My Teaching & Teaching Philosophy: Dr. Aswini Pradhan

I believe that teaching is a field of inquiry and that educators at every level should be dedicated to the scholarship of the field. An effective teacher must have a great understanding of the subject matter being taught as well as underlying pedagogical theory. It is an educator's responsibility to stay current in a field of study, engaging in research and participating in scientific societies, conferences, workshops, classes and/or life-long mentoring that can improve subject matter knowledge. I must be able to make good choices about what to teach and how to structure and organize material to form a rigorous curriculum. At the same time, it is important to stay abreast of current theory and research in the field of teaching and pedagogy. The following beliefs and principles summarize my teaching philosophy.

- I must know what to teach as well as what is the best way to teach or present it and in order to be effective. Educators must know their students, and remain in touch with popular culture. I must be aware of what students know when they come into the classroom to form a foundation on which to build as well as how to tap into that knowledge. I view teaching as a process of encouraging students to make connections between their real world experiences and the subject under study. In any course, I should attempt to guide students through subject matter and facilitate new discoveries. Students should always take away new insights, explanations, and skills.

- Writing is one of the most important skills that a student can develop. Being an effective writer can allow a student to develop his or her ideas to their fullest potential and can allow him or her to communicate those ideas to others. Writing skills developed in the beginning of a student's career can enable the student to be successful for the rest of his or her professional career. Writing assignments in which students become involved with content, whether current issues, literature review, science, history, or other, are one of the best means of encouraging students to engage in critical thinking.

- The role of a teacher is also to be a facilitator; I should empower students to become responsible for their own independent learning. However, I do recognize that students learn in different ways and I am committed to including all students in the learning process. I should be able to vary teaching styles and should expect students to participate in a mixture of lecture, discussion, and group activities occurring both in class and in labs. Technology is important in the classroom since it is a rapidly developing instructional vehicle and can be an invaluable tool for addressing different learning styles. It allows students to become more involved in the processes of learning rather than focusing on the product that they produce, although I have found that focusing on the process invariably leads to a better product.

- Through my teaching students should gain experience with rapidly evolving computer and information technology, but I also believe that technology must be used as a means of accomplishing more, to allow for better and improved learning and teaching, and should not be used as a end unto itself. The World Wide Web is one important tool that I utilize to expand subject matter and concepts to the global community.

- I am responsible for building a relationship with students. I should be accessible to all students, making sure that I talk to individual students both inside and outside the classroom and that I am available to students after class. With university level students, a strong mentoring relationship is essential. Therefore, I must respect all students without regard to race, color, sex, age, handicap or national origin.

- I believe all students are capable of learning, and that all students have something to contribute to the classroom environment. Each student can bring new insights to a subject or raise questions about a subject that have not yet been considered. I view classroom learning as a reciprocal process. I must be committed to student success for I am responsible for making the subject matter accessible to those who do not yet know or comprehend the subject.

- I must provide formative as well as summative feedback. I must ensure wide participation in the classroom. I believe that greater diversity leads to increases in the breadth and depth of learning. I am committed to recognizing and to addressing diversity in the classroom.
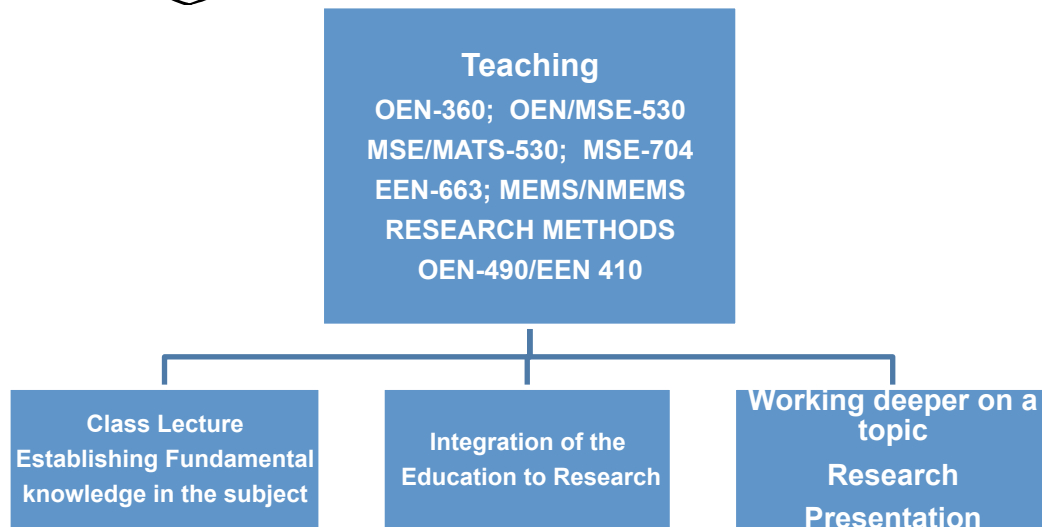
- I believe that effective teaching skills can be developed. Teacher training and instructional development, therefore, must be viewed as primary long-term responsibilities. I must have knowledge of what skills make a teacher effective and must work to craft those skills. These skills must be honed, and they must be personalized. Being an effective teacher is a difficult task, but I accept teaching as a challenge and as a responsibility. I have found that teaching can provide rewards that are well worth the effort.

- I believe that excellent teachers strive to be role models for their students. Being a role model encompasses many things, but the teachers I admired most have been role models in three general areas: as scholars, as scientists, and as mentors.

- As a scholar, a teacher's primary concern should be to pursue knowledge and to bring that knowledge into the classroom. There are many ways that a faculty member can pursue knowledge, such as preparation for class and laboratory sessions, participation in scientific conferences, mentoring student research, following current scientific literature, and collaboration with colleagues. The pursuit of knowledge between teacher and students is a key in fostering student learning. First, students need a fundamental knowledge foundation of the unifying concepts in biology. But perhaps equally important is that they acquire life-long learning skills such as problem solving, critical thinking, and written and verbal skills. To accomplish this, I must consider how I convey knowledge to my students. Learning objectives should be clearly defined and expectations aimed to challenge students. My communication of knowledge must take into account diverse learning styles, along with different educational and experiential backgrounds. I address these issues by presenting concepts in different ways, such as using lecture, animations, problems, group activities, peer teaching, and guest lecturers. Relating concepts to everyday life also helps motivate a diverse classroom of learners. One way this can be accomplished is by having students compare popular press scientific writing to peer-reviewed literature in small groups. A

jigsaw activity gives students the chance to compare and contrast these types of writings, then share the results with their peers.

Primarily, my Current teaching procedures follow the flow chart given below:

Teaching
OEN-360; OEN/MSE-530
MSE/MATS-530; MSE-704
EEN-663; MEMS/NMEMS
RESEARCH METHODS
OEN-490/EEN 410

| Class Lecture Establishing Fundamental knowledge in the subject | Integration of the Education to Research | Working deeper on a topic Research Presentation |

OEN 360: Optical Materials: Optical Engineering: **Undergraduate** Class

OEN/MSE 530: Optical Materials: Electrical/Optical Engineering: **Graduate** Class

MSE/MATS 530: Introduction to Materials Science & Engineering: **Graduate** Class

MSE/MATS 535: Electronic and Photonic Materials: **Graduate** Class

MSE 704: Thin Film Phenomena: Materials Science & Engineering **Graduate** (Ph.D) Class

EEN 663: Solid State Devices: Graduate Class, **Nanophotonics**

OEN/EEN 590, MEMS/NMEMS, **Nanotechnology**

OEN 490/EEN 410 Seminar

Plan forTeaching (as necessary)

(a) **Materials Strengthening, (b) Engineering Thermodynamics, (c) Energy and Society, (d) Nuclear Materials, (e) Advanced Concepts in Radiation Detection and Measurements**

(f) Physical and mechanical properties of materials, Radiation resistant materials

(g) **Nanotechnology in Materials Engineering and Energy Technology**

(h) MEMS & NMEMS

I would like to develop courses for:

(i) Energy Materials & Devices (j) Nanotechnology for Energy and Bioengineering

Mentoring Philosophy

Like any interpersonal relationship, the one between mentor and student, evolves over time with its attendant share of adjustments. Today's students coming from increasingly diverse backgrounds may add a layer of complexity, but it's more likely to enrich than confound the relationship. I am very down to earth and place everything into perspective, whether it is research, classes or professional growth. I am devoted for my graduate students to succeed, learn to do research well, reach lofty goals, and graduate in a reasonable amount of time.

My basic mentoring philosophies are as follows:
   • Taking an interest in developing another person's career and well-being.
   • Having an interpersonal as well as a professional relationship with those whom I mentor.
   • Advancing the person's academic and professional goals in directions most desired by the mentees. *Develop intellectual independence in student and faculty mentees.*
   • Tailor mentoring styles and content to the individual, including adjustments due to differences in culture, ethnicity, and gender, and so on.

The development of scholars in training and mentoring for the retention of women, and racial and ethnic underrepresented minorities (URM) in STEM [1] requires a formal mechanism to educate faculty on gender and cultural issues. Hence, the mentoring program of the graduate students, postdoctoral researchers as well as faculties is designed to address those issues and is to include recommended practices [1, 2]. Very often, URM researchers have not had opportunities to learn and exercise essential elements for a successful career, formal oral and written communication, teaching, and leadership. I offer research and professional training to postdoctoral fellows and several graduate students on a regular basis. The training of postdoctoral associates and students is directed towards development of the comprehensive set of skills needed for successful research, industrial or academic careers. I provide constructive criticism and encouragement, compliments on achievements. I encourage them to participate in the NSF-CREST and DoD (Army research office) center of excellence collaborative works, which broaden their perspectives by in-depth exposure to research and work environment. Postdoctoral associates and junior faculties are advised on how to develop their research initiatives, prepare proposals and mentor students from diverse backgrounds, and encouraged to become independent scholar. I provide enough opportunities for recorded teaching experience. This approach has been very successful over the years. Two current CREST-CNBMD members (Bahoura and Zhang) joined NSU, initially as postdoctoral researchers, and became full faculty and independent researchers

through my intensive mentoring program. Through my guidance, both faculties acquired funded research projects in which I am Co-PI. I mentored faculty from outside the University, for example Dr. Victor Adedeji from Elizabeth State University (HBCU), to write grants in which I am a Co-PI.

I provide logistics to Research Associates and faculties to design plans for professional development within their first months of employment. They receive career counseling from me for identifying, seeking and securing the experiences that would best prepare them for their chosen career direction. The professional development plan reflects the expectation that at the end of two years, the research associates will have secured the professional appointment envisioned by the plan. The postdoctoral and junior faculty researchers mentoring plan include but not limited:
(a) preparation of grant proposals, (b) preparation of publications and presentations, (c) teaching and mentoring best practices, (d) training in responsible conduct of research, (e) training on effective collaboration with diverse researchers, (f) leadership and management, (g) communicating science to diverse audiences, (h) career counseling and applying to job openings, (i) Interview skills, (j) networking, and (j) others identified by the target audience.

The hallmark of a successful mentoring relationship is a shared understanding of expectations and responsibilities. These create the framework for the relationship, and they are largely established in the early meetings with a student. A relatively modest investment in those meetings can yield great dividends. I prefer to mentor students in order to build the leadership as well as mentoring capabilities in them, especially for the graduate students. Therefore, I use consistently the method, which I call as "*Mentoring under Mentoring*" – an umbrella for strong learning ethics with a skillful leadership quality. This is schematically presented as follows:
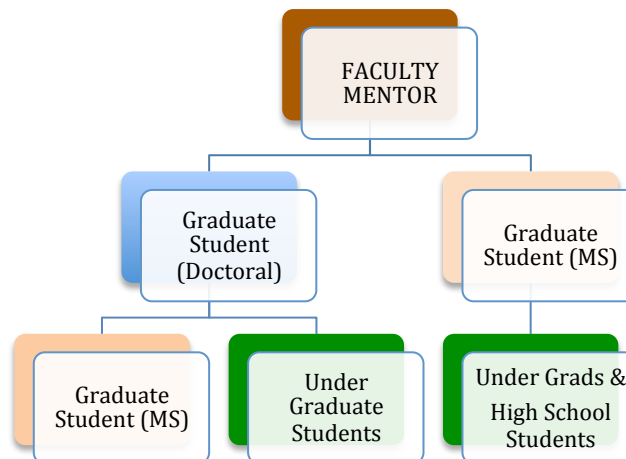
In this mentoring program, which is basically appropriate for a relatively large group of students receiving the opportunity for complete scholarly development, the following *FIVE* qualities are extensively developed; (a) **P**roductivity, (b) **R**esponsibility, (c) **I**ndependence & **I**nspire, (d), Development of team **S**pirit, and (e) Development of **M**entoring capability, in short called "*PRiiSM*". The PRiiSM directs the faculty mentor to take the responsibility for the overall development of scholarly activities, teaching and education of all mentees

through intensive supervision, discussion and establishing a relation between all students. The progress of each mentee is assessed and documented. The success lies in monitoring and mentoring the student whenever necessary, if possible very occasionally.

Assessment indicators of the professional and academic development of the graduate students, postdoctoral researchers and junior faculty will include numbers of papers co-authored, papers with primary authorship, conferences attended, presentations at conferences, proposals submitted with their participation, courses instructed, students mentored, and activities participated in, led, and managed. Their responses to a survey on satisfaction with training and job placement are carefully reviewed. These assessment indicators prepare the junior faculties for their tenure and promotion.

References
[1] M. E. Canton and D. P. James, *Mentoring in Higher Education: Best Practices,* 2nd edition (Robertson Publishing, Pacifica, CA, 2006).
[2] Committee on the Guide to Recruiting and Advancing Women Scientists and Engineers in Academia, Committee on Women in Science and Engineering, and National Research Council, *To Recruit and Advance: Women Students and Faculty in Science and Engineering* (National Academy Press, Washington, DC 2006).