HO CHI MINH UNIVERSITY OF TECHNOLOGY AND EDUCATION **FACULTY OF ELECTRICAL AND ELECTRONICS ENGINEERING**	**Programme:** Biomedical Engineering **Programme Level:** Undergraduate	

Syllabus

1. **Course Name:** Biomedical Sensor Technology

2. **Course Code:** TESO330765

3. **Credits: 3 credits** (3:0:6) (15-hour lecture and 6 hours of self-study per week)

4. **Course Instructor(s):**

   A. Truong-Duy Nguyen, MEng

   B. Dang-Khoa Tran, MEng

5. **Registration Requirements**

   A. Pre-requisite Course(s): Basic Electronics

   B. Previous Course(s): Digital Systems

6. **Course Descriptions:**

   This course introduces students to the knowledge of biomedical sensor technology, from theory and working principles to these sensors' applications. In addition, this course also deals with measurement techniques, sensor signal processing, and sensing systems in medical equipment.

7. **Course Learning Outcomes (CLOs)**

CLOs	Descriptions *After completing this module students should be able to:*	ELO(s)/PI(s)	Competency
CLO1	Demonstrate their understandings associated with biomedical sensors in the field of biomedical engineering.	ELO1/PI1.1	R
CLO2	Collect, analyze and process biomedical signals from various types of sensors.	ELO4/PI4.2	R
CLO3	Work in a team cooperatively and efficiently to resolve problems related to biomedical sensors.	ELO5/PI5.2	R
CLO4	Read and understand technical documents about sensors written in English.	ELO6/PI6.4	R
CLO5	Compute, design, and operate sensor measurement systems.	ELO7/PI7.2	R

   Notes: I: *Introduction,* ***R:*** *Reinforce,* ***M:*** *Mastery*

8. **Course Content**

   – Introduction to sensors and basic sensor manufacturing technologies.

- Sensor signal conditioning methods (Wheat-stone bridge, amplification and linear, A/D conversion).
- Optical sensors (principles, classification and medical applications).
- Temperature sensor (principle, classification and medical applications).
- Chemical sensors (principles, classification and medical applications).
- Biosensors (principles, classification and medical applications).
- Level, position and motion sensors (principle, classification and medical applications).
- Pressure sensors, pressure (principle, classification and medical applications).
- Accelerometers (principles, classifications and medical applications).

9. Teaching Methods

- Presentation
- Group presentations and reports

10. Student Assessments

- Grading scale: **10**
- Assessment plan:

No.	Content	CLOs	Competency	Assessment Methods	Assessment Tools	Weighting (%)
Formative Assessment						**50**
1	Basic knowledge and concepts of sensors	CLO1/ PI1.1	R	Quizes	Score sheet (online)	*10*
2	Basic principles, applications, application circuit design calculation.	CLO5/ PI7.2	R	Essay test	Short questions	*20*
3	Essay, construction of application circuit.	CLO3/ PI5.2 CLO4/ PI6.4	R	Q&A test	Rubric	*20*
Summative Assessment						**50**
5	Principles, analysis, selection, application of various types of sensors.	CLO2/ PI7.2	R	Multiple-choice	multiple-choice questions	*50*

11. Learning Materials

- **Textbook(s):**

  Ursula E. Spichiger-Keller, Chemical Sensors and Biosensors for Medical and Biological Applications, Wiley-VCH, 2008.

- **References:**

  Michael J. McGrath, Sensor Technologies

  Jon S. Wilson, Sensor Technology Handbook, Arizona October 2004

  Jon S.Wilson, Sensor Technology Handbook, Elsevier Inc, 2005.

12. General Information

Academic Integrity

All students in this class are subject to HCMUTE's Academic Integrity Policy *(http://sao.hcmute.edu.vn/)* and should acquaint themselves with its content and requirements, including a strict prohibition against plagiarism. Any violations will be reported to the Faculty of Electrical and Electronic Engineering Dean's office.

Notice of Change

All information in this syllabus (other than grading and absence policies) may be subject to change with reasonable advanced notice. Students need to regularly update the information of their registered class.

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13. Approval Date:

14. Endorsement:

Dean of Faculty	Head of Department	Course Instructor
Sign here...		
Assoc. Prof. Minh-Tam Nguyen	Assoc. Prof. Thanh-Hai Nguyen	

15. Revision History:

1ˢᵗ Revision:	*Course Instructor* **Assoc. Prof. Thanh-Hai Nguyen** Head of Department
2ⁿᵈ Revision:	*Course Instructor*

| | **Assoc. Prof. Thanh-Hai Nguyen**
Head of Department |
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