

### MS4613 – Wearable sensors for healthcare

<b>Course Code</b>	MS4613				
<b>Course Title</b>	Wearable sensors for healthcare				
<b>Pre-requisites</b>	NIL				
<b>Pre-requisite for</b>	NIL				
<b>No of AUs</b>	3				
<b>Contact Hours</b>	LECTURES	26	Lab	13	
<b>Course Aims</b>					
<p>Wearable healthcare monitoring and diagnosis is an attractive topic in both biomedical research and industry. In this course, you will be introduced to the fundamentals of materials and processing technologies related to wearable healthcare application as well as the state-of-the-art integrated healthcare devices. This course emphasizes an interdisciplinary knowledge buildup spanning from material science to electrical engineering for a small group of interested students. Hands-on device fabrication experiments are also offered to develop practical engineering abilities and innovative engineering minds. Students who are keen on learning and developing your own wearable healthcare monitoring solution should consider taking this course.</p>					
<b>Intended Learning Outcomes (ILO)</b>					
<p>By the end of this course, you would be able to:</p> <ol style="list-style-type: none"> <li>1. Explain the basic principles of materials and device design and manufacturing techniques for healthcare related wearable applications.</li> <li>2. Describe key advanced integrated system on healthcare monitoring and diagnosis.</li> <li>3. Analyze and propose solutions for healthcare monitoring</li> <li>4. Design and fabricate healthcare related devices to achieve certain healthcare functions.</li> </ol>					
<b>Course Content</b>					
<p>Materials fundamentals for wearable sensors:</p> <ul style="list-style-type: none"> <li>• Electronic properties of materials</li> <li>• Flexible and stretchable substrates for integrated platform</li> <li>• Electrophysiological signals</li> <li>• Wireless technology</li> </ul> <p>Material processing and manufacturing technology</p> <ul style="list-style-type: none"> <li>• MEMS- Lithography and patterning</li> </ul>					

- 3D printing, screen printing, inkjet printing

Advanced integrated devices for healthcare monitoring and diagnosis

- E-textile
- Printed electronics with functional application
- Patchable systems for wearable sensors
- Outlook

Lab Sessions on fabricating integrated devices for healthcare monitoring and diagnosis

### Reading and References

1. Wearable Electronics Sensors: For safe and healthy living, edited by Mukhopadhyay, Subhas C; Springer International Publishing, 2015.
2. Flexible Electronics: Materials and Applications, edited by Wong, William S., Salleo, Alberto; Springer International Publishing, 2009.

### Course Policies and Student Responsibilities

#### Lab Safety

You should adhere to lab safety rules and regulations at all times during the lab sessions.

#### Attendance

For your own learning, please attend all the lessons.

#### Absenteeism

Absentees must be supported by a medical certificate or other valid official documents.

#### Teamwork

As teamwork is a major component of this course, you are encouraged to work closely and cohesively with your team so that you can have the best design and fabrication of your prototype.

### Academic Integrity

Good academic work depends on honesty and ethical behavior. Quality of your work as a student relies on adhering to the principles of academic integrity and to the NTU Honor Code, a set of values shared by the whole university community. Truth, Trust and Justice are at the core of NTU's shared values.

As a student of NTU, it is important that you recognize your responsibilities in understanding and applying the principles of academic integrity in all the work you do at the University. Not knowing what is involved in maintaining academic integrity does not excuse academic dishonesty. You need to actively equip yourself with strategies to avoid all forms of academic dishonesty, including plagiarism, academic fraud, and collusion and cheating. If you are uncertain of the definitions of any of these terms, you should go to the [academic integrity website](#) for more information. Consult your instructor(s) if you need any clarification about the requirements of academic integrity in the course.