TEACHING PORTFOLIO

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'I am But a Slave (of Allah)'

Sahih Bukhari

Hadith 3445

1. Teaching Philosophy

"I will do more than teach, I will inspire" is an excerpt from an anonymous poem called *I Will Do More* which sums up what I believe all teachers should strive for. I strongly believe that a teacher's role goes beyond the classroom or lecture hall - a teacher not only teaches a subject matter but also equips and prepares their students for life-long learning.

I've always believed that to be an effective teacher, one must be passionate about teaching. Someone with a passion for teaching will creatively craft messages and activities that work for their students. He or she will enjoy discovering what makes the students' brain 'tick' and will respond accordingly. With true passion as a motivating force, contagious enthusiasm will spill over to create a positive learning environment.

Understanding how people learn is one of the significant aspects of teaching. This is linked to their "knowledge" background and maturity. It was an interesting experience when I was trying to explain my scientific research (related to environmental biotechnology) to my peers, my now 67 year old dad (who holds a PhD in Public Administration) and to my younger brother (a software engineer).
I found that the key is to relate to the audience by starting from what they know and building upon it. Providing real life everyday examples makes it very easy.
I try to understand my student's knowledge through in-class discussions and one-on-one interactions.

Environmental biotechnology is an applied field where students constantly apply the fundamental concepts and theory learned in the classroom, including other disciplines. My main goal is to encourage independent thinking and analytical reasoning to augment their problem solving skills, thus encouraging them to not just memorize. I prompt them to question at every stage: "why? how?" and satisfy their curiosity, and to gauge their own understanding of the subject matter.

A good teacher should have sound fundamentals and command over the concepts as well as a broad knowledge beyond the realms of the particular course being taught. Thus, he/she can provide useful inter-disciplinary examples which make learning very interesting and motivates the students. Good course material with sufficient problems/examples and case studies is very effective. While advance preparation is essential, I believe that a good teacher should be able to adapt to the requirements as the course proceeds.

2. Teaching Responsibilities

After completing my Master's Degree in 1998, I was initially appointed as a lecturer at the Department of Chemistry, Faculty of Science, Universiti Teknologi Malaysia (UTM) in Skudai, Johor. Two years later, the Department of Biology was officially set up at the Faculty of Science. On the basis of relevancy of my academic background and research experience, I was transferred to the Department of Biology in 2000. The Department Biology then became the Faculty of Biosciences and Bioengineering (FBB) in 2007. Finally in November 2012 FBB then merged with the Faculty of Health Science & Biomedical Engineering to become the Faculty of Biosciences and Medical Engineering (FBME) where I am teaching till present.

During my two years at the Department of Chemistry, I taught Basic Chemistry (SSK 1003) and General Chemistry (SSK 1103) to both science and engineering students. Besides lectures, I also handled the General Chemistry Lab (SSK 1801 & SSK 1801) and Biochemistry Lab (SSB 2811). I also supervised Final Year Undergraduate Projects for the Industrial Chemistry students (SSU 5904). Typically I supervised 3 to 4 students.

Since joining the Biology Department in 2000, I have taught both core and elective subjects to Industrial Biology and Pure Biology majors such as Microbiology (SSB 3203), Physiology and Screening of Industrial Microorganisms (SSG 2313), Molecular Biotechnology (SSB 3212), Bioremediation and Biodegradation (SSB 3552) and Biosensors Technology (SSB 4692). Besides lecturing the mainstream students, I have also been assigned to teach the subject Cellular and Molecular Biology (SSG 1113) at the School of Professional and Continuing Education (SPACE) and the Programme for After-Diploma Students (PKPG).

At present as a graduate faculty of FBME I am still teaching two courses Physiology and Screening of Industrial Microorganisms and Biosensor Technology (Appendix I – Course Outline) and one new course entitled Extremophiles. I have also taught postgraduate courses such as Protein Engineering and Environmental Engineering.

3. How I Construct My Teaching Philosophy

My teaching philosophy has been influenced and shaped generally by the National Education Philosophy, and specifically by that of UTM's. In harmony with the National Education Philosophy, UTM's Education Philosophy states that:

The Divine Law of Allah is the foundation for science and technology. Universiti Teknologi Malaysia strives with total and unified effort to develop excellence in science and technology for universal peace and prosperity, in accordance with His will.

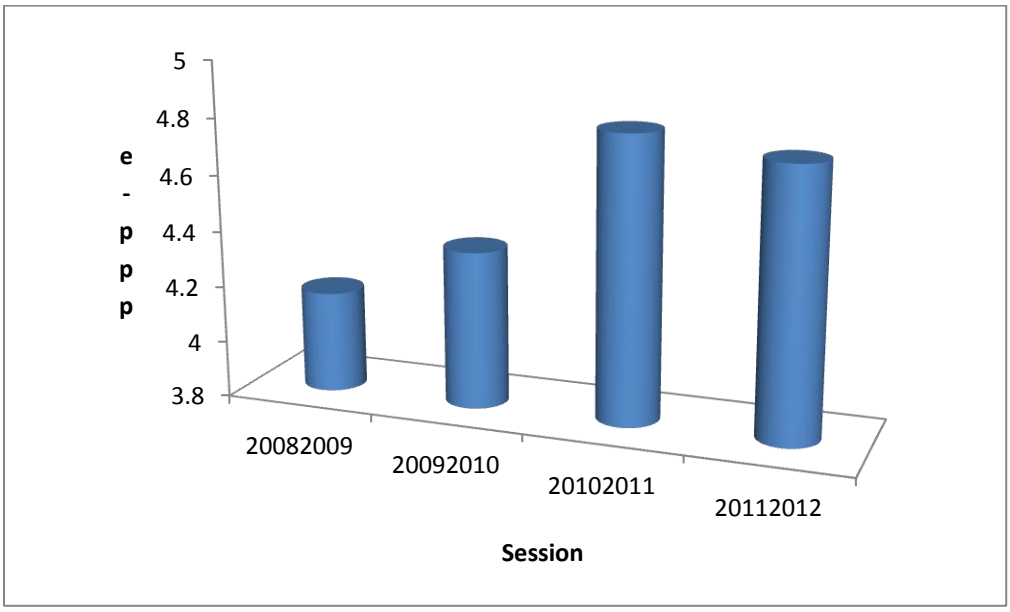
In line with this philosophy I am committed to assisting the University in graduating competent, creative and versatile professionals who are guided by high moral and ethical values in the service of God and mankind. This will require graduates with sound disciplinary and professional knowledge, and effective skills in communication, teamworking, problem solving, entrepreneurship, leadership and lifelong learning.

My teaching philosophy has also been influenced by my experience as an undergraduate student abroad. I remember one subject, Applied Microbiology, which I particularly enjoyed and excelled in because I was happy with the way it was being taught by my lecturer Dr. Stuart Andrews. In order to reinforce our knowledge and understanding of the fundamental concepts and theories, he would give us a few case studies which we had to solve. I remember very well his words to the class and I quote *"To solve these case studies, not only must you have good knowledge and understanding of the basic concepts, you must also have sound intuition."* More than twenty years on, today as a lecturer myself, I try whenever possible to remind my students that it is not just how much knowledge you have, it is how you use it!

My fellow colleagues especially my seniors (mentors) have also helped me shape my teaching philosophy. Often times I have looked to them, especially those who have very good rapport with their students, for advice on the best or effective way of approaching teaching. In other words; What is their *secret* recipe to make an effective teacher? Although I have found their advice to be invaluable, my search continues for that *secret* recipe.

4. Evaluation of Teaching

The chart below shows the score of my e-PPP for the past four years since 2008 to 2012 for one of the courses I teach (SQG 3692 - Biosensor Technology). As can be seen my teaching skills have gradually improved over the years.



6. Teaching Improvement

As education has evolved to include various technological tools so has my approach to teaching. Traditional lecture method such as using overhead transparencies and white board was no longer used in delivering the lecture notes. The application of power points, videos and multimedia, real pictures that show real situation and attractive pictures were applied as the teaching tools. I also bring in real samples such as commercial glucose biosensor & other bioassay kits to class to further enhance my students understanding and appreciation of learning. These particular approaches are very important especially in teaching environmental courses such as biosensors. Outside the classroom, where applicable and appropriate, I have also brought students to visit environmental places and biotech industries to enable them to gain practical knowledge and interact with industrial personnel. I believe these approaches will make the lectures more interesting, interactive and easily understood.

I believe that for best teaching to occur, one has to update and modify the teaching strategy through experience. As an educator, each day in the classroom is an opportunity for me to further improve my teaching. My role as a scientific researcher and national auditor of the MQA (Malaysia Qualification Agency) has made me appreciate even more my critical role as an educator and how I can help to shape the learning of my students.

APPENDIX I – COURSE OUTLINE

PRE-REQUISITE	:
EQUIVALENCE	: None
CONTACT HOURS	: 2 Hours Lecture

Lecturer	E-Mail	Room No.	Phone No.
1. Dr. Shafinaz Shahir	shafinaz@fbb.utm.my	DSI	30064

PREPARED BY : Course Owner	**CERTIFIED BY : Dean FBB**
Name : Dr. Shafinaz Shahir	**Name** :
Signature :	**Signature** :
Date : 20 Feb 2012	**Date** : 20 Feb 2012

SYNOPSIS

This course will present an overview of the fundamental principles and applications of biosensors. More specifically it will cover the following subjects: What is a sensor? How does a sensor become biological in nature? The history of biosensors. What are the components of a biosensor? What are the types of transducers used in biosensors? What are bioreceptor molecules? How are bioreceptor molecules attached to the transducers, i.e. immobilised? What are the most important factors that govern the performance of a biosensor? In what areas have biosensors been applied?

COURSE LEARNING OUTCOMES

By the end of the course, students should be able to :

No.	Course Learning Outcomes	Programme Learning Outcome(s) Addressed	Assessment Methods
1.	Describe the fundamental components required to make a viable biosensor.	PLO1(C2)	Q, T, F_t
2.	Discuss the advantages and disadvantages of materials that can be used as biosensing elements in relation to their use in biosensors.	PLO1(C2)	Q, T, F_t
3.	Illustrate the methods that can be used to immobilize biomolecules to a transducer for the construction of a viable biosensor.	PLO2(C3)	Q, T, F_t
4.	Illustrate the principles and applications of transducers as applied in biosensors.	PLO2(C3)	Q, T, F_t
5.	Analyse the working performance of a biosensor using experimental/theoretical data.	PLO3(C4)	F_t
6.	Compare and contrast the types of biosensors used for the detection of an analyte in terms of type of biomaterial used, biochemical reaction involved, transducer type, and performance factors.	PLO3(C4)	A

7.	Demonstrate effective communication skills in oral mode on biosensor assignment.	PLO4 (P4, CS1, CS2, CS3, CS4)	Pr

Note :Q – Quiz; T – Test ; F_t – Final Exam; A – Assignment; Pr - Presentation

STUDENT LEARNING TIME

Teaching and Learning Activities	**Student Learning Time (hours)**
1. Face to Face Learning	
a. Lecturer-Centered Learning i. Lecture	26
b. Student-Centered Learning (SCL) i. Practical/Tutorial ii. Student-centered learning activities	 - 2
2. Self-Directed Learning	
a. *Non-face-to-face learning* or student-centered learning (SCL) such as manual, assignment, module, e-Learning, etc.	19
b. Revision	19
c. Assessment Preparations	8
3. Formal Assessment	
a. Ongoing Assessment (quizzes, tests, Pr)	4
b. Final Exam	2
Total (SLT)	**80**

TEACHING METHODOLOGY

1. Lectures and discussion, group discussion, Independent Study.
2. Students will complete a group assignment and each group will present their assignment to the class in the last week of lectures. The assignment must also be submitted the week before study week for assessment.

WEEKLY SCHEDULE

Week	Lecture	Topic / Content
1-2	1-4	**Chap 1 Introduction to Biosensors** - definition of biosensor - history of biosensors - analyte/substrate - biological component and its immobilization - transducer types - performance factors - applications of biosensors in brief **QUIZ 1 - CO1 (WEEK 2)**
3-4	5-8	**Chap 2 Biological Components/Biological Elements** - types - advantages and disadvantages - some applications **QUIZ 2 – CO2 (WEEK 4)**
5-6	9-12	**Chap 3 Immobilization of Biological Components** - immobilization defined - types of immobilization methods - advantages and disadvantages of immobilization methods **QUIZ 3 – CO3 (WEEK 7)**
7	**MID-SEMESTER BREAK**	
8-9	13-16	**Chap 4 Transducer 1-Electrochemistry** - Introduction - 1st Generation biosensors - 2nd Generation biosensors - 3rd Generation biosensors - Screen-printed electrodes:glucose strip - Oxygen electrode for BOD biosensor **Test 1 : CO1, CO2, CO3 (Week 8)**
10-11	17-20	**Chap 5 Optical Biosensors** - Introduction - Bioluminescence -principle - Bioluminescence-based biosensors **QUIZ 4 – CO4 (WK 11)**

12-13	21-24	**Chap 6 Performance Factors for Biosensors** - Introduction - Performance factors (sensitivity, selectivity, response time, reproducibility, lifetime) - Some examples **Test 2 – CO4 (Wk 13)**
14	25-26	**Chap 7 Biosensors: Future/New Trends** - Nanobiosensors - Implantable biosensors?-diabetes
15	27-28	**Group Presentation** **Assignment submission**
16-18	**REVISION WEEK AND FINAL EXAMINATION**	

* Schedulling of quizzes and tests are subject to change.

REFERENCES

1. Eggins, B.R (1996) *Biosensors: An Introduction*, John Wiley & Sons.
2. Blum, L.J (1997) *Bio- and Chemi-Luminescent Sensors*, World Scientific.
3. Eggins, B.R. (2002) *Chemical Sensors and Biosensors*, John Wiley & Son.
4. Cooper, J.M. & Cass, A.E.G (2004) *Biosensors : A Practical Approach*, Oxford Univ.Press
5. Recent literature/articles from biosensor-related journals.

GRADING

No.	Assessment	Number	% each	% total	Dates/Weeks
1.	Assignment	1	15	15	15
2.	Presentation (CS)	1	5	5	15
3.	Quiz	4	2.5	10	2, 4,7, 11
4.	Test	2	15	30	8, 13
5.	Final Exam	1	40	40	17/18
Overall Total				**100**	

PLAGIARISM / ACADEMIC DISHONESTY

"Plagiarism is the use or close imitation of the language and thoughts of another author and the representation of them as one's own original work. Within academia, plagiarism by students, professors, or researchers is considered academic dishonesty or academic fraud and offenders are subject to academic censure." (Wikipedia)

ATTENDANCE

The student should adhere to the rules of attendance as stated in the University Academic Regulation :-

1. Students must attend not less than 80% of lecture hours as required for the course.
2. The student is prohibited from attending any lecture and assessment activities upon failure to comply the above requirement. Zero mark will be given for the course.