



# **SNS COLLEGE OF TECHNOLOGY**

## **(AN AUTONOMOUS INSTITUTION)**

Approved by AICTE & Affiliated to Anna University  
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Recognized by UGC Saravanampatti (post), Coimbatore-641035.



## **Department of Biomedical Engineering**

**Course Name: 19BM0302 & WEARABLE TECHNOLOGIES**

**Topic :Optical Glucose Sensor**

**Semester :6**

19BM0302/ Optical Glucose Sensor /Mr.S.Prince Samuel /AP/BME



# INTRODUCTION TO DIABETES



A metabolic disease in which the body's inability to produce any or enough insulin causes elevated levels of glucose in the blood."

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<b>Blood Sugar Classification</b>	<b>Fasting Blood Sugar Levels</b>	<b>Post Meal Blood Sugar Levels</b>
<b>Normal</b>	70-100 mg/dL	70-140 mg/dL
<b>Prediabetes</b>	101-125 mg/dL	141-200 mg/dL
<b>Diabetes</b>	125 mg/dL and above	200 mg/dL and above



# TYPES OF DIABETES



- Type 1
- Type 2
- Gestational diabetes
- Prediabetes

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# TYPE 1 DIABETES

- Also known as juvenile diabetes
- Usually diagnosed in children and young adults
- When body's own immune system destroys the insulin producing cells of the pancreas – beta cells – which produce insulin
- Only 5% of people have this disease
- Body does not produce insulin
- Is not preventable
  - No primary intervention
- Causes?
  - Predisposition to diabetes – genetics - and something (i.e. weather, virus ... etc ) in environment triggers the disease

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# TYPE 2 DIABETES

- Most common form of diabetes – about 90% of cases
- Used to be called adult onset, non insulin dependent diabetes
- Body produces insulin, but does not use it properly
  - glucose doesn't move into cells, they pile up in the bloodstream when they do occur are often ignored because they may not seem serious

**TYPE 2**

**BODY CANNOT USE INSULIN PROPERLY**

- Can develop at any age
- Most cases can be prevented



# GESTATIONAL DIABETES MELLITUS



- Having diabetes during pregnancy
  - Family Hx of diabetes, overweight prior to pregnancy?
- Having gestational diabetes puts you at risk for diabetes type 2
- Giving birth to a baby >9 lbs also puts you at risk for type 2
- 18 out of every 100 pregnant females will develop GDM

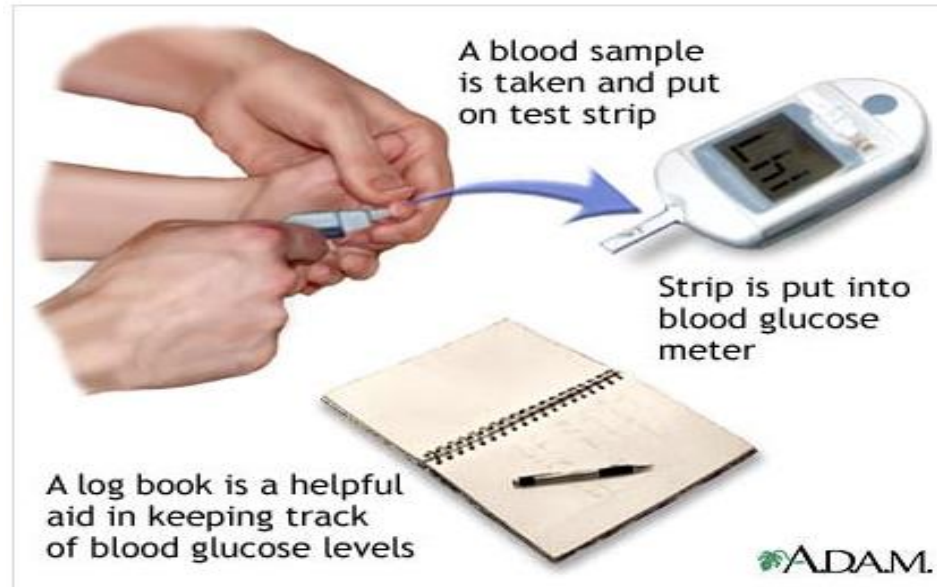
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# GLUCOSE SENSOR

A Glucose sensor is designed to automatically measure interstitial sugar every few minutes, without any user intervention



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# WORKING OF OPTICAL GLUCOSE SENSOR



- The idea is that as the intensity of fluorescence varies, information is transmitted through radio waves by an implanted device equipped with both light source and photodetector.
- Then the waves would be received by another device worn outside the body and information regarding the individual's glucose level would trigger an alarm.
- Glucose Sensor uses a hydrogel, a polymer similar to contact lenses, that is permeable to glucose.
- A Fluorescent Chemical Compound is contained within a hydrogel polymer for stabilization inside the body.
- The Hydrogel has multiple functionalities as enzyme reservoir and a skin sensor and maintaining osmotic gradient for glucose extraction from the skin.





# SYMPTOMS OF DIABETES & OPTICAL SENSOR



Common symptoms of diabetes include:

- Excessive thirst and appetite
- Increased urination (sometimes as often as every hour)
- Unusual weight loss or gain
- Fatigue
- Nausea, perhaps vomiting
- Blurred vision
- In women, frequent vaginal infections
- In men and women, yeast infections
- Dry mouth
- Slow-healing sores or cuts
- Itching skin, especially in the groin or vaginal area



A top-down view of a white card with the words "Thank you" written in purple cursive. The card is on a light grey marble surface. To the left is a bouquet of purple flowers. To the right is a black pen with a white polka-dot grip and a small gift wrapped in white paper with a grey dot pattern, tied with red and white striped twine. A spool of the same twine is in the top right corner.

Thank  
you