



No. Crt	Topic Title	Topic Description	Competence Area
1	CNC machine control software and GUI	LabView real-time and FPGA design - read G-code files, axis control, GUI development	LabView and FPGA programming
2	Emulated Resistance for DC Power Supply Load Diagram determination.	The equivalent DC resistance of a transistor running in linear region is controlled by an uC.	Electronic Devices and Circuits, Power Electronics, Embedded C
3	Bipolar Linear DC Power Supply	Two ways to realise (voltage / current source) must be compared in Pspice simulation: a current source and voltage source in series and two feedback circuits.	Electronic Devices and Circuits, Power Electronics, Embedded C
4	Bipolar Switched Mode DC Power Supply	Bidirectional switches and two feedback circuits is used for voltage / current source realisation.	Electronic Devices and Circuits, Power Electronics, Embedded C
5	Thermal Micro-Chamber for Electronic Devices Testing	Microchip dsC and Peltier elements is used for controle the temperature inside the box where is introduced an electronic devices.	Electronic Devices and Circuits, Embedded C
6	Smart Mirror	<p><b>Materials:</b></p> <ul style="list-style-type: none"> <li>- Raspberry Pi (recommended) using Raspberian OS (python) or Win10 IoT OS</li> <li>- old/scrap working monitor</li> <li>- webcam Raspberry Pi compatible</li> </ul> <p><b>Overall steps:</b></p> <ul style="list-style-type: none"> <li>- Link Raspberry Pi to monitor and camera.</li> <li>- Send camera feed from raspberry pi to monitor</li> <li>- Overlay additional content on mirror corners ( news feed, weather, calendar, etc) refreshed every 5-10 minutes</li> </ul> <p><b>Additional step:</b></p> <ul style="list-style-type: none"> <li>- Configurable content on mirror</li> <li>- Link Raspberry Pi with Android phone for content expansion</li> </ul> <p><b>Additional steps</b> ( if time and know-how allows)</p> <ul style="list-style-type: none"> <li>- low-level AI integration that processes images and lets users know if clothes match.</li> <li>- clothes recommendations depending on weather outside.</li> </ul> <p><b>Topic applications:</b></p> <p>The biggest application can be comfort. Can be used to</p> <ul style="list-style-type: none"> <li>- check weather state and other content available in the morning when doing bathroom routine.</li> <li>- check if important emails/calls are missed is Android link is established.</li> <li>- check calendar for today and possible 1-2 days in advance for reminders, meetings, TODOs, etc.</li> </ul>	Computer Science

7	SENT sensors generator	In automotive industry and especially in chassis controller system there are used pressure sensors communicating using SENT protocol. SENT (Single Edge Nibble Transmission) protocol is a one-way serial protocol used for transmitting signal from a sensor to controller. The goal of this project is to create a configurable SENT sensor generator which will be used in HIL Testing (Automatic Testing) and will have the possibility to inject some protocol errors or functional errors. Programming languages: C programming + Python Devices: dsPIC Evaluation Board	Computer science, embedded system, automatic testing
8	LIN sensors generator	In Automotive Industry is usually used LIN (Local Interconnect Network) as communication protocol between two ECUs or between a sensor and the ECU. In Chassis Controller System, LIN protocol is used by Aquaplaning sensors. The goal of this project is to create a configurable LIN sensor generator which will be used in HIL Testing (Automatic Testing) and will have the possibility to inject some protocol errors or functional errors. Programming languages: C programming + Python Devices: dsPIC Evaluation Board or Infineon Evaluation Board	Computer science, embedded system, automatic testing
9	Inventory application	In each company/Group there are a lot of equipments which have to be kept under control. Usually there is a inventory document which have to be updated often. The goal of this project is to create an application which will help each employee to update and to keep the inventory up to date easier. SQL Database will be used as a storage. Programming language: C# and SQL scripting	Computer science, Informatics
10	Framework for Automatic Software Testing	For testing the SW, developed for Chassis controller Systems, will be necessary to create a framework to have the possibility to control the inputs (power supply, the sensors), to simulate the communication (CAN, FlexRay), to write some test scripts which will inject and read the SW variables thru CANape Vector Softer and to generate a test report. Also is important to be prepared for integration in a Jenkins environemnt for Continues Integration concept. <b>Programming language:</b> Python, CAPL <b>Devices:</b> Vector Devices (CANape, CANoe Tools)	Computer science, embedded system, automatic testing
11	InstaMirror	Smart mirror based on Android OS linked to an Instagram account. The smart mirror should be able to take a picture, apply filters, tweak image parameters, add tags, etc and post to the linked Instagram account. All interaction with the device shall be based on gesture recognition.	Computer science
12	Smart wearable for the elderly	The project's output should be a medical wearable device targeted for the elderly. This device should be able monitor basic vitals and scan for abnormalities, additionally it should be able to detect if the person has suffered a fall. In all cases, the device shall send out a notification to either the family ora medical professional, alerting them to the situation.	Computer science
13	V-Model Process Quality Checker Tool	Positive and negative pulses generated using two bidirectional switches, controlled with Microchip dsC.	Computer science

14	Routing failure detection	<p>Implement a classification algorithm that can identify sporadic failures to transfer data form one communication channel to another.  The bus traffic is stored in a Mongo database.  The test data will be provided by Continental.  The data structure of the database records will be defined by Continental.  If needed, training data must be created by the student.  The training data can be generated with CANoe tool.  Support in creating the CANoe simulations can be provided by Continental.  Converting between log files and Mongo database records will be done using a Continental tool.  The routing requirements will be specified by Continental.  Required knowhow/skills:  A. Know how about classification algorithms.  B. Good skills in programming in at least 1 language (preferable Python or C# or Java).  C. Good understanding of communication protocol principles.  D. Basic understanding of databases.</p>	Computer science, Python, C#, Java, Communication protocol principles, databases, classification algorithms
15	Design Patterns	Implementing of design patterns (for OOP), excepting Factory and Abstract Factory.	Computer science, Informatics
16	Total Commander	Creation of a Total Commander	Computer science, Informatics
17	Unwanted Automated detections filtering	Creation of an application that will create zones within which to invalidate any detection, based on the history of detections	Computer science, Informatics
18	Scripts generator	Automated configurable scripts generator ( CAPL/Lauterbach)	Computer science, Informatics
19	.csv file processing	Application for .csv file processing - comparison between simulation and device interfaces	Computer science, Informatics