**Outcomes**

* Process music signals using signal processing techniques to extract its signal characteristics such as rhythm (e.g. beat), spectral contents (e.g. colour) and mood (e.g. swinging, loud, quiet);
* Creatively map the music characteristics to dance routines;
* Analyse music signals in real-time on the microcontroller to synchronize dance movement to music;
* Balance a mini-Segway using a PID controller so that it moves around on two wheels under the control of your phone;
* Implement the mini-Segway that autonomously dance to live music.

**Assessment**

* **Presentation** by each project team to an assessor in the morning of Wednesday 20 March 2019
* Take part in a **“Coming Dance” competition** and showcase each team’s design

**Milestones**

1. **~~Control of the Segway – 20~~~~th~~ ~~Feb - COMPLETED~~**
   1. ~~Drive the Segway with a stabilizer along a defined path using a Bluetooth controller~~
   2. ~~Use stabilizer and later implement self-balancing~~
2. **Detects beats and flash LEDs – 27th Feb**
   1. Analyse the music using the microphone on the PyBench and detect when the beat occurs – Flash LEDs to indicate beats
3. **Simple dance with stabilizer – 6th March**
   1. Analyse Staying Alive and Lose Yourself to Dance
   2. Create simple dance routines
   3. Transfer to the PyBench to store on the SD card and write a Python program to control the Segway with stabilizer so that it moves to music
4. **Come Dancing Competition**
   1. Demonstrate the Segway dancing to live music while balancing on two-wheels
   2. Assessment is based on robustness
   3. Creativity of dance routine
   4. Quality of synchronization to music