

Syllabus Of Winter Session

1. Introduction to Robotics

- Robots we have made so far: Demonstration
- Different fields involved in Robotics (Presentation 1)
 - Mechanical Aspect
 - Electronics and Embedded Logic (Microcontrollers and microprocessors)
 - Computer Vision, AI and computer CAD/CAM
- Actuators, Microcontrollers and Microprocessors (Presentation 2)
- Computer aided manufacturing with
 - 1. CNC
 - 2. 3D printing
 - 3. Injection Mouldingwith applications (Presentation 3)

2. 3D printing

- 3D modelling
 - Introduction
 - 3D modelling demo with projector
- 3D printing the model
- Materials: ABS, PLA and modern materials like metal, wood ...

3. Basic C

- Functions, Structures and everything preceding it

4. Basic electronics (extremely practical course)

- Voltage and Current intuition
- Resistors
 - Voltage divider intuition
 - R-2R DAC
- Capacitors
 - Intuition
 - A makeshift aluminium foil capacitor
 - RC circuit fading LED
- Inductors
 - Intuition
 - Making inductors with copper wire
- Oscilloscope - Resistors, Capacitors, Inductors
- Diodes and Transistors (Bistable Multivibrator and Charge Pump)

5. Embedded C with AVR

- Bits, bytes, bitwise operators and bitmaps
- Bitmasking and bit flipping with AND, OR, and XOR
- Output and Input with DDR and PORT
- Led Control with AVR port and multiplexing
- Timers in AVR and preemptive multitasking