8051 Programming:

1. IO Interfacing
   1. Program the robot to blow the buzzer for 1 sec.
   2. Program the robot to blink LED with delay of 1 second.
   3. Program the robot to blow buzzer when switch is pressed. When switch is released it should turn off.
2. LCD Interfacing
   1. Program the robot to display your name
   2. Program the robot to display e-Yantra on first line and Fire Bird V on second line.
   3. Program the robot to display special character.
3. Position Encoder
   1. Program the robot to move 50cm forward.
   2. Program the robot to take 90 degrees turn
   3. Program the robot to trace square of side 50cm
4. USB to serial communication
   1. Loading Program:
      1. Small demo activity on how to load program in robot using USB to serial communication.
   2. USB to serial communication:
      1. Program the robot to connect with PC, type a character on keyboard and it should display on LCD.
5. Interrupts
   1. Write a program to buzz the  buzzer after every two seconds using timer overflow interrupt. (Do NOT use the delay function)
6. PWM
   1. Program the robot to control the speed of the motor.
7. Interfacing ADC
8. GPS Interfacing
9. Wireless comm. Using zigbee
10. Interfacing Motors:
    1. Types of motors
    2. Program the robot to move 50cm forward and then buzz buzzer for 1 second.
    3. Program the robot to for different types of turns.
11. **white line sensors** - line following robot, multi-surface line follower, etc
12. **Sharp GP2D12C Infrared Range sensor** - Obstacle detector and Obstacle avoiding robot, etc
13. **IR proximity sensors** - wall follower robot, etc
14. **Battery voltage sensing:**

1. Using the battery voltage sensors monitor the power consumption of the robot during various activities such as locomotion, buzzer and LCD operation.

For all topics, two more problem statements you need to decide and develop modules.

ARM7 Programming:

1. IO Interfacing
   1. Program the robot to blow buzzer for 1 sec.
   2. Program the robot to blow buzzer and blink LED when switch pressed.
2. LEDs
   1. Program the robot to glow LED
3. LCD Interface,
4. Counting external events with on chip counters,
5. Real Time Clock (RTC),
6. Pulse Width Modulation (PWM),
7. Relay and Buzzer Control for alarm events,
8. Servo Motor Control ,
9. On chip ADC/DAC SPI / I2C / UART
10. Interface, Bluetooth/Zig-bee interface