

## **Experience of the Graduate Assistants in the Capstone course**

**Mayuri Mahajan, Sneha Date, Aditya Gupta, Prafulla Kesari, Vishal Naik, Farrokh Attarzadeh**

Engineering Technology Department  
College of Technology  
University of Houston

### **Abstract**

The paper presents the experience of five Graduate Assistants (GAs) in the capstone class in the Computer Engineering Technology (CET) program in the Engineering Technology Department, College of Technology (CoT) at the University of Houston. The GAs in the capstone course perform important roles that exceeds the traditional expectation of grading homework and proctoring exams. It is a challenge for the GAs to perform and deliver timely results to the students and faculty advisor. The course is highly demanding and rewarding for the students, GAs and the faculty advisor. The one year course is run like a professional company wherein the students are required to design and construct project prototypes and keep the GAs and faculty advisor updated regarding the progress on their projects on a weekly basis. The GAs evaluate student and teams performance, showcase student projects in various events and conferences, conduct and compile several surveys, maintain all tools and parts inventory of the lab, assist teams prepare posters and brochures for events and conferences and last but not the least assist students in preparing technical papers. The GAs go through a rigorous screening and interview process before they are hired [1, 2] and then participate in intensive training before and during the semester [3]. The Graduate Assistant not only acts as a catalyst for the growth of the students but also plays an important role in checking and appraising the students in an unconventional and wholistic way as compared to the way a normal GA works and contributes to a class.

### **Introduction**

The capstone course is a demonstration to confirm students have achieved their goals from the educational institution and major department. The course is designed to assess cognitive, affective and psychomotor learning and to do so in a student-centered and student-directed manner which requires the command, analysis and synthesis of knowledge and skills [4, 5].

The benefits of this course do not merely apply to the students but adds an excellence to the graduate assistants as well.

The course was designed in 2004 by the faculty advisor from the College of Technology at University of Houston and consists of project development by undergraduate students,

based on their own ideas. The course consists of several phases like Team formation, Brainstorming, Project Management, Creativity and Innovations, Proposal development and presentation, Prototype building and Final Presentation and Demonstrations. Some of the completed projects lead to conference papers [6-7], journal publications [8-12] and provisional patents [13-16]. The GAs help the students throughout these activities along with peripheral activities like maintenance and record keeping of the lab inventory, grading student reports, writing research papers of potential projects to present at conferences.

The experience is truly rewarding for the graduate assistants. It helps them develop their interpersonal as well as technical skills.

## **Experience**

The capstone course is the best way of learning beyond defined syllabi and exams. It actually is the application of all the previous knowledge acquired. The Michigan Professional Preparation Network Report lists 10 best outcomes of the course [17]. The Graduate assistants are ones who guide the students throughout the course and these outcomes do rub off on their personalities as well. Few of them are mentioned below along with how it helped develop the GAs as well.

*Communication competence* – Communication is an important factor in ones success and it surely does get enhanced in a graduate assistant as he/she is constantly in touch with the students and acts as an agent between the professor and the students. The GAs have learnt new methods and procedures through this course like the Purchasing policy, cost estimation, analyzing assessment results, etc. By instructing students on the same, the GAs have grown to become familiar with such procedures, which they would not have a chance to get familiar with otherwise.

*Critical thinking* – In the due course of mentoring and helping students with their projects, the GAs develop the art of critical thinking. The judgment of a person improves drastically as one develops the skill. To quote an example of the increase in experience and judgment of a GA, once a student came across a difficulty in his project wherein he had two grounds and he needed two inputs to give a single output taking the grounds and both the signals into consideration. The assistants were successfully able to assist the student by suggesting use of a Differential Amplifier for the same purpose.

*Contextual competence* – A graduate assistant when hired is chosen for his/her knowledge in the field. One can integrate personal knowledge with the gained knowledge to arrive at a practical understanding.

*Professional Ethics* – The course is designed to be highly professional and includes all the facets a real industry would have. Professional Ethics is one of the most important values a Graduate assistant learns before he/she enters the real professional world outside. The GAs are trained to give priority to Ethics above the job duties if necessary.

The assistants themselves submit a weekly progress report to the course advisor and report the amount of work and progress accomplished during the previous week. The GAs have weekly meeting with the course advisor to review the progress reports, student and team performance, immediate plans and announcement and resolve issues related to the course.

*Leadership capacity* – Handling of more than 5 teams comprising of 3 to 4 students each does add self confidence in the graduate assistant and helps develops their leadership quality. Each semester, one night before the Final Project Presentations, there are maximum of 2 GAs in the lab who handle up to 7-8 teams which includes checking out parts and tools while keeping track of their progress at the same time. They provide technical guidance to the teams and help them put the final touches to their projects. The lab hours are extended until early morning hours for the students to achieve completeness and functional accuracy in their projects.

*Motivation of continued learning* – The course does motivate the assistants to keep learning and keep increasing their knowledge as they learn with the students while helping them technically, for writing reports or making presentations. Every new semester triggers something new and helps the assistants to broaden their perspective. Every semester the assistants are introduced to new challenges. Recently, the capstone course was changed from one semester long to one year long. The deliverable of the first semester is a high quality proposal and report and the deliverable at the end of the second semester is a high quality final report and prototype demonstration. In order to avoid delays in student graduation, each semester a new proposal course is offered. In order to enhance students and GAs experiential training, a part-time practicing engineer is added to the senior project team. The engineer is working with the GAs to develop a multi-functional, small-scale bulldozer for the lab for training and demonstration purposes.

Adding to the above outcomes, the experience an assistant acquires during the tenure of the course is way beyond expectation. He/she learns important qualities like time management and disaster management. The Graduate Assistants consider their work at the Senior Project Lab as a course in professionalism which has taught them how things work in industry.

The Graduate assistants work in a team of five in the capstone course. They have a hierarchy amongst themselves which refines the process and helps in getting a better outcome due to appropriate allocation of responsibilities. Another facet that adds to their values is Team work. It educates them to adapt themselves to the situation together and come up with the best solution taking each assistant's opinion into account.

The responsibility of writing research papers for various projects presented at professional conferences has beyond doubt been the experience of its kind. It helps the graduate assistants build their writing skills, the categorization of thought and matter and last but not the least their resumes. All the various showcases and presentations have given the GAs good communicational skills.

The assistants are treated with respect for their contribution to the course and are given due credit for the same. Being a part of the Capstone team is meritorious and awarding in the true sense.

## Summary and Conclusion

The experience of the graduate assistants has been truly amazing and has helped them in the most optimal way possible. It helped them develop all the facets of their personality and imbibed a sense of confidence and boldness that they can handle multiple situations gracefully with the best result. The industry simulated training at the Capstone Course is instrumental in making the GAs ready for professional world. The GAs are part of the development process for the class, the department as well as themselves.

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## **Biographies**

### **MAYURI MAHAJAN**

Mayuri Mahajan is currently pursuing her Masters in Electrical Engineering (Majoring in Signal Processing) from the Cullen College of Engineering, University of Houston and plans to graduate in Summer 2009. She is interested in the field of Sound and Image processing, Internetworking, Digital design and Telecommunications. She is a Teaching Assistant in the department of Engineering Technology.

### **SNEHA DATE**

Sneha Date is currently pursuing her Masters in Electrical Engineering (Majoring in VLSI) from the Cullen College of Engineering, University of Houston and is planning to graduate in Fall 2009. She is interested in the field of VLSI and Embedded Systems, Internetworking, Digital video. She is a Teaching Assistant in the College of Technology in the department of Engineering Technology.

### **PRAFULLA KESARI**

Prafulla Kesari is currently pursuing his Masters in Electrical Engineering (Majoring in Microelectronics) from the Cullen College of Engineering, University of Houston and plans to graduate in summer 2009. He is interested in the field of VLSI Circuit Design, Layout, ASIC and FPGA Design and Verification. He is a Teaching Assistant in the Department of Engineering Technology.

### **VISHAL NAIK**

Vishal Naik is currently pursuing his Masters in Computer Science (Majoring in Software Engineering) from the College of Natural Sciences & Mathematics, University of Houston and plans to graduate in Summer 2009. He is interested in the field of Enterprise Software Application Development. He is a Teaching Assistant in the department of Engineering Technology.

### **ADITYA GUPTA**

Aditya Gupta is currently pursuing his Masters in Electrical Engineering from the Cullen College of Engineering, University of Houston. He plans to graduate in summer 2009. He is interested in VLSI Circuit Design, Layout, Verification and Testing. He is a Teaching Assistant in the Department of Engineering Technology.

### **FARROKH ATTARZADEH**

Dr. Attarzadeh is an associate professor in the Engineering Technology Department, College of Technology at the University of Houston. He teaches software programming, digital logic, and is in charge of the senior project course in the Computer Engineering Program. He has developed a concept referred to as EMFA (Electromechanical Folk Art) as a vehicle to attract young students to the STEM fields, and is Associated Editor for student papers at *the Technology Interface* (<http://engr.nmsu.edu/~etti/>). He is a member of ASEE and has been with the University of Houston since 1983.