering minor, with future plans for a nationally recognized club and university major.
 - Partner with companies to promote sales engineering and technical sales as a viable career path.
 - Educate students in business, sales, communication skills and other career-oriented abilities.
- *Character and image of business*
 - The character of this club will reflect the desire of those individuals who are willing to put in the time and effort to succeed in life. This club will act as a tool to benefit both the members of the club and society as a whole, by providing better trained, more qualified, ethical sales engineers in greater numbers. Through careful implementation, this club will become the very model for other professional clubs.

Sponsorship Opportunities

- Why You Should Sponsor the SEC

First and foremost, your generous donations help supplement the cost of marketing materials used throughout the year for any events or info sessions that you conduct here on the Cal Poly Campus. Our officers put a lot of time and effort into creating professional fliers, announcements and publications designed specifically to reach your target audience, and ensure you obtain the results you are looking for at your events.

Your donations will also help subsidize the cost for continual, long-term advertising efforts, such as a strong web presence, club shirts, banners and booths. These efforts would not be possible without your help! To show our gratitude, your company logo may be represented on any sponsored SEC material.

We host various social events and workshops open to our members as a means to encourage interpersonal skills, networking, and a collaborative club environment. Your funds will go towards any associated participation fees, marketing, food, and possibly incentives for these academic, social and collaborative events. Our officers volunteer a

lot of their own time and money to ensure the success of this club. As such, we like to reward their motivation and productivity with small incentives like refreshments at meetings and a quarterly officer retreat to promote continued enthusiasm about the club and its sponsors.

o Benefits of Sponsorship

▪ *Advertising*

- Company Name on our website, on our t-shirts, consistent campus wide postings upon request.
 - The better the awareness among students that a company will be attending Cal Poly's campus, the more effective recruiting efforts will be.
 - We want to raise *brand awareness*. This is especially true if your company does not develop consumer products.
 - Every student should be aware of the companies that are looking to hire individuals with their skill sets and education and the specific jobs/opportunities available.

▪ *Advisory Board Membership*

- We will create an advisory board with representatives from each company that we partner with.
- This board will serve as the guiding force for the direction of the club.

▪ *Access to resume database and contact information*

- We will have a database of resumes from all of our members that partner companies can access.

▪ *Consistent contact with potential recruits*

- We are providing a platform so companies can influence students early on and set them on a path to ultimately be employed with them.
- We want students be informed about your business as soon as possible. This will aid in hiring for internships as well as careers.

▪ *Sales Engineering Minor on Campus*

- The ultimate goal, (which is more than likely a few years down the road) is to implement a standalone minor in Sales Engineering on the Cal Poly campus.
-

Event Coordination

▪ Company Presentations

- This is the standard event we hold for our club members, students, and interested companies, where your company rep comes and speaks about your company, sales engineering, etc. Also an opportunity to recruit our members.

▪ Company Tours

- We will coordinate students traveling to your place of business to tour your facilities. It is a great time to show students hands on what your company does, and again is a great time for recruiting.
 - Annual Banquet
 - We will coordinate a banquet style event once a year with our partner companies and members of our club. This is a great chance for students to network and get to know your company in depth.
- Financial Contribution Summary

We have a tier system in place for how we wish to manage company financial support. We have a range for how involved a company wants to be. If a company wishes to just put on an event and not partner for the long term, they can pay for just that event. Otherwise, they can choose a level of support they would like to give on a yearly basis. Here is the tier system as currently proposed:

Partnership(Per Year)	Single Event
\$2,000: 1-2 events guaranteed (depending on size)	30+attendees: \$300*
\$5,000: 2-3 events guaranteed (depending on size), Advisory Board	50+attendees: \$800*
\$10,000+: Unlimited (within reason), priority, concrete direction for the club, advisory board. For companies that wish to help fund an SE minor on campus.	100+attendees: \$1500*

* Metrics Used to Guarantee Attendance: Data collected from past events to determine appropriate marketing strategy

- Sales Engineering Minor and Financial Commitment Fund

A sales engineering minor is the primary long term goal of the club. We are looking to set up a commitment fund for companies to pledge funds that will go for the creation of this minor. Any funds pledged by a company will not be immediately accepted; only upon a feasible implementation of the minor will we accept the funds. This is an accurate way for the club and school to determine when enough funds will be available to put the minor in place. It also allows companies to hold onto the funds and invest them elsewhere until the time to contribute has come. This idea is in the works and has not been finalized. Once implemented, the proper documentation will be drafted to allow for both our club and interested companies to track committed contributions.