



BMT 432

Special Topics in Biomedical Engineering

Course leader: Omar Altwijri



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Special Topics in Biomedical Engineering

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- Availability in office:
Sunday & Monday (from 09.00 am – 12.30 pm)
Tuesday to Thursday (from 10.00 am – 03.00 pm)



BMT 432

Special Topics in Biomedical Engineering

- Second Semester (1438 – 1439).
- Level: 7 (undergraduate).
- Four Credit hours (3 + 1).
- Lectures: Sunday 1.00 pm – 4.00 pm.
- Practical: Thursday 4.00 pm – 6.00 pm

Textbook and Other Suggested Materials

Textbook:

Modeling and Simulation in Biomedical Engineering: Applications in Cardiorespiratory Physiology.

By Willem Van Meurs.

Other Suggested Materials:

- Lecture and lab Handouts.
- University Blackboard.
- Referred Web Pages.
- Journal articles.

Why you are here?

What do you want to learn?

Course Philosophy & objectives:

In week 15; Marwan alfuhaid (and all students) should have an undergraduate level of understanding for the following topics and skills:

- 1. How could modeling and simulation – from an engineering point of view - could be applied to improve healthcare.
- 2. Understand the basics of the two famous techniques of engineering simulation; Finite Element Analysis and Computational Fluid Dynamics (FEA & CFD).
- 3. Hands on simulation commercial packages.



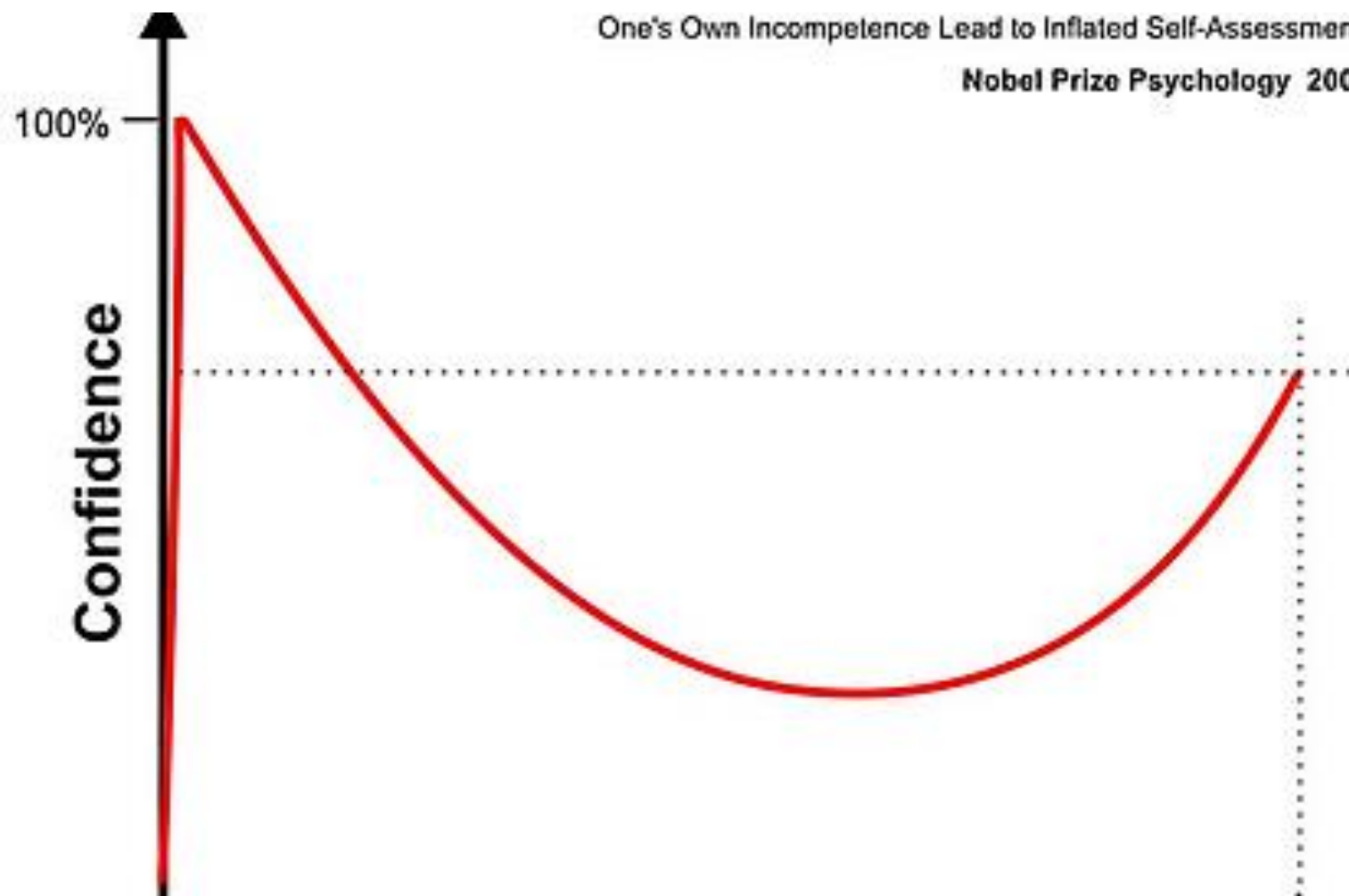
Course Philosophy & objectives (Cont.):

- 4. Rayan and other students should be able to use simulation codes to carry on their first modeling project.
- 5. Understand the basic principles of various advanced topics in medical engineering including tissue engineering, nanotechnology uses in medical engineering and others.
- 6. Have the confidence and the correct tool for self-teaching technique to learn the new advancements on the field.
- 7. Contribute to society (assignment 1).
- 8. More to be added with students feedback.



One's Own Incompetence Lead to Inflated Self-Assessment.

Nobel Prize Psychology 2000



Requirements to complete the course

- Attend at least 75% of lectures and practical. (Clickers – Student's responsibility).
- Participate in all activities.
- Marks:
 - ✓ 30% Semester activities
Homework's: 20 (10 + 5 + 5)
Quizzes, Class responses & Class activities: 10
 - ✓ 10% Mid-Term Exam.
 - ✓ 40% Final Exam (20% Written + 20% project presentation).
 - ✓ 20% Lab project.

Class attitude (-5)

-Talking during lecture or presentations.

Bonus:
Good evaluations,
Discussion board, and +



Good and bad work (Homework and Exam).

Good:

- Original (yours).
- Specified.

	Good	Bad
Number of words	Within 10% +/-	More than 10% +/-
Question answered	Completely	Partly
Non-required information	0%	More than 0%
Plagiarism	0%	More than 0% (Serious issue)
References	100%	Less than 100%

Focus	Response	Marks
Plagiarism	More than 0%	0 in OVERALL HOMEWORK
Discussion of articles	Discuss 8 articles Discuss 6 articles Discuss 5 articles Discuss 4 articles Less than 4 articles	4 2 1 0.5 0.25
Ideas are organized		2
Reference to articles	Reference Completed (in text + at end)	2
Opinion	Your opinion with scientific reasoning Your opinion without any justification	2 1

Bonus: Matching self evaluations

Assignment 1

20 Marks (10+ 10)

Grade each
other

(Students Evaluations)

Idea and performance: 10

Idea quality, society contribution, measured work and ability to be applied.

Presentation: 10

Slides Quality	Idea Clarity	Eye contact	Response to audience questions	Total
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Attendance

- A) Yes

What is FEA?

- A) Finite Engineering Analysis.
- B) Fundamental Engineering Analysis.
- C) Finite Element Analysis.
- D) Full Engineering Analysis.

Teaching Assistant (TA)

- Tasks.
- Experience.
- Bonus (5 marks).

General Class Regulations

- Attendance is taken at the beginning (no second attempt).
- Arriving after I actually started the lecture (about 5 mins of the beginning) is not acceptable, please return home or wait for the second part of lecture (after break).
- Talking to each other is only permitted for discussions, anything outside this you will be asked to leave the class.
- Mobile phones must be in silent before the lecture starts. If buzz is heard you will be asked to leave the class.
- Laptop, smart phones are only allowed if you are following instructor. If used outside you will be asked to leave the hall.
- Students who may be asked to leave the class for disturbing others will be deducted two marks (-2) from semester activities (each time).

Week	Topic	Evaluations	الاستراتيجية
2	Intro to the course, Blackboard LMS	(Exercise 1)	محاضرة تقليدية ثم تطبيق عملي على الكمبيوتر على نظام البلاكورد - القيام بنشاط فصلي أثناء المحاضرة لمعرفة ماهو plagiarism
3	Intro to Simulation, Simulation in Medicine	(Exercise 2) (Homework 1) (Assignment 1) Groups	سأقوم في البداية باختبار معلوماتهم السابقة عن هذا الموضوع عن طريق أسئلة اختيارات متعددة باستخدام تقنية الكليكرز. ثم سأعطيهم نشاط صفي لإيجاد إنجاز طبي عبر استخدام تقنية المحاكاة (ورقة منشورة - مقطع فيديو - نتائج جيدة). بعد ذلك أقوم بتجميع النتائج التي حصلوا عليها و فرزها حسب أنواعها لما تم التخطيط لدراسته، وأضيف إليها مالم يتعرضوا له و تم وضعه داخل الخطة. يتم هذا خلال مناقشة فصلية و محاضرة تقليدية نهاية الوقت لتجميع الأفكار و تلخيصها.
4	Smart surgeries	External: Habeeb Alsolami	
5	Introduction to Medical artificial intelligence	External: Faisal Alotaibi	
6	FEA	(Exercise 3) (Assignment 1 presentation1) (Quiz1)	محاضرة تفاعلية يتخللها استخدام الكليكرز، و في نهايتها نشاط فصلي للقيام ببعض المسائل المبسطة بشكل مجموعات.
7	CFD	(Exercise 4 – case study) (Homework2)	محاضرة تفاعلية يتخللها استخدام الكليكرز، يلي ذلك نشاط فصلي يتشكل الطلبة فيه لمجموعات و يوزع عليهم حالة دراسية لكل مجموعة، ليقوموا بدراستها ثم قيام كل مجموعة بعرض تقديمي كل حالة على حدة عن طريق العروض التقديمية.
8	Advanced approaches in FEA and CFD		ستكون المحاضرة بطريقة التعلم بالاكتشاف حيث سنقوم بمراجعة مبادئ طريقتي المحاكاة التي درست في المحاضرات السابقة، ثم محاولة معرفة المجالات الممكنة لتطبيقها في المجال الطبي
9	(Assignment 1 presentation2)		

Week	Topic 1	Topic 2	الاستراتيجية
10	Midterm Exam 25 th Mar 2018		Online
11	Tissue eng – stem cells	Feedback on HW2 (Exercise 5) (Homework3)	
12	Refractive Surgeries	Exam Feedback (Exercise 6)	الفصول المقلوبة و نقاش باستخدام الكليكرز - و محاضرة تفاعلية نهائية الوقت لتجميع الأفكار و تلخيصها.
13	Tissue eng – stem cells (External speaker)	Feedback on HW3	استضافة محاضر زائر للمشاركة في تطبيقات استخدام الهندسة النسيجية في الطب – نقاش يتخلله استخدام الكليكرز.
14	(External speaker)		
15	Assignment 1 presentations (Groups 1,2)		Written Feedback

Students Topics

- ?



Plagiarism

First class activity.

- What is Plagiarism?
- How to avoid it?
- Submit HW1 (Trial).

