# GUJARAT TECHNOLOGICAL UNIVERSITY
## Diploma in Mechatronics Engineering
## Semester: 4

**Subject Name:  CONTROL DEVICES**

| SR NO. | COURSE CONTENT |
|---|---|
| 1. | **INTRODUCTION**<br>1.1. Control device<br>1.2. Meaning, need and application.<br>1.3. Open loop control<br>1.4. Closed loop control<br>1.5. Sinking and sourcing concept. |
| 2. | **SIGNAL PROCESSING.**<br>2.1. Need and meaning<br>2.2. Data acquisition<br>2.3. Sampling<br>2.4. Digitized signal<br>2.5. Sampling rate<br>2.6. Nyquist frequency<br>2.7. Aliasing<br>2.8. Ananlog to digital conversion<br>2.9. Digital to analog conversion |
| 3. | **SENSOR**<br>3.1. Need and classification.<br>3.2. Important parameters (such as sensitivity, linearity, range, response time, accuracy, repeatability, resolution, threshold value etc.) Its definitions and Importance in sensor selection.<br>3.3. Working and application of sensing technique for following parameter.<br>   -Position and speed.<br>   -Stress, strain, force and torque.<br>   -Temperature.<br>   -Pressure.<br>   -Flow and level.<br>   -Vibration and acceleration<br>   -Acoustic<br>   -Profile / shape using touch probe<br>   -Optical<br>   -Electric load<br>   -Object detection<br>   -Vision<br>3.4. Selection criteria for sensors<br>3.5. Common troubles and remedies in sensor operations. |

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| **4.** | **ACTUATORS**<br>4.1. Definition, need, working, applications.<br>4.2. Different types of actuator.<br>    a) Electrical (this includes mainly following)<br>        • DC motors – series, shunt and compound.<br>        • Ac single-phase motor.<br>        • AC poly phase motor.<br>        • Servomotors.<br>        • Stepper motors.<br>        • Linear motors.<br>    b) Hydraulic<br>    c) Pneumatic<br>4.3. Precautions in handling / operating actuators.<br>4.4. Selection criteria.<br>4.5. Common troubles and remedies. |
| **5.** | **MECHATRONIC SYSTEMS**<br>5.1. Introduction.<br>5.2. Design steps and considerations<br>5.3. Various mechatronics systems.<br>    a). Being used in day-to-day life and<br>    b). Expected use in future.<br>5.4. Working, elements and its functions and -applications of following system.<br>    a). Hydraulic robot arm.<br>    b). DC motor base bottle filling.<br>    c). Temperature sensing system.<br>5.5. Mechatronics systems, which are in recent trend |

**REFERENCE BOOKS:**

| Sr. No. | Name of Books | Author |
|---|---|---|
| 1. | Mechatronics and measurement systems:2e | David G. Alciatore -TMH |
| 2. | Introduction to robotics | Arthur J.Critchlow (Macmillan publishing company) |
| 3. | Mechatronics | Published by HMT |
| 4. | Mechatronics | by W.Bolton |