Welcome

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CAREER EPISODE 1

Introduction

CE 1.1

My first career episode is a demonstration of the project "Design and Construction of a Propeller Clock". During the project time, I was a student of Electronics and Communication Engineering. The project was initiated in …….. and completed in …….. The location of the project was …….. city/country.

Background

CE 1.2

Ct Institute Of Technology was established in 2008. The most prominent engineering disciplines that the university has to offer are Computer Science, Electrical and Electronics, Information Technology, Civil and Electronics and Communication. The students worthy to undergo the engineering programs are selected on the basis of merit and every year, the university generates skillful engineers to play to useful part in this technological era.

CE 1.3

In this project, the main objective was to display different images by controlling rows of LEDs; this could only be achieved using 89S52 microprocessor. For this purpose, a number of LEDswere attached in a row on rotating board,and the clock was placed on a rotating piece of board and providedwith power. It was decided to utilize power from a DC motor. The rotation of the LEDs was at very high speed,and this could be controlled using micro-controller to glow LED. This combination was used to develop a floating display. Further scope of this project wasto simulate an array of LEDs while themicroprocessor kept noting the time and changed the pattern on time. For thebinary clock, six digits were needed. LED showed one state when it was on and zero state when it was off.

CE 1.3

I performed following responsibilities during this project

- Prepared a timetable to complete all the tasks on time
- Studied documents, articles, and research papers related to this work
- Supervised my team members and all the activities related tothe project
- Arranged meetings and distributed the tasks
- Reported the encountered problem and prepared a proposal to resolve this problem
- Recorded the calculations and waveform
- Presented the final report and presentations.

CE 1.4

Hierarchy of the project is given below;

Personal Engineering Activity

CE 1.5

At the beginning of this project, I studied the old and latest designs of a propeller clock to understand the limitations of each design. I coordinated with my seniors to get guidance from them,and they shared their experiences regarding similar projects which boosted my learning a lot. After thorough research, I chose the main components of my circuit design. The components, I used in this project were PIC (16F73), Crystal (4 MHz), High speed DC motor (1000 RPM), ceramic capacitor (200 microfarad), ULN (2807), Bridge rectifier, voltage regulator, PCB, LED driver ULN2803,and 16 LEDs (Red color). I used two different rotating displays because a cylindrical display was only able to display text while thedisk-shaped rotating display was able to show theanalog clock.

CE 1.6

To design the circuit, I developed a block diagram to understand the proper working of propeller clock consisting of power (12V), Infrared control, PIC 16F73, ULN 2803, Bunch of LEDs, or DC motor with 1000 RPM. I noticed that the clock was on a spinning piece of

board, it should get power. I thought of many ways to achieve this power, including the use of two or more motors; the shaft of the 1st motor was fixed to a base,andthe 2nd motor rotated the body of the 1st motor whichresulted generating of electricity. Anotheroption was using slip-rings.I brainstormed with my team and decided to use anotherway; I used the DC motor's rotating armature and used it as a power supply. I left a hole by removing one motor's bearing to take out the wires from the motor. The smallest DC motor consisted ofthree terminals,and it behaved like the three-phase alternating current, so I rectified it to DC. A benefit of this technique was that the motor positioncould be determined by determining the phases straight of the microprocessor.

CE 1.7

I connected all the inputs of PIC 16F73 with the pins of ULN 2803.The outputs of the port B of the microcontroller were the inputs of ULN2803. I attached the LEDs with suitable resistances to protect them from voltage overflow. My design for a Propeller Clock utilized a mechanically scanned display usually consisting of a row of LEDs. In the scanned display, the LEDs were not illuminated constantly. I considered two main types of rotating displays disk and cylindrically shaped for this project. The hardware of propeller clock contained a bunch of sixteen led in a row which was externally connected to theoutput of ULN2803. ULN2803 acted as aLED driverwho drove the LED on 5v. I provided input to ULN IC from themicrocontroller. I connected eight pins of one port to theinput of ULN. Then, I connected all this circuit to the PCB and attached to the high-speed DC motor with 1000 RPM. After rotation, I noticed the LED pattern which approved my design.

CE 1.8

I designed a propeller clock for which I followed some steps to complete the project. Firstly, I disfigured the motor to separate all the components in it. I knocked the sleeve bearing out of the case and soldered the other terminal of the motorso that the size of the ball bearing extended. To achieve the right height, I repositioned the shaft of the motorand used ahollow

spacer to press it. I took a Berg connector consisting of three wires and soldered the three terminals on the motor's armature with it. I glued a short threaded spacer to the shaft at the end that stuck out the hole and reassembled the motor.

CE 1.9

In this step, I built the circuit. I used the vector board,andhand wired the circuit together. Before implementing the circuit, I programmed 16C84 using 18-pin socket. I implemented a DIP resistor array to test the brightness of LED. I connected LED with 120-ohm resistors and used acapacitor value 47000uF if we turned it off it was still in running position. To make it work accurately, I didn't connect the ceramic resonator for 4MHz crystal.After completing this task, I came to the next step in which programming the PIC 16F73 was completed successfully. Like the CPU, the PIC was also controlled by software programming. Depending on which kind of PIC we used, I determined the operating frequency which was almost about 20MHz and the capacity of memory was 1K to 4K words. I calculated the speed using frequency of the clock.For program memory capacity, I used 14bit WORD. I measured the program memory in BYTES and 1byte=8bits. The value of the bit was either 1 or 0, instruction word of PIC 16F84=14bits, 1k word=1 x 1024 x 14 = 14,336bits. I converted Kbytes by dividing it to 8 x1024 which were equal to 1.75K bytes and capacity of the memory 1G bytes = 1024M bytes, 1M bytes = 1024K bytes, 1K bytes = 1024 bytes. As all these calculations were in binary,so 1k bytes was not equal to 1000 bytes.In next step, I connected the circuit to the motor then provided power supply to the motor. I noticed that as soon as 5volts reached the circuit, the clock started its working and displayed 12:00. After accomplishing this task, I further went to the modification step. To make a better display, I adjusted the motor speed. I controlled the infrared by adding TSOP1738 sensors connected to the pin of themicrocontroller. I simulated the program using software tool to ensure it worked properly.

CE 1.10

I found some challenging problems in this project;firstly, I faced a problem while stabling the plate of PCB over themotor and it took a lot of our time. The second problem we faced

during the project was stabilizing the RPM of DC motor. To resolve this problem, I used avoltage regulator.So, I varied the speed of themotor according to our desire.

CE 1.11

I obeyed IEEE and ASTM standards for this project. I examined other related projects and followed 'The 8051 Microcontroller and Embedded Systems' as a reference book. I contacted my seniors and supervisors,and they shared their valuable experience with me. I listened to their important guidelines and implemented them in my project. I trusted their advice as they were senior to me in experience.

CE 1.12

I conducted meetingson a daily basis with my team members and made sure that every task performed was according to the planned working schedule. As I supervised my team members,so it was my duty to make sure no one suffered from any problem regarding literature review or hardware implementation. During the project, I showed my technical, management, and leadership skills. I guided my team member in every step. I helped my teammates in literature review and demonstration of theproject. To overcome the stress or burden to my team member, I divided the tasks so that everyoneperformedthe task in which they were expert.

CE 1.13

I developed a project report according to the university standards. I consulted with my supervisor and my seniors before making a report. I coordinated with my teammates in compiling the project thesis. While making a report, I showed my good English language skills,and I tried to use simple words of English language so that everyone could understand it. I prepared a final presentation using Microsoft PowerPoint Program. Before presenting it in front of my team members and chairman, I got it approved by my supervisor.

CE 1.14

I made sure that while working with the circuit, power should be off. Before connecting the power to the circuit, I checked the connections and assured that they worked properly. I tested all equipment using voltmeter before connecting it to the circuit. I warned my team members that if they smell anything burning, then they should immediately turn off the power and examine the circuit again. I made sure that my group members wore eye protection safety goggles while soldering. I warned my team members that they should test the components first before connecting it to the circuit. I made my workplace clean, dry, and safe and assured that my project didn't cause any harm to the environment. I advised my group members that when working, not to wear flapping or loose clothing. I instructed my team members to carefully deal with the capacitor because it held high voltage even whenthe circuit was disconnected from the power.

CE 1.15

I tried to makemy projectcost-effective, for this purpose, I performed a cost analysis before ordering the components. Before implementing it in hardware, I checked it using software simulation to make sure that the value of capacitor or resistor I used was suitable for my project.I also checked the working of DC motor with 1000 RPM through software simulation to ensure that the desired output was formed. When the required output was achieved, I ordered the componentsfrom themarket. I used voltage regulator in order to maintain the constant voltage.

Summary

CE 1.16

I completed my project efficiently by organizing all the activities. I applied problem-solving techniques which I learned in the starting phase of my university. This project was used as a stopwatch or by replacing LCD screens. In future, multicolor LEDs may be used to replace LCD screens.In this project, I had a lot of responsibility to fulfill because I was a team leader and I had to manage all the project activities. It was a platform for me to improve my engineering knowledge and skills. I saved the cost by performing a software simulation and

then implemented it on the hardware. This project raised my leadership and technical skills. I utilized all my skills this project.

CAREER EPISODE 2

Introduction

CE 2.1

My second career episode was related to the project "LTE Network Design." During this project, I was a student of Electronics Engineering at College of Science, Health and Engineering La Trobe University, Bundoora VIC 3083. The project was started in …… and fulfilled in …… and the project was based in …… city/country.

Background

CE 2.2

La Trobe University was established in 1967. From now it's marked 50 years of La Trobe University. Over 1,70,000 students were graduated from this university. The university produces more skillful engineers who cancreate their position in the market using their technical skills.

CE 2.2

This project aimed to design an LTE network for an appointed area and to achieve maximum network coverage, design a cellular system using celplanner software, adjacent and composite interferences, minimum co-channel, and using a minimum number of base stations. LTE is a wireless communication with high-speed characteristics, and it is also marked as 4th Generation LTE. 4G LTE is basedin HSUPA, WCDMA, HSPA, and HSDPA. LTE is an updated version of the UMTS technology which gives data rates having high speed. We considered some parameters during designing an LTE network which was thestrength of

the signal, Rate of the data, signal to noise ratio (SNR), modulation scheme, Bit Error Rate (BER), and crosstalk or disturbance. The area assigned to me for this project was North 32^{o}, 29', 21.0" N, South 32^{o}, 21', 00.9" N, East 093^{o}, 44', 50.0" W, and West 093^{o}, 57', 50.0" W.

CE 2.3

During this project, I performed the following responsibilities

- Carried out a literature review related to wireless communication to understand its working before starting the project
- Prepared a working scenario to complete the tasks on time
- Divided the design into two parts and distributed the tasksto group members
- Supervised the tasks assigned to team members
- Selection of the correct area to place antenna so that it will give more coverage at particular area
- Analyzed the simulations and determined the parameters for both sectored or non-sectored designed
- Coordinated with my group members and supervisor on weekly basis
- Assembled the final project report and gave the copy of the report to supervisor and the chairman of the department
- Prepared a presentation and explained the process to the assigned panel

CE 2.4

Here is the ranking of my position in this project.

Personal Engineering Activity

CE 2.5

Before stepping into the beginning of this project, I examined the related work which was already done in the past years. I contacted my seniors and my supervisor to guide me in this project. After discussion, I started the project. I divided the design into two parts Non-

Sectored and sectored section so that they could be executed efficiently by the team members. The parameters of the system that I considered were enabled the Topography and Morphology, Height of subscriber antenna (above ground), frequency table (GSMR29), and the height of Base station antenna was above morphology (AGL+MFL). For Non-Sectored design, the antenna specifications that I considered in this project were an Omnidirectional antenna (A01909), the width of the Azimuth and the elevation beam was 0.0° and 6.0°, Nominal gain was 9.0dBd, and the pattern of main lobe radiation. For sectored part of design, I used 3 different antennas for 3 sectors. For antenna type 7146-11, I considered the width of Azimuth and elevation beam was 120.0° and 65.0°, the gain of the nominal was 5.5dBd, and the lobe radiation pattern was larger as compared to the side lobes. For antenna type 7129-12, the width of the azimuth and elevation beam was same as 7146-11 type but, the nominal gain was increased to 7dBd. For antenna type 7145-11, the width of Azimuth and elevation beam was 105.0° and 65.0° while the nominal gain was 6dBd.

CE 2.6

During the project, I met with many challenging issues. One I faced during the analysis of topography and morphology, I realized that the designated area lied on unbalanced surfaces and dense vegetation, water bodies, and the area of dense urban. These flaws decreased the quality of the signal and resulted in data loss. I focused on placing the antenna in such a way that most of the area was covered. I didn't assign the antenna in a dense area or water because it blocked the signal. To resolve this issue, I used 20 Omnidirectional antennas in Non-Sectored so that maximum of the areawas covered. I determined the average power which was almost 48.85W, the height of the antenna was 10m, and the coverage was 82%. For the sectored area, I assigned 20 BTS in a different locationin that area. Each and every BTS had 3 sectors, and I placed separate antennas in every sectored. The average power and height of the antenna were 78.3W and 29.95m, and the coverage was almost 97%.

CE 2.7

I observed the composite signal (downstream) for non-sectored using cel-planner software. I determined the strength of the signal for all BTS's which was >= -80.0dBm and the signal of the antenna was good. For composite signal (upstream), the strength of the signal was,

For 80% MS was >= -80 dBm

For 16% MS was >= -85 dBm

For 3% MS was >= -90 dBm

For 1% MS was >= -95 dBm

I also determined the signal to noise ratio (downstream) for Non-Sectored which was 1% for 50dB S/N, 8% for 40dB S/N, 42% for 30dB S/N, 29% for 25dB S/N, 16% for 20dB S/N, 3% for 15dB S/N, 1% for 10dB S/N, and 51% for greater than 30dB S/N. The Signal to noise ratio for upstream was calculated 1% for 40dB S/N, 11% for 30dB S/N, 19% for 25dB S/N, 29% for 20dB S/N, 27% for 15dB S/N, 11% for 10dB S/N, and 59% for greater than 20dB S/N.

CE 2.8

I also observed that the 82% of the assigned area had more than 10Mbps data rate. From BTS to MS the transmission of the data was targeted to achieve the data rate of downstream which was greater than 10Mbps. Similarly, for upstream, I noticed that 42% of the data rate was more than 10Mbps. For schemed selection (downstream), I saw that 64-QAM covered 82% of the assigned area and QPSK covered area only 12%. In case of upstream, 93% area was covered by 64-QAM. I also observed the Interference C/I results for both downstream and upstream. I noticed that nearer to BER (10^{-5} or 10^{-6}) the BTS data rate was improved. I also observed the result for the sectored level of the composite signal, Signal to noise ratio, downstream or upstream data rate, selection of scheme for 16-QAM or QPSK, Interference of C/I, and data rate/user for reduced BER (10^{-5} or 10^{-6}).

CE 2.9

I successfully covered the aim of the project. I achieved the maximum area of the coverage using a minimum number of antennas. I assigned the antennas in a designated area such that they covered the maximum area. I tried to use less power while using the parameters in design. I attained the desired interference C/I at 0% for 12dB or 5dB. I concluded that as the BER was reduced, the area of the coverage was also reduced while the data rate nearer to BTS was increased.

CE 2.10

In my final design, the parameter specifications that I preferred for Non-Sectored design which were bandwidth of radio signal=10 MHz, 1/3QPSK, 1/3 16-QAM, 1/3 64-QAM modulation scheme, the BER required for this project was 10^{-4}, assumed resolution and radius was 1" or 4Km and for the specification of sectored area, I considered 1/3 QPSK, 3/7 16-QAM, 5/6 64-QAM modulation scheme with same bandwidth.

CE 2.11

This project was mostly based on software simulations so protection of data was my first preference. In order to protect the data, I created back up of software files because the software simulation of this project was very crucial. To saved the data and make it error free, I gave training to my group members so that they were aware how to use the software. I tried to maintain the working environment safe and clean. I made sure that my group members were following the safety policies and rules. I advised my team members to wear gloves while dealing with antennas and installing them.

CE 2.12

Before starting the project, I arranged a meeting with my team members and supervisor in which detailed discussions were made. After the discussion, I prepared a working scenario, and we shared the burden by giving tasks to every member of the group. We daily reported each other in which we discussed what we had done yesterday. In every step of the project,

we gave respect to each other and worked together as one unit. I always encouraged my team members. I helped them at any stage of the project they needed. Every step of the project design was based on one another so if any queries were found, I immediately arranged the meetings and tried to solve the problem. I managed my team members and always guided them if they suffered any problem. I tried to maintain a safe working environment and made sure that no one worked under pressure.

CE 2.13

Being well versed in the English language, I finally compiled the project report. In final project report, I gathered the research work from my other team members and I finally complete the report. I tried to make it simple using fine words and described each phase of the project. I used Microsoft Word for making this report and PowerPoint for making the presentation. Before final submission, I discussed it with my team members and made sure that every detail was mentioned in it. After the discussion with my team members, I gave it to a supervisor and got it approved by him. I prepared a presentation in which every stage of the project was discussed and presented it to my team members. Due to my performance in this project, reward and appreciation were given by the faculty of the department.

CE 2.14

In this project, I followed IEEE standards and considered wireless communication by Theodore S. Rappaport as a reference book. I thoroughly read the chapters in which working on wireless communications was described in detail. I also read the articles related to the LTE network design.

Summary

CE 2.15

I accomplished the tasks using my engineering knowledge, abilities, management, interpersonal, communication, and technical skills. It wasn't possible to fulfill the tasks without my team members. They performed their responsibility very well and proved that

we were a team. They always stood with me in every phase of the project, and we solved the problems together. They guided me when I have faced issues during the project tenure. I attended multiple seminars and events organized by the university and tried to implement all those knowledge that I have learned from these activities.

CAREER EPISODE 3

Introduction

CE 3.1

In my third career episode, I have explained my project "Network Design." During the time, I was completing my Degree in …… from the University…….. The project was carried out from …….. to …….. The location of the project was …….. city/country.

Background

CE 3.2

The objective of this project was to develop a network for a multi-site company that was consisted of three sites-Base, far, and near connected to different communication cables. The goal of this project was to design the network, understand the complete network, its topology, and the behavior of the traffic. The network of the company had three sites Far, Base, and Near. They were joined by communication cables.

CE 3.3

I performed following responsibilities in this project.

- Prepared a proposal for this project and submitted to the supervisor
- Acknowledged the details of the project using online browser, research papers, and other articles
- Arranged meetings then decided the tasks and divided it among the group members
- Prepared a working plan and informed it to every member of the project
- Prepared solution reports of the problem I encountered in this project
- Provided comfortable working environment for my team members
- Prepared a final report and presentation and demonstrated it to my team members

CE 3.4

My position in this project is highlighted below.

Personal Engineering Activity

CE 3.5

To understand the behavior of the network, I used 'Riverbed Modeller' in this project. I developed a block diagram of the topology of a multi-site company. The specifications that I considered while making the design consisted of Base with 4 floors;

- Development Floor
- Sales Floor
- HQ Floor
- Manufacturing Floor

The area of HQ floor included 3-workstations, servers, and 1-switch and the area for development floor included 5 workstations and one switch. For manufacturing floor, I considered one workstation and switch. Similarly, for the sales floor, I considered the area of three admin and two marketing workstations. I prepared a block diagram for representing the whole base site, showing the network bone in the middle and connected it to the near and far site through FDI. s

CE 3.6

I implemented the network design for near site in the software. I connected them with one Ethernet cable to one manager, one marketing, one switch, FDDI gateway, one front desk, six admin, and four sales. I also implemented a far site network which connected one gateway to one switch, one front desk, firewall internet, one manager, three marketing, two support, and five admin workstations. I used 100baseT cables to connect the workstations. I assigned static IP address 18046215 to the server gateway and firewall. The internet connection that I used was a serial PPP-T3. I performed a network design for the base site, HQ Floor, Development Floor, Manufacturing Floor, Sales Floor in the software to verify it.

CE 3.7

I created seven rows for application configurations. In design configuration, the application configurations that I used were dbDOC Query, dbDOC entry, dbFIN, dbHR, dbINV, dbMFG, and srDEV. The requirements for dbDOC included constant time interval (920) and size of transaction = (350000, 6400000000) and the data was accessed from the server. The requirements for dbDOC entry were constant time interval=600 and size of transactions = (350000,80000) and data were entered into the server. I considered the requirements for

dbFIN, which were constant time interval = 840 and size of transactions = 10000, accessing of data was also performed. The requirements for dbHR were constant time interval = 300, size of transactions = (20000, 20000) and data was entered into the server while the size of the packet lied between 2KB-20KB and dbINV were constant time interval =600 and size of transactions = (20000, 20000) while the size of the packet was -100KB. The requirements for dbMFG were constant time interval (1800) and size of transactions (1000) while the size of the packet was similar to dbINV. Then, I calculated the requirements for srDEV, which were mean= 30sec and host traffic= 200000.

CE 3.8

I created eight rows in order to design profile configuration in the software. The front desk consisted of dbHR application. I assigned the start time to the admin which was almost 300 to 600. I used different values of time set in dbINV or dbDOC applications. I created four rows in the developer which included dbHR, dbDOC, dbDOCE, and srvDEV. I implemented two profiles in support and marketing design network and created four profiles for both supervisor and sales. I implemented manager profile design in the software to verify it.

CE 3.9

I implemented the configuration report of log entries, front desk user, admin user (for dbINV, dbHR, and dbDOC), developer user (for dbHR, dbDOC in both entry and query mode), support user (for dbHR and dbDOC), supervisor user (for dbHR, dbINV, and dbMFG), sales user (for dbHR, dbINV, dbDOC, dbFIN), sales user (for dbHR, dbINV, dbDOC, dbFIN), marketing user (for dbHR and dbDOC), and manager user (for dbHR, dbINV, dbFIN) in the software to understand its performance. Through graphical representation, I observed the proper working of the designed network.

CE 3.10

Technical problems and their solutions

CE 3.11

The network design that I created was very crucial to the success of this project. So to ensure that my design remained safe on the computer, I attached my personal computer with a UPS power supply to give it back up whenever the voltage is low. I also installed antivirus on the computer to save the software from getting corrupt. In this way, I was able to save all the design files and keep them secure on my computer. I made copies of the files and transferred them to a USB device for further protection. For the implementation phase, I equipped my teammates with Personal Protective Equipment to keep them safe from any

harm. I followed my institution's safety guidelines and used the equipment that was authorized.

CE 3.12

I took training on Riverbed Modeller, and after gaining enough practice, I taught my teammates how to create effective network designs using the software. During the off-hours, I requested a few minutes from my project supervisor and discussed important details of the project with him. It was due to his guidance that I was able to execute the project tasks efficiently. I also interacted with my seniors and built good relations with them. In return, they shared their experiences and provided me with their help whenever I was in need. I strengthened my learning with the help of this experience.

CE 3.13

I made my design as cost-friendly as possible by performing a cost analysis which would determine the total expenses of this project. I listed out all the materials and tools in MS-Excel with respect to their quantities and market cost. I compared the costs of multiple suppliers and opted for the best option. After completing the analysis, I tabulated the results in the final report with total estimated cost. I prepared a funding proposal and attached the cost estimations with it to get funding assistance from the university. By managing the costs, I was able to execute the project in a cost-effective manner.

CE 3.14

I was a punctual member of the weekly team discussions and meetings with the supervisor. Throughout the tenure, I did not miss one meeting and showed my physical as well as a mental presence in them. The meetings were held every week to keep a check on that the tasks that were achieved and the ones that were to be achieved. The members were welcomed to express their opinions, and I took full advantage of this opportunity. I gave suggestions and put forth my creative ideas that could benefit this project.

CE 3.15

I was quite considerate towards my teammates as they were important members of the project team without which the triumph of this project was impossible. I treated them with honor and respect so that they would treat me the same. I have a helping nature, so I made sure that none of my team members face any difficulty during their tasks. I monitored my team and pointed out their mistakes so they would not repeat it the next time. I attended seminars and technical conferences which helped me in further improving my technical

and engineering knowledge. I also studied different networking books and boosted my knowledge.

CE 3.16

I was involved in documenting tasks of the project. For this purpose, I followed the technical report writing standards of my institution. I developed detailed reports about all the procedures and tasks that were carried out and submitted it to the supervisor. He reviewed the report and gave me suggestions on modifying the report and clarifying the details in it. I followed his suggestions and modified the reports exactly as he told me too. In the next review, he was quite satisfied and set my report as an example for other teams.

Summary

CE 3.17

I successfully designed the network for the assigned area and gained proficiency in the network designing software. I successfully made all the submissions including project proposal, funding application, and final report. I pay my great thanks to my parents, seniors, teachers, and team members for supporting me throughout this time. I was able to demonstrate my leadership skills and managed the project in a very efficient way. This project was a learning opportunity as I learned from others and brought improvements in myself.

PROFESSIONAL ENGINEER
Summary Statement

Competency Element	A brief summary of how you have applied the element	Paragraph in the career episode(s) where the element is addressed
PE1 KNOWLEDGE AND SKILL BASE		
PE1.1 Comprehensive, theory-based understanding of the underpinning natural and physical sciences and the engineering fundamentals applicable to the engineering discipline	I applied the knowledge of basic sciences and network engineering fundamentals to achieve the goals of the projects	CE 1.5, CE.1.6, CE 1.7, CE 1.8, CE 1.9, CE 1.10, CE 2.5, CE 2.6, CE 2.7, CE 2.8, CE2.9, CE 2.10, CE 3.5, CE 3.6, CE 3.7, CE 3.8, CE3.9, CE 3.10

PE1.2 Conceptual understanding of the mathematics, numerical analysis, statistics and computer and information sciences which underpin the engineering discipline	I modeled, analyzed, estimated, and tabulated mathematical models of these projects. My estimations were later on proved using software simulations	CE 1.3, CE 1.9, CE 2.6, CE 2.7, CE 2.8, CE 2.10, CE 3.7, CE 3.13
PE1.3 In-depth understanding of specialist bodies of knowledge within the engineering discipline	In a few steps of these projects, I acquired training and expertise in a specific software and used them to verify my network designs	CE 1.9, CE 1.13, CE 2.11, CE 2.13, CE 3.5, CE 3.11, CE 3.12, CE 3.13
PE1.4 Discernment of knowledge development and research directions within the engineering discipline	I used these projects as a learning platform and gathered sufficient scientific knowledge in my choice of engineering field	CE 1.3, CE 1.5, CE 1.11, CE 2.3, CE 2.5, CE 2.14, CE 3.3, CE 3.12, CE 3.15
PE1.5 Knowledge of contextual factors impacting the engineering discipline	I identified the important norms of the engineering discipline and implemented them in the projects to verify my designing approach	CE 1.11, CE 2.14, CE 3.16
PE1.6 Understanding of the scope, principles, norms, accountabilities and bounds of contemporary engineering practice in the specific discipline	My designs incorporated both, primal and latest methods and I was able to abide by various codes of practice I applied a combination of legislative requirements and formal codes to strengthen my designs	CE 1.5, CE.1.6, CE 1.7, CE 1.8, CE 1.9, CE 2.5, CE 2.7, CE 2.8, CE2.9, CE 2.10, CE 3.5, CE 3.6, CE 3.7, CE 3.8, CE3.9 CE 1.11, CE 2.14, CE 3.16

	The working environment did not impose a sense of hostility for anyone. Instead, safety measures were takes to secure everyone's precious life	CE 1.14, CE 2.11, CE 2.12, CE 3.11
PE2 ENGINEERING APPLICATION ABILITY		
PE2.1 Application of established engineering methods to complex engineering problem solving	I identified and targeted salient issues that arose in the project and pulled them out by root to save costs and time of the project	CE 1.3, CE 1.10, CE 2.6, CE 3.3, CE 3.10
PE2.2 Fluent application of engineering techniques, tools and resources	I took training on specific software platforms that were vital for a number of project's processes like Riverbed Modeller, MS-Excel, etc	CE 1.9, CE 1.13, CE 2.11, CE 2.13, CE 3.5, CE 3.11, CE 3.12, CE 3.13
PE2.3 Application of systematic engineering synthesis and design processes	Standard models of network systems were used to get inspiration for my designs	CE 1.5, CE.1.6, CE 1.7, CE 1.8, CE 1.9, CE 2.5, CE 2.7, CE 2.8, CE2.9, CE 2.10, CE 3.5, CE 3.6, CE 3.7, CE 3.8, CE3.9
PE2.4 Application of systematic approaches to the conduct and management of engineering projects	I managed a team of engineers belonging to the same field as me and gave them a direction to facilitate the processes of the projects I addressed contextual issues efficiently to save the incurring costs of the project	CE 1.3, CE 1.5, CE 1.6, CE 1.12, CE 1.13, CE 2.3, CE 2.5, CE 2.11, CE 2.12, CE 2.13, CE 3.3, CE 3.12, CE 3.14 CE 1.6, CE 1.15, CE 2.9, CE 3.11, CE 3.13
PE3 PROFESSIONAL AND PERSONAL ATTRIBUTES		
PE3.1 Ethical conduct and professional accountability	I upheld engineering norms and professional code of ethics to devise my designs I committed to using safe procedures and performed risk	CE 1.11, CE 2.14, CE 3.16 CE 1.14,CE 2.11, CE

	management for the protection of my fellow engineers	2.12, CE 3.11
PE3.2 Effective oral and written communication in professional and lay domains	I was involved in the session of weekly meetings, displaying my punctuality, dedication, seriousness, and devotion towards the projects	CE 1.3, CE 1.11, CE 1.12, CE 1.13, CE 2.3, CE 2.5, CE 2.12, CE 2.13, CE 3.3, CE 3.12, CE 3.13, CE 3.14, CE 3.16
PE3.3 Creative innovative and proactive demeanour	Not only did I go through reference books but kept a close contact with my seniors and supervisor to be a part of their experiences and learn more through them	CE 1.3, CE 1.5, CE 1.11, CE 2.3, CE 2.5, CE 2.14, CE 3.3, CE 3.12, CE 3.15
PE3.4 Professional use and management of information	I made good use of my English language proficiency and made it shine in my report writing tasks	CE 1.3, CE 1.13, CE 2.3, CE 2.13, CE 3.3, CE 3.13, CE 3.16
PE3.5 Orderly management of self, and professional conduct	Being organized in nature, I developed project schedules, task division table, block diagrams, etc and followed them thoroughly I researched all the technical processes including the maintenance and advancements of my project	CE 1.3, CE 1.12, CE 2.3, CE 2.12, CE 3.3, CE 3.14 CE 1.3, CE 1.5, CE 1.11, CE 2.3, CE 2.5, CE 2.14, CE 3.3, CE 3.12, CE 3.15
PE3.6 Effective team membership and team leadership	I had an understanding of team dynamics to a great extent and used it to keep my team under control for the benefit of the projects	CE 1.3, CE 1.5, CE 1.6, CE 1.12, CE 1.13, CE 2.3, CE 2.5, CE 2.11, CE 2.12, CE 2.13, CE 3.3, CE 3.12, CE 3.14

Reach to our executive for your report to be done at below
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