

Nr. crt.	Title	Description	Technical knowledge required	Tests
1	Smart Watch Connectivity for a Diagnostic On Board Unit.	<p>The Continental Universal Telematic Equipement (CUTE) device offers a wireless interface to a vehicle over which the user can read out diagnostic information of that vehicle. The present conectivity of the CUTE On Board Unit(OBU) is GSM and Bluetooth 3.0 .</p> <p>The idea of the thesis is to analise and implement bluetooth 4.0 conectivity of the CUTE OBU. After the fist proof of concept the student shall implement a use case which involve bluetooth 4.0 conectivity while also researching several features that can be implemented based on the new low-power bluetooth.</p> <p>A first potential feature would be offering the data which is aquired by the OBU to a smart-watch to the user.</p> <p>Other potential features are: Connectivity to a head-up display. Connectivity to smartphone.</p> <p>The subjects covered during this project are: Bluetooth Communication.</p> <p>Also the student shall gain knowledge about may embedded software modules which are inside the OBU thus gaining knowledge in the following subjects: GPS, GSM communication, Accelerometer, Gyroscope, and Vehicle Diagnosis.</p>	Basic Embedded Systems, ANSI C.	ANSI C; microcontrollers

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2	Continous integration with Jenkins	<p>The Continental Universal Telematic Equipement (CUTE) device offers a wireless interface to a vehicle over which the user can read out diagnostic information of that vehicle. The present conectivity of the CUTE On Board Unit(OBU) is GSM and Bluetooth 3.0 .</p> <p>Jenkins is a powerful application that allows continuous integration and continuous delivery of projects, regardless of the platform you are working on. It is a free source that can handle any kind of build or continuous integration. You can integrate Jenkins with a number of testing and deployment technologies.</p> <p>The idea of the thesis is to develop a application that parse and converts XML files to a format accepted by the Jenkins plugins. Development of additional scripts wich automatically moves or rename files may be required. Additional work with Jenkins plugins will be required in order to improve continous integration procces. The student will also be responsable of all maintenance work wich involves Jenkins continous integration.</p>	<p>ANSI C, Windows/Linux Scripting, XML.</p> <p>any knowledge regarding module testing or testing tools such as Tessa is a plus</p> <p>any knowledg regarding Jenkins is a plus</p>	ANSI C;
3	Generic library for serial port interface, applied on power source control (for SWATT)	<p>Develop a library (windows DLL) with some exported function which allows control of devices connected to a virtual serial port (over USB).</p> <p>Prove the library by controlling a power source connected to the USB port of a PC.</p> <p>Integration of the DLL in a computer application named SWATT.</p> <p>Implementation language: C++ or C#</p>	<p>Specific technical knowledge required: C++ or C#</p>	ANSI C, C++ C#

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4	Dynamic Module/ Unit Test using Cantata/ Courage	Dynamic Module/ Unit Test is an important step regarding ADAS development process. Dynamic Module/ Unit Test requires the execution of the software units. The software shall be executed in test environment: Cantata/ Courage (). The dynamic tests are performed with the knowledge of the module internals (written in C/ C++). This means that the branches and paths in functions and modules have to be considered and when the tests will be designed not only the function of the test object is tested, but at the same time it will be checked if all branches in the software have been covered (code coverage).	Mandatory: C/ C++ Optional: microcontrollers	ANSI C, microcontrollers, C++
5	Development of ASIC Automatic Testing environment	Design of LabView applications for ASIC ATE (Automated Test Equipment) environment, based on National Instruments PXI system. Design of various automated test sequences for automatic evaluation of various ASIC parameters. ASIC performance and parameters evaluations based on collected data. CPK evaluation based on collected data from several samples.	labview	Labview
6	RF and Antenna design for access system product	We involve student in real development of RF products by: - Getting familiar with RF topologies - Getting familiar with RF measurement equipment - Getting familiar with specific available literature - Getting familiar with soldering techniques, shielding and matching - Help or perform performance test - Contribute to design - Procure material for matching - Perform simple-medium matching design, perform simulation and measurements, compare results	ETC student, preferable at telecommunication Studied already radio communication course, television, TTI, SCS, etc. Having good results for these exams.	Hardware

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7	Wireless charger products	<p>We involve student in real development of RF products by:</p> <ul style="list-style-type: none"> - Getting familiar with HW topologies and wireless antenna for Qi standards - Getting familiar with HW measurement equipment - Getting familiar with specific available literature - Getting familiar with soldering techniques, shielding and matching - Help or perform performance test - Contribute to design - Procure material for sample buildings/prototypes - Perform simple-medium matching design, perform simulation and measurements, compare results 	ETC student , Good knowledge of step up/ step down convertors, communication protocols lika CAN, LIN, electromagnetism, power management, SRA (sisteme cu reglare automata)	Hardware
8	SW Unit Testing using Classification Tree Method	<p>The Classification Tree Method is a systematically method for structured test case design. The process of the determination of test cases is parted in subtasks. Therefore the input data regions are parted into classes which depend on requirements, specifications and basically on required functionality. In the Classification Tree Editor this method can be applied visually in an easy and intuitive way. Additionally using the CTE integrated in TESSY you can directly enter the test data and execute the tests in TESSY. This leads to a simplified and accelerated test development.</p>	C programming language knowledge	ANSI C, microcontrollers
9	ECAD Library component creation	<p>Use Zuken CR5000 tool for building schematic symbols and footprints for PCB design</p> <p>Analyze technological aspects regarding components description</p> <p>Create new library components according to technologies and standards used in the company</p> <p>Update existing components according to technological changes in the company</p> <p>Work in close cooperation with the team taking care of Electro-mechanical 3D models of components;</p>	CAD tools (Mentor Board Station, Mentor PADS or Zuken CR5000) is a plus PCB soldering technologies know-how is a plus	Hardware

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10	Script for license management	<p>The script/tool must be able to manage all the existing and new licenses. The main features that the tool should provide are:</p> <ul style="list-style-type: none"> - Provide information about the status of the licenses – expired/in use, responsible - Provide information about the expiring dates of the licenses - Send automatically mails to the license responsible - Send emails to the suppliers - Provide a friendly user interface - Provide access based on approval - S.o. <p>The programming language is not defined, free to define in which language should be written. It must only be easy to update and maintain.</p>	Minimum requirements: Basic knowledge on C programming	ANSI C, C++, C#
11	Reporting for Quality Department	<p>Inside the quality department - there are monthly reports regarding status of the different development activities (e.g. are the tests performed, are the code reviews performed). Data is collected from tools with linked databases.</p> <p>Scripts are needed to collect, analyze and report data from the different databases. Visual basic (.xls based) and SQL programming languages as used</p>	Visual basic (for application or .xls)	Any available test
12	BLDC motor control performance testing	The project consists in studying and understanding of project specification relative to the TCU (Transmission Control Unit) electrical tests, BLDC and DC motor functionality and TCU functionality.	electronic components, microcontrollers	microcontrollers, hardware

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13	Design of mechanical parts used in ADAS sensors	<p>The student will gain knowledge of ADAS sensors.</p> <p>Redesign of die cast part (example camera housings):</p> <ul style="list-style-type: none"> -study of design guidelines for die cast part -get familiar with the CATIA working in ADAS -design of part in CATIA – definition of extrusion direction, creation of separation plane, draft angle analysis - drawing part creation <p>Get familiar with tolerances:</p> <ul style="list-style-type: none"> -tolerance types -interpretation of geometric tolerances -tolerance chain calculation <p>Redesign of part using other technologies (plastic, sheet metal) – study, design, drawing</p>	Specific technical knowledge required: CAD, design guidelines for different technologies, tolerance calculation	Mechanics
14	Camera Check for Assembly Quality and Dimensional Conformity	<p>Research and creation of a system for optical automatic inspection of the backend line correct assembly of the products.</p> <p>Possibility of introduction into all the assembly lines and also for the incoming inspection steps.</p> <p>The system must verify also dimensional the parts that are being assembled and the dimensions of the entire assembly result</p>	Camera , vision systems programming. PLC, sensors programming. Programming knowledges(ex: C++, CSharp, ...etc.)	Ansi C

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15	Simple Automated FIFO Shelf	<p>Create a First in First Out Shelf to store the PCB magazines with minimum investment and minimum degree of automation (logo, pneumatics, counterweight, simple solutions.)</p> <p>The shelf itself must be easy reproducible and interchangeable. The shelf must be created like a part of a pattern easy to be added one to the other.</p> <p>First step:</p> <ul style="list-style-type: none"> - Create and propose minimum 3 concept - Study of the feasibility of the solutions and choose the best one - Create the documentation (time schedule, 3D model, drawings, list of materials, cost estimation etc....) - Build up the shelf and test it - Introduce the shelf into the production - Followup.... 	Solidworks or CAD systems, technical drawing and tolerances, Pneumatics and simple automation basic knowledge	Mechanics
16	Investigation for stencil coating material treatment and technology.	The project aim is to study different metal material treatment for stencil and also the influencing of different manufacturing stencil technology's	Microsoft Power Point, English, Solder paste printing process (not mandatory).	Any available test
17	API interface to launch automated tests	<p>Create an API interface for test management tool according given specifications.</p> <p>Daily tasks: requirements understanding, create scripts, review and test scripts.</p> <p>A mentor will support you to stepwise take over own responsibility after an initial training phase which will familiarize you with specific tools.</p>	Basic C programming language knowledge Basic knowledge of embedded systems and about microcontrollers	ANSI C, microcontrollers.
18	Studies for increasing PCB surface tension	Random on the Varnishing process, due to lower surface tension we are facing with the de-wetting defect. The project aim is to study this phenomenon and search for solutions to increase the PCB surface tension.	Microsoft Power Point, English, Conformal Coating or Varnishing process (not mandatory).	Any available test
19	PTC Integrity user and project administration module	Check and assign user and projects permissions within Integrity administration module.	n/a	IT

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20	V2X communication stack evaluation board	<p>V2X wireless communication protocol is used in car-to-car communication system. It is based on short range, ad-hoc wi-fi protocol, specially used in automotive industry.</p> <p>The goal of the project is to set up an AUTOSAR environment on a microcontroller based evaluation board. In this SW architecture the V2X communication stack has to be integrated, and tested.</p>	C programming language, microcontrollers	ANSI C, microcontrollers
21	Demo Application for an Embedded Linux Platform	<p>Our group is responsible with creating a modern platform that offers various services for our application developers such as:</p> <ul style="list-style-type: none"> - Bluetooth - Wi-fi - GPS - GSM/3G - Touchscreen - USB Connection <p>We want to develop a demo application to showcase the various functionalities that our platform has to offer. During your summer practice, you will learn to use the APIs to use the technologies mentioned above and you will be part of the development effort for this brand new demo app.</p>	<p>Experience with an OOP language (C++ or Java)</p> <ul style="list-style-type: none"> - Some embedded experience would be a plus - Some Linux experience would be a plus - Some GUI design experience would be a plus 	C++, Java
22	Lightweight Profiling Tool for a Linux Based Embedded Platform	We need your help in creating a lightweight tool that can parse automatically generated profiling logs and interpret/classify the data. The processed and filtered information would then be represented via custom visualizations.	<p>Experience in an OOP language (C++ or Java)</p> <ul style="list-style-type: none"> - Some embedded experience would be a plus - Some Linux experience would be a plus - Some GUI design experience would be a plus 	C++, Java

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23	Planning Synchronization Tool	<p>We, in the Dynamic Platform group, use two tools in our day to day work.</p> <ul style="list-style-type: none"> - A tool to track the issues and features that need to be implemented - A tool to track the work of our team on the issues and features to be implemented (AGILE) <p>We want to create a mechanism to synchronize these tools in order to automate the planning and reporting process.</p>	<p>Experience in an OOP language (C++ or Java)</p> <ul style="list-style-type: none"> - Some shell scripting experience would be a plus 	C++, Java
24	Auto Code Generation ACG from Matlab Simulink models for customer projects	<p>We receive from customer models in Matlab Simulink format. We need to generate code out of these models and tests.</p> <p>In order to reach that we need to follow several steps:</p> <ul style="list-style-type: none"> - generate test vectors using Reactis from customer models - import customer models and modify in SDA format (Continental specific Matlab library) - generate specifications - auto code generation, review generated code, solve error/warning messages - import test vectors and run test cases in floating point, fixed point, software in the loop (SIL) and on the target with microcontroller (PIL), analyze test results - document, save results in a MKS workspace 	<p>Systems Theory: good</p> <ul style="list-style-type: none"> - Systems Identification: good - Numerical Control Systems: good - Signal Processing: good - Programming ANSI C: good 	ANSI C, Matlab.

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25	Automatic testing of an Airbag Control Unit	<p>As a student in Passive Safety Test Group you will learn about Airbag Control Unit, get in contact with the latest test equipment on the market, use SW functions to control complex/Real Time measuring equipment.</p> <p>Inside our team we have several exciting projects open for you:</p> <ul style="list-style-type: none"> - develop HW & SW tools that enable automatic test activities for the Airbag Control Unit. - develop automatic tests using C# and the preexisting CFramework. - maintain & Develop Excel macros for test result evaluation 	Good programming skills. Basic electronics & uController know-how	C++, C#, hardware
26	Test Automation for Live Items on Diagnostics Tool	To develop a tool to be able to generate a simulation file(XML format) from an Indium datasheet in regard to manipulate for each live item the data in the response message and generate a report of the output (value displayed for each input value modified in the response message). The Report will be extracted for The Continental diagnostic tool and OE tool. Both report will be compared in regard to validate the live items for the Indium datasheets.	C#, XML, CAN, KWP2000, ISO14229, Excel	C#
27	Module SW development for embedded transmission system.	Learning the process and performing an industrial SW for automotive products. Requirements analysis, design concept, coding in C language and integration in a complete project.	Good knowledge of microcontrollers and understanding of programming principles.	ANSI C, microcontrollers
28	Responsive web applications	<p>The project has the goal to implement prototypes of web applications using different UI controls and check their behavior on various screen resolutions.</p> <p>Activities:</p> <ul style="list-style-type: none"> • Implement a simple web app and check the behavior of the most common controls on different screens and different browsers • Detect the UI problems and make improvement proposals • Analyze the Continental UI design rules and come up with a layout framework 	OOP, C#/Java; knowledge of web development technologies (ASP.NET, MVC, HTML5, Bootstrap) is a plus	C#, Java

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29	Vehicle Plant Model	Develop a customizable vehicle plant model for testing control strategies using a realistic test environment.	MATLAB/Simulink, Physics	Matlab ANSI C
30	Simulink Customization Tools	Develop MATLAB .m scripts for custom Simulink tools (e.g. model formatting).	MATLAB (preferred), programming (any structured programming language)	ANSI C, Matlab,
31	Graph Plugin for PNA tool, ODX Flash Generator in Java	The PNA(PowerSAR NVMY Analyzer) tool generates a report of NonVolatile Memory in a format fitting for user needs. Some graphical reports, useful for our customers, should be generated by a Graph Plugin ODX Flash Generator is an application which is preparing the final files to be flashed using ODX(Open Diagnostic Data Exchange – ISO22901-1) standard format.	XML/XSD/XSLT/DOM, Java Eclipse, Swing, Apache POI	Java, C#, C++
32	Automated testing	The IIC department is providing Software for Infotainment systems. An important step of the software lifecycle is to validate that it meets the customer expectations, that it functions according the specifications. Automate as many test scenarios will increase the test coverage, will decrease the number of problems that are not observed by manual testing. We are using an automated test platform in order to write test cases. Main responsibility: automate test cases. Beside that, he will participate to the real test process, part of kanban process used. The student will be part of a software development team, being in close contact with software architect, developers, testers in order to get all information needed.	Terminal year at faculty, basic knowledge of programming C, C++	ANSI C, C++
33	Automate test for model driven development	Create automated tests for Rtools, our application used for Rhapsody workflow.	Java	Java
34	MapView redesign	MapView is a memory visualization tool. It has been developed to help software developers know and estimate memory budgets. The tool is analyzing data produced by compiler and linker and creates an intuitive report in Excel as output.	JAVA, XML, basic knowledge about microcontrollers architecture; Nice to have knowledge about C Language	Java - prio 1 ANSI C - prio 2 Microcontrollers- prio 2

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35	ASICs SMPS	<p>Tools: LeCroy oscilloscope, Test template, IMS</p> <p>Daily tasks:</p> <ul style="list-style-type: none"> - Understanding of the requirements and the description of the switching mode power supply modules - Understanding of the ASICs requirements - Support in the testing setups - Support in ASICs power supply testing <p>After an initial training phase which will familiarize you with our products, tools, processes and organization, a mentor will support you in taking over of the responsibility for the power supply testing, mainly SMPS.</p>	electronics	Hardware
36	Tools for continuous integration	In order to implement continuous integration methods on Instrument Clusters application projects, different tools (C#, Excel with VBA) needed for automatization of testing, requirements traceability, software build, etc, must be developed. We need students who are willing to improve their skills or learn new programming languages (C#, VBA).	C or C#	C
37	Sensor Test Framework	Test framework for Sensor application which generates semi random test cases, encapsulates the software under test and processes the results in a human readable format. The results can be compared with a previous set of results from a different software version.	C++ , minimum low level knowledge (interrupts , timers)	ANSI C, microcontrollers, C++
38	Thermal analysis of Engine Control Units	Perform thermal analyses ,physical tests and measurements for Engine Control Units and electrification controllers. Use ANSYS - IcePak as CFD analysis tool.	Thermal management , physical thermal processes.	Mechanics
39	Structural analysis of Engine Control Units	Perform structural analyses (vibration) Prepare samples for physical tests and measurements for Engine Control Units and electrification controllers. Use ANSYS as structural finite element analysis tool.	Strength of Materials , Vibration , basic knowledge of Finite Elements	Mechanics

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40	Runtime Measurements in an Embedded Automotive System	<p>Background: The Commercial Vehicles Instrument Clusters are embedded systems that are based on a real time operating system. Ensuring the right timings are critical for the correct system execution.</p> <p>Project proposal: In a given embedded system, different timings must be measured by using an existing runtime measurement environment (target + tool). Measurements must be done for: Startup and shutdown sequence, ISR timings, runtime execution, system running in a stress environment. Integration of the timing markers, documenting and analysing the results must be done.</p>	C, basic embedded knowledge	Ansi C, Microcontrollers
41	Frequency Generator Unit – performance analysis	<p>Background: The Commercial Vehicles Instrument Clusters and Body Control Units are frequently using generated frequency signals for controlling some sensors or other ECU's from the truck.</p> <p>Project proposal: Performance analysis for the units that can generate output frequencies must be done. This must include the unit usage from internal point of view, frequency generation limitation, ISR latency, low level signal generation methods.</p>	C, basic embedded knowledge	Ansi C, Microcontrollers
42	Universal Display Controller	Internally developed project that is used in demo project. We plan to extend the current product with additional interfaces. Project goal is to implement and integrate the new features (radio, wifi, etc).	C or C++	ANSI C, microcontrollers, C
43	Linux Can frame simulator	Implement a standalone linux system that is able to capture and simulate network nodes from the can bus. Server and application should be implemented in C and or C++.	C or C++	ANSI C, microcontrollers, C

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44	Design parts of a HUD	Design in Creo some of the following parts as 3D model +2D drawing: <ul style="list-style-type: none"> • Side wall • Motor holder • Lager • Heat sink • Screen • Mirror / mirror holder / mirror assembly If the ProE knowledge is not available, 1 week is needed for the basic training Creo.	general technical knowledge / ProE/Creo	mechanics
45	Design some parts of an Instrument cluster	Design in Catia V20 the following parts as 3D model +2D drawing: <ul style="list-style-type: none"> • Small light-guide - display • Main light-housing • Light conductor • Rear Cover • Dials • Mask • Lens • assembly If the Catia knowledge are not available, 1 week is needed for the basic training Catia.	general technical knowledge / Catia	mechanics
46	Design parts of an Instrument cluster	Design in Creo some of the following parts as 3D model +2D drawing: <ul style="list-style-type: none"> • Small light-guide - display • Main light-housing • Light conductor • Rear Cover • Dials • Mask • Lens • assembly If the ProE knowledge are not available, 1 week is needed for the basic training Creo.	general technical knowledge / ProE/Creo	Mechanics

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47	Design parts of a secondary display	Design in Catia 2 of the following parts as 3D model +2D drawing: <ul style="list-style-type: none"> • Frame • Rear cover • Assembly If the Catia knowledge are not available, 1 week is needed for the basic training Catia.	general technical knowledge / Catia	Mechanics
48	Auto-code generation from SDA models for DRPD aggregate	SDA is a Continental specific tool based on Matlab and Simulink. The student must improve already existing SDA models to have 100% test coverage and to be able to generate code based on the respective models. This means creating test cases in SDA and scaling the models for ACG.	Systems Theory: good Numerical Control Systems: good Low level programming (C, embedded C): good	ANSI C, Matlab
49	SW development and testing	Become familiar with the SW development process for several aggregates in P ES: Engine Lubrication, Engine Temperature, Heating Ventilation and Air Conditioning. In this project you will learn the development process, technologies and tools used in engine projects. All the process steps, technologies and tools will be used on real tasks. Scope of the practice is to understand the incremental development, the change and the configuration management and see the needs that are coming from various roles (SW Developer, Project Manager and Discipline Manager).	Low level programming (C, embedded C): good Microcontrollers: good	ANSI C, microcontrollers
50	VitalQIP 8 Project	Support the Corporate Network and Voice team during the rollout of the new DNS/DHCP/IP Address Management solution and new feature set.	IT Infrastructure skills – Networking, Software Installation, Windows XP/7/10 OS	IT
51	McAfee infrastructure migration (Regensburg -> Frankfurt)	Project for migrating Corporate Infrastructure from Regensburd Datacenter to Frankfurt Datacenter.	IT Infrastructure skills – Networking, Software Installation, Windows XP/7/10 OS	IT

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52	FEA generic	<p>Tools: LeCroy oscilloscope, Test template, IMS, FEA Automated tool</p> <p>The task would be to build up and stand for FEA automatic test . The idea is to gather the knowledge of existing testbenches and optimize the existing program for testing.</p> <p>The task is also to be checked the existing manual tests witch might be automatic.</p> <p>The SW used is Excel based, plus other specific diagnose programs.</p> <p>The knowledge acquired would be the usage of Microsoft Office especially Excel.</p>	electronics	Hardware
53	Fuel low pressure pump control improvement	<p>You will have the chance to learn the basic principles of low pressure pump functionality by developing and improving the data acquisition and control by implementing in C the models developed in Matlab/Simulink.</p> <p>In this project you will learn the development process, technologies and tools used in engine projects. All the process steps, technologies and tools will be used on real tasks.</p> <p>You will have to create a structure according with Continental standard architecture and last but not least you will have the possibility to test the results on real environment.</p>	<p>Matlab/ Simulink: basic</p> <p>C : basic / advanced</p> <p>Basics of Automotive, Microcontrollers</p>	ANSI C

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54	SW development process from design and implementation to testing	<p>Become familiar with the SW development for one of the most complex aggregate in P ES – Injection Realization. This is the control algorithm for Gasoline injector. In this project you will learn the development process, technologies and tools used in engine projects. All the process steps, technologies and tools will be used on real tasks.</p> <p>Scope of the practice is to understand the incremental development, the change and the configuration management and see the needs that are coming from various roles (SW Developer, Project Manager and Discipline Manager).</p>	C languages, Microcontrollers	ANSI C
55	Automatization of electrical tests for EMC and Test Lab	Take existing equipments and create an automatization of the test, self test, multiplexing and demultiplexing of I/O, based on specific test plan.	Specific technical knowledge required: - Electronics - Test equipments - Test procedures - Automatization	hardware
56	Development of component simulators to support the “Component_Release” concept	<p>The new SW platform, under development in PSS, promotes the concept of Component Release (or Release by Component).</p> <p>To support this concept, a means of performing component specific tests, as a stand alone product has to be conceived. Performing these tests should be possible, without integration in the broader product (Airbag Control Unit in this case) and it without even having the specific hardware available.</p> <p>One appropriate approach is a simulator, which is a project that integrates the component under test with an environment which allows the injection of component specific input data and monitoring of the component’s reaction.</p> <p>The practice shall start with a documentation phase, followed by a design phase and the implementation and testing of the simulator.</p>	C programming language. Experience with IDE’s is desired.	ANSI C

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57	Static C Code Analysis: removal of root cause vs message suppression	<p>As part of the effort to ensure high code quality, C files are analyzed by a static checker (lint) to find errors or deviations from MISRA* rules.</p> <p>In order to meet customers' "zero lint messages" requirement two alternatives stay at hand:</p> <ul style="list-style-type: none"> - correcting the code in order to have the message removed from the lint report or - simply suppressing the lint message. <p>While the second is the simpler alternative it also is the un-safest and it shall only be used if there is no way to remove the root cause which leads lint to report the message and only if by keeping the code unchanged (and consequently the tool would report the message!) the outcome of the application is under control/correct.</p> <p>The aim of the project is to set up two lists of lint messages:</p> <ul style="list-style-type: none"> - a list of lint messages which can be eliminated by removing the root cause in the code; each message in this list will be accompanied by code examples before and after the correction - a list of messages that are allowed to be suppressed, because there is no way (workaround) to get rid of the message and because suppressing the message is not only un- avoidable but also safe; each message in this list will be accompanied by code examples and possible justification messages. <p>The practice shall start with a documenting phase, followed by a hands-on-code phase and finally by the</p>	C programming language	Ansi C

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58	Comparative study of MISRA 2004 vs MISRA 2012; Which C99 features impact embedded C programming?	<p>As part of the effort to ensure high code quality C files are analyzed by a static checker (lint) to find errors or deviations from MISRA* rules.</p> <p>Currently, MISRA 2004 is the set of rules automotive code has to be compliant with but the request from car manufacturers for compliance with MISRA 2012 is around the corner.</p> <p>The main difference between the two consecutive revisions of the MISRA rule set consists in the fact that MISRA 2012 support C99 and tolerates C90 while MISRA 2004 supports C90.</p> <p>The aim of the project is to find which of the new rules in MISRA 2012 relate to features of C99 not to be found in C90.</p> <p>Knowledge of these features may help prepare for new programming techniques as well as avoid usage of C99 features not supported in embedded software.</p> <p>The practice shall start with a documenting phase, followed by a hands-on-code phase and finally by the set up of a document containing the differences between MISRA 2004 and MISRA 2012, as well as a list of C99 features accepted for embedded programming.</p> <p>*The Motor Industry Software Reliability Association</p>	C programming language	Ansi C

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59	Automated test Equipment Switch	<p>Your task is to improve the characteristics of an existing electronic switch design. The switch will be used inside an Automated test equipment. Expected results are improvement of the switching time and reduction of the parasitic capacitance of the switch.</p> <p>What needs to be done:</p> <ol style="list-style-type: none"> 1. Analyze and understand the current solution used for the electronic switch 2. Search for new market components (MOS's) with better characteristics than the existing one. 3. Design and simulate the new proposed schematic 4. Build and test a prototype 5. Prepare the design for small series production <p>A mentor will guide you during your summer practice to explain what needs to be done.</p>	Analog / Digital Electronics, knowledge of Electronic equipments testing	Microcontrollers, hardware
60	Development Process Improvement	<p>Your task is to work together with the Process development team in order to find improvements inside the development process. You will have to learn how to do requirement engineering, change management and management reporting of different measures. You will work with project managers to create configuration management items for different projects.</p> <p>A mentor will guide you during your summer practice to explain what needs to be done.</p>	Highly Communicative person, Team worker	Any available test

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61	Test Simulator for EMC testing	<p>Your task is to create and build a simulator of analog / digital / PWM signals that can be used inside an EMC test chamber. The simulator should be connected to the Electronic Control Unit, and simulate the test signals. The control of the simulator should be made via optical cable.</p> <p>What needs to be done:</p> <ul style="list-style-type: none"> - Analyze and understand requirements of the signals to be generated / measured - Create a block diagram of the simulator - Create the schematics / Layout of the simulator - Build and test a pair of prototypes <p>A mentor will guide you during your summer practice to reach your goals.</p>	<p>Analog / Digital Electronics, knowledge of Electronic equipments testing, optical communication, basic understanding of EMC</p>	<p>Microcontrollers, hardware</p>

Nr. crt.	Title	Description	Technical knowledge required	Tests
62	Sensor Module for Formula Student Car	<p>Design and Build a sensor Module for a Formula Student Car, based on an existing development platform (choose from Arduino, BeagleBone, RaspberryPi, MSP430 Launchpad, etc) and a PCB shield that you would create. The device needs to have a housing and connect to the vehicle wiring harness.</p> <p>The sensor module should read 8 analog inputs, 8 digital Inputs and 4 frequency inputs. The data should be sent by CAN interface to the other vehicle control units.</p> <p>What needs to be done:</p> <ul style="list-style-type: none"> - Define the architecture of the sensor module - Choose the existing development platform (from Arduino, BeagleBone, RaspberryPi, MSP430 Launchpad, etc) - Schematics for the shield board, containing all the signal conditioning - Layout of the PCB, Bill of Materials - Building and testing the prototype - Start software development - Integration in the Formula Student car - A mentor will guide you during your summer practice period 	Analog / Digital Electronics, knowledge of Electronic equipments testing, communication protocols	Microcontrollers, hardware

Nr. crt.	Title	Description	Technical knowledge required	Tests
63	Wireless communication for Formula Student Car	<p>Design and Build a wireless communication system for a formula student car. The purpose of the module is to get the Car parameters on CAN network, and send them via an existing communication module to the base station at the pit stop. The expected range is less than 500m in noisy environments(competition).</p> <p>What needs to be done:</p> <ol style="list-style-type: none"> 1. Choose the communication module (433MHz module, Wi-Fi, etc) 2. Design the transmitter module, re-using a standard development board (Arduino, BeagleBone, Raspberry Pie, MSP430 LaunchPad) 3. Design the receiver module for a simple connection to the computer (USB, serial) 4. Create the Layout of the Boards, Bill Of Materials 5. Build and test the prototypes 6. Software development on the Transmitter module 7. Software development on the receiver Module (computer) 8. Integration in the Formula Student car <p>A mentor will guide you through your summer practice period.</p>	Analog / Digital Electronics, knowledge of Electronic equipments testing, communication protocols	Microcontrollers, hardware
64	Cluster analysis of DV and PV errors	<p>Introduction of all DV and PV errors in CQTS or MRDB tool</p> <ul style="list-style-type: none"> - Cluster analysis of data - Define improvement measures - Track and monitoring implementation of defined measures - Check effectiveness of measures implemented 	-	Any available test
65	Automatic Test Scripts Generator	<p>Based on requirements test scripts can be generated and automatically run on target. Client requirements placed in a specific format so that scripts can be generated and automatically.</p> <p>Scripting generation algorithm creation.</p>	OOP, C# / Java.	C# / Java.

Nr. crt.	Title	Description	Technical knowledge required	Tests
66	CANoe Simulation updates for projects	CANoe Simulation are used to simulate different vehicle ECU. Update simulation according to project needs: build or update new panels and add new features	Ansi C, Visual	ANSI C
67	Conti Connecting You	Student will have to develop an application that will allow people from the same team/group to interconnect and share different information. Car sharing platform for the colleagues from the same Group / Team / Department / Company. Mobile application development.	Android, Java,	JAVA
68	Graphical interface & testcase creator for SWATT	A graphical environment (for inputs and outputs) can be created to allow testcase generation similar to testbench usage (based on user activity). The "buttons" in the panels will generate text lines in a .c.test file, which can be later executed with SWATT	C#, Visual Studio (Visual)	C#
69	IntellAR Stand/ IntellAR Poster	Scan a pattern with your device from a picture on the wall or a stands, and project 3D models about our products together with extra details directly on the screen of your phone or tablet device.	Android, Java,	Java
70	Mobile app for car diagnosis and troubleshooting	Create an Interactive customer service application (mobile) (containing information about the car, guidance in case of error, nearest auto-service, troubleshooting etc) The application should contain different sections: 1. Car user manual – possibility to search a topic of interest (ex a light on board, setting the seat/mirrors position etc.) 2. Find nearest authorized car services based on current location 3. Frequent issues and how to solve them if possible without service assistanceand any other idea from students.	Basic programming knowledge in mobile applications development (Android Studio. Eclipse, Visual Studio, Xcode etc.)	C#, Java

Nr. crt.	Title	Description	Technical knowledge required	Tests
71	Autonomous Driving	Build a platform (Car) which includes : - Sign recognition - Lane assist - Remote Driving - Safe break - Adaptive cruise control	C / C++ , OpenCV (basic) ,Basic Electronics	ANSI C, microcontrollers, C++, hardware basic
72	Design Document Generator	Build Design generator for SW modules based on C code. Generate the following : - Interfaces - State charts - Function call graph	C or C# or Java, Parsing files	ANSI C,, C++, C# or Java,
73	HSSPI Driver for and ARM Based platform	Create a driver that is able to program a HSSPI (High Speed SPI)based memory connected to an ARM based microcontroller. Main features: 1. Initialization of the HSSPI based communication with the memory chip 2. Implementation of the sector erase mechanism for the available memory chip. 3.Implementation of the read mechanism for the available memory chip. 4. Implementation of the program data mechanism for the available memory chip. 5. Integration of the driver in a real time system for performing target tests. 6. Create a driver specification.	C programming language, microcontrollers, flash memory, CAN bus	ANSI C, microcontrollers, C++
74	Automotive CAN to Ethernet Bridge	The result of the project will be a tool called Continental Engineering Services Integration Tooling – Media Bridge (CESIT-MB2) that can be used to convert data from three separated CAN interfaces to an 100Base-T1 Ethernet standard uplink. It can be used e.g. to interconnect automotive ECU's to Automotive gateways (Automotive GTW) thereby optimizing: harness size and internal CAR architecture.	Students: 2-3 year of study HW Knowledge Required: Signal and Systems, Basic Electronics, Ethernet Design , Basic OSI Model Overview MD Knowledge Required: Catia/Creo knowledge, tolerance calculation, Technical drawing, Manufacturing technologies. SW Knowledge Required: Basic ANSI C, Basic microcontroller understanding, Basic OSI Model Overview	HW, MD

Nr. crt.	Title	Description	Technical knowledge required	Tests
75	Automotive Ethernet Gigabit Converter	<p>The result of the project will be an tool called Continental Engineering Services Integration Tooling – (Ethernet) Media Converter (CESIT-MC4), that can be used to convert data from 1000Base-T Ethernet standard to 1000Base-T1 Ethernet standard that is used in automotive environment. It can be used e.g. to interconnect automotive ECU's to standard IT equipment like Ethernet Switches or directly to PC's.</p>	<p>Students: 2-3 year of study HW Knowledge Required: Signal and Systems, Basic Electronics, Ethernet Design , Basic OSI Model Overview MD Knowledge Required: Catia/Creo knowledge, tolerance calculation, Technical drawing, Manufacturing technologies. SW Knowledge Required: Basic ANSI C, Basic microcontroller understanding, Basic OSI Model Overview</p>	HW, MD, ANSI C
76	Universal Display Controller	<p>Internally developed project that is used in demo project. We plan to extend the current product with additional interfaces. Project goal is to implement and integrate the new features (radio, wifi, etc).</p>	C or C++	ANSI C, microcontrollers, C.
77	Dynamic graph visualization of the base software architecture in an instrument cluster project	<p>Develop a PC software tool (C#) which generates a graphical overview of the embedded software architecture for an instrument cluster base software project. The tool will use as input configuration files (pseudo language format) of the base software modules. Main tasks: - Understand software architecture of an instrument cluster base software project - Parse input files and store useful information in internal data structures - Develop a PC tool which is using existing library for graphs representation to visualize in a dynamic way details about software architecture</p>	ANSI C, Embedded systems / Microcontrollers	ANSI C, Microcontrollers, C#

Nr. crt.	Title	Description	Technical knowledge required	Tests
78	Kinect-o-car	<p>Building a toy car and guiding it through Microsoft Kinect with hands/legs movement.</p> <p>As project guidance, the following link can be checked: http://www.amazedsaint.com/2013/10/cakerobot-gesture-driven-robot-that.html</p> <p>The project would have 2 steps:</p> <ol style="list-style-type: none"> 1. Build the toy car and make it move (SW + EE + MD) 2. Adapt the SW of the built car to be guided by movements recognized by Kinect 3. OPTIONAL: Make a graphical interface to see the car's route 	<p>Basic EE/ HW knowledge - Arduino / Raspberry PI/ UDOO Basic knowledge</p>	<p>ANSI C, microcontrollers, C#, hardware and mechanics.</p>
79	Software Reference for Bluetooth cryptography	<p>Encryption in Bluetooth with low energy (BLE) uses Advanced Encryption Standard (AES) cryptography. To make sure the communication is always secure and protected several features are covering encryption, trust, data integrity and privacy for user's data.</p> <p>The project scope outline the need to define a Reference Software Application involved in message data encryption/decryption over a Bluetooth channel. Encrypted message payload data is forward to a High Secure Microcontroller (HSM) responsible with authentication/authorization mechanism.</p> <p>Project output is expected to be a java computer application able to monitor message data payload over a secure connection association between BLE and HSM.</p>	<p>Java knowledge</p>	<p>Java</p>

Nr. crt.	Title	Description	Technical knowledge required	Tests
80	IDSW RF Tool	<p>The purpose of this project is to define and implement together with the team a GUI which can be used for receiving and decoding RF frames from a remote keyless device.</p> <p>The scope of this tool is to help the team during the project development phase.</p> <p>Tool shall have the following main features:</p> <ul style="list-style-type: none"> - HW used : development board from NxP - User friendly GUI - Real-time RF acquisition - RF parameters configurability - RF data parsing <p>The phases of the summer practice project are:</p> <ul style="list-style-type: none"> - Definition of the concept - Implementation of the tool - Testing in real project 	C, Microcontroller, C#/C++ knowledge	ANSI C, microcontrollers, C++/C#
81	IDSW Static Code Analyzer Tool.	<p>The purpose of this project is to define and implement together with the team a tool which can be used for analyze of C-written source code in remote keyless projects.</p> <p>Tool shall have the following main features:</p> <ul style="list-style-type: none"> - CPU load analysis - shared variables analysis - stacj usage alaysis - call tree analysis (function calls , modules interaction) <p>The phases of the summer practice project are:</p> <ul style="list-style-type: none"> - Definition of the concept - Implementation of the tool - Testing in real project 	C, Microcontroller, C#/C++ knowledge	ANSI C, microcontrollers, C++/C#

Nr. crt.	Title	Description	Technical knowledge required	Tests
82	Secure vehicle Access and Start via Near Field Communication (NFC).	<p>The purpose of this project is to define and implement together with the team a system which can be used for secure Access and Start of the car using a smartphone. Communication channel between car and smartphone is NFC and this should be secure.</p> <p>The phases of the summer practice project are:</p> <ul style="list-style-type: none"> - Definition of the concept (use case scenarios, data flow, communication channels). - Security concept that can be embedded into project concept. - Implementation of the server (e.g. secret key exchange) - Implementation of a smartphone application - Implementation of the software on embedded hardware. 	C, Microcontroller, Java knowledge. C# knowledge, Android development experience and web application servers (eg Apache Tomcat) knowledge are a plus.	ANSI C, microcontrollers
83	Automated Signal Analysis Environment	<p>The target of the project is to define and develop "Automated Signal Analysis Environment" together with the team. The tool shall be able to analyze/verify if the communication protocol (SPI, UART, etc) between 2 components is correct or not. The communication signals are stored in CSV (comma separated values) files format.</p> <p>The following steps shall be followed:</p> <ul style="list-style-type: none"> - Concept refinement (basic requirements for the tool) - Implementation of valid communication description in xml - Implementation of the CSV files analysis in C# - Verification of the implementation using test vector files 	C, C# Optional: XML, microcontrollers.	ANSI C, microcontrollers

Nr. crt.	Title	Description	Technical knowledge required	Tests
84	Automated HIL Environment for Remote Keyless Entry SW	<p>The target of the project is to develop test scripts for HIL (Hardware In the Loop) test environment for embedded systems, specific to Remote Keyless Entry function.</p> <p>The following steps shall be followed:</p> <ul style="list-style-type: none"> - Learning the script language - Learning car access software - Learning test techniques - Implementation of various tests for car access generic SW components 	C, embedded SW, Optional: Python, microcontrollers, SW testing techniques.	ANSI C, microcontrollers
85	EOL CAN Trace decoder tool	<p>Create a tool that takes as input a CAN trace monitor output (example: CANOTRON) and adds comments to the CAN trace related to the EOL interfaces used.</p> <p>Application should be sensible to the EOL image and what module versions are located inside. Therefore it will need to also be able to read from the EOL image file and get info. First revision can be based on "Latest" module specifications.</p> <p>Optional – use MKS feature to download some module specifications</p> <p>Optional – extend CANOTRON application</p> <p>Optional – generate warnings for the CAN trace (based on some scripted input) for various commands (double initializations, 0xB0, 0xB3 errors, etc.)</p>	Visual C / Visual Basic	C++

Nr. crt.	Title	Description	Technical knowledge required	Tests
86	EOL embedded chess game	<p>Create an embedded application that is capable of playing a stream of data in MP3 format. The stream of data ("MP3 file", "WAV file", "Raw Data file") can come as:</p> <ul style="list-style-type: none"> - Data is already available in a RAM space - Data is already available in a FLASH space (more memory available) - Data is streamed over CAN to the application <p>Optional – Create an equalizer Optional – Create sound feedback over the instrument cluster's display (sound spectrum) Optional – Create sound feedback over the instrument cluster's LED's with PWM signals (low / medium / high frequencies are highlighted by different LEDs) Optional – Data algorithms (configure Kbps, volume, etc)</p>	Embedded C	ANSI C, microcontrollers
87	EOL-Based Pong Game	<p>The scope of the project is to implement an EOL image that is capable of running a pong game on an instrument cluster. The game itself will be loaded into the cluster RAM via EOL protocol and will take control of the program execution in an endless loop. The following functions have to be provided:</p> <ul style="list-style-type: none"> - The pinball game physics and algorithm - A drawing engine for game interface - Support for 2 players (2 input channels will be used, either CAN or pushbuttons) - Save game / load game feature (games to be stored in an available flash block) - Support for a basic set of player interaction commands (movement, pause, start, etc...) 	C , microcontrollers, basic electronics	ANSI C, microcontrollers

Nr. crt.	Title	Description	Technical knowledge required	Tests
88	EOL "plug and play" toolbox	<p>Create an embedded special application, that once downloaded in the RAM space of an instrument cluster, will read out all the available information that the current project has available (used controller, connected devices, clock settings, etc.) and will make them available to an used.</p> <p>Implementation requirements</p> <ul style="list-style-type: none"> - Get Controller ID - Get active CAN channels - Get clock settings - Get activated peripherals - Test connected devices safely and return device information <p>Optional requirements</p> <ul style="list-style-type: none"> - Create a decoding tool for responses 	<p>Embedded C Microcontrollers</p>	<p>ANSI C, microcontrollers</p>
89	Cluster Instruments reprogramming via Ethernet	<p>The scope of the project is to develop a subsystem able to reprogram Cluster Instruments via Ethernet.</p> <p>Memory devices to be reprogrammed are:</p> <ul style="list-style-type: none"> - internal flash memory of microcontroller - external SPI serial NOR flash memory <p>The access to memory devices should be based on usage the existing software drivers for every memory device.</p>	<p>C , microcontrollers</p>	<p>ANSI C, microcontrollers</p>

Nr. crt.	Title	Description	Technical knowledge required	Tests
90	Delta Flashing	<p>The scope of the project is to develop a system able to update the ECU only with the differences between actual and new software instead of reprogramming the complete new software.</p> <p>The project consists of 2 parts:</p> <ol style="list-style-type: none"> 1. PC tool – should be able to use a differential binary files compression algorithm to calculate the differences between the actual software flash data (Base File) and new software flash data (Update File). The differences (Delta Files) are transmitted to the ECU. 2. Embedded part (code running on microcontroller) - should be able to build the Update File using the group of Delta Files and the Base File. To achieve this, a complementary algorithm is used. <p>The flashbootloader will replace the flash memory content. The old software will be patched with Delta Files sent by the PC-Tool. The patching process is defined by a specific algorithm.</p>	<p>For PC tool: C++, C#</p> <p>For Embedded Part: C, Microcontrollers</p>	<p>For PC tool: C++, C#</p> <p>For Embedded Part:: ANSI C, microcontrollers</p>
91	Ethernet Trace tool	<p>The scope of the project is to develop a tracer tool which monitors Ethernet messages.</p> <p>It should be able to:</p> <ul style="list-style-type: none"> - capture messages - interpret messages - filter messages - create a log file - provide an easy UI for the user 	<p>OOP, C++, C#</p>	<p>C++, C#</p>
92	Graphics in flashbootloaders running on Cluster Instruments	<p>The scope of the project is to introduce graphical elements inside flashbootloader systems.</p> <p>While flashbootloader is running, it should be able to display:</p> <ul style="list-style-type: none"> - Flashbootloader SW version - Flashbootloader status - Loading animation - Progress bar - Application SW version which is downloaded - Specific warning messages 	<p>C, microcontrollers</p>	<p>ANSI C, microcontrollers</p>

Nr. crt.	Title	Description	Technical knowledge required	Tests
93	Interpreter and compare tool for HEX files	<p>The scope of the project is to develop a tool able to interpret and compare HEX files.</p> <p>It should be able to:</p> <ul style="list-style-type: none"> - Interpret Motorola, Intel, and Bin/Ptr formats - Compare and highlight the differences between 2 files with same format - Convert files from one format to another - Edit files 	OOP, C#	C++, C#
94	Ultrasonic sensor for level and proximity sensing	<p>The ultrasonic sensor will use TDC1000, a fully integrated analog front-end (AFE) for ultrasonic sensing measurements of level, fluid identification/concentration, flow, and proximity/distance applications in automotive application. The sensor emits high frequency (20 kHz to 200 kHz) acoustic waves that are reflected back to and detected by the emitting transducer. The time between the emitted wave and received echo is used to determine level/concentration of the liquid.</p> <p>Project challenges: Ultrasonic level sensor is affected by the changing speed of sound due to moisture, temperature, and pressures. Correction factors can be applied to the level measurement to improve the accuracy of measurement. Proper mounting of the transducer is required to ensure best response to reflected sound. Since the ultrasonic transducer is used both for transmitting and receiving the acoustic energy, it is subject to a period of mechanical vibration known as "ringing". This vibration must attenuate (stop) before the echoed signal can be processed.</p>	Ultrasonic sensing TDC1000 Embedded C Microcontrollers	ANSI C, Microcontrollers, Hardware
95	Night vision and obstacle detection based on FLIR technology.	<p>The goal of the projects is to acquire data from a FLIR sensor, process the data and display on the Head-Up Display (Cluster or another display), provide real time warnings if potential obstacles are detected. Data will be processed using a single board computer, Raspberry Pi or similar. We will use QT to develop the application.</p>	Microcontrollers C/C++ base knowledge about Linux / Android, desire to learn better Linux Android OS, and QT	ANSI C, microcontrollers

Nr. crt.	Title	Description	Technical knowledge required	Tests
96	Instrument Cluster sharing between locations	<p>In our projects we end up working with more and more locations around the globe. This puts a strain on the budget of a project requiring sw-pms to buy a high quantity of targets and debug equipment to fit the high load each location might have.</p> <p>Solution: Adapting an already existing web interface to allow for scheduled flashing, user based sessions for device usage/remote CANoe simulation and remote debugging.</p> <p>Locations from different time-zones will have the obvious advantage of being able to share the devices very efficiently (scheduled flashing will also mean that the next person can find the target flashed with his previous sw). For similar time-zones the advantage is that a device located in one location can still be instantly shared between locations, allowing for clusters of devices to exist in just one location.</p>	PHP/ MySQL	ANSI C

Nr. crt.	Title	Description	Technical knowledge required	Tests
97	multi License web manager	<p>In our current development we need and use multi licenses. However, their number is limited and many times it can happen that a build fails or debug cannot be done due to every license being in use. The process of checking who is using current licenses involves either using some command line scripts (parsing of the output data is needed) or using a limited graphical interface from multi with which most people are not accustomed with.</p> <p>As a result, getting quick overviews with the current status which could be parsed and sorted is not an easy task.</p> <p>Solution: an intuitive feature-packed web interface. Draft version: http://tmd6307m:8888/multi/</p> <p>More features to be added as part of the project:</p> <ul style="list-style-type: none"> - reworked Backend/Frontend - Send alerts via email when max. no of licenses is reached (for a certain product) - Create trend reports - Map real-time usage numbers to planned releases and estimate future needs based on trends - Detection and prevention of cases where users keep licenses locked by accident. Example: alert user and his/her TL by email when time exceeds a certain value 	PHP/ MySQL	ANSI C

Nr. crt.	Title	Description	Technical knowledge required	Tests
98	Demo Software for Head Up Display	<p>The project aims to create demo software for an HUD. This means that the original software has to be changed so that different functionalities can be activated and displayed (digital speed, navigation indication, etc...)</p> <p>Additional functionalities will also be implemented in HMI:</p> <ul style="list-style-type: none"> - Slideshow views (composed by images and texts) - Animation between slideshow pages <p>The software system will be developed in C programming language. Knowledge in XML based HMI configuration is optional.</p>	C programming language	ANSI C
99	Audio/Phone/Navi automatic test	<p>The project aims to create an automated test sequence for testing the audio, phone and navigation functionality for our projects.</p> <p>Based on the CAN dbc we will have to generate all the possible values which can be sent through CAN from the Radio to the instrument cluster and see if they can be represented correctly on the display.</p>	VBA, C.	ANSI C
100	Automation of various tasks	<p>The following scripts are needed for in the development of our projects:</p> <ul style="list-style-type: none"> - Automatic generation of RAM/ROM consumption for integration test based on the memory consumption generated from Visual Studio - Adaptation of the dataset comparison tool used on projects with only physical EEPROM to work on projects with FEE - GUI for DOORS traceability tool which is used to generate RAM/traceability reports - Automatic generation of .prg files for integration 	VBA, C, C#, python	ANSI C, C#

Nr. crt.	Title	Description	Technical knowledge required	Tests
101	Buzzer priority automatic test	<p>The project aims to create an automated test sequence for testing the prioritization between all the buzzer codes available on Fiat projects.</p> <p>The application follows to activate all possible combinations of buzzers and monitor de output. The project will be done using: CAPL, CANoe simulation, VBA and Multi.</p>	VBA, C.	ANSI C
102	HMI tools	<p>The project aims to round up a set of existing tools into one single tool with a GUI and also to add some new features which would help the HMI team working on Fiat projects.</p> <p>Currently, the following tools are available: exporting texts from excel file, exporting fonts, exporting icons from .psd images. The plan is to merge the 3 tools into a single tool, with a user friendly graphic interface and to add a check at the end of the exporting to see how many fonts were used for creating the .psd images. In this way, we check that the customer sends the .psd images only in the font which was agreed.</p>	C#	C#
103	State Machine Automatic Test	<p>The project aims to create an automated test sequence for a state machine in our projects. This state machine handles the prioritization between all the types of warnings which can be triggered by the cluster instrument.</p> <p>The application will follow the steps:</p> <ul style="list-style-type: none"> - Creating a mapping in excel between the name of the environment variables which trigger the warnings and the indication ID from the application - CAPL (from Vector) code to generate the indications based on the excel above - Monitoring the output using Green Hills Multi scripts 	VBA, C.	ANSI C

Nr. crt.	Title	Description	Technical knowledge required	Tests
104	DB Compare Tool	Compare MS Access databases: structure and data The application requires to: - compare the structures of databases - read and compare data from databases - create a clean and straightforward user interface for showing the differences - merge the differences between databases	C#/Java, OOP, General DB knowledge, Logic, Windows User Interface (custom controls, data exchange, user interaction), Ability to read, understand and follow a basic set of requirements	C++/ C#/ Java.
105	Automated signal simulations for Full Display Cluster Instruments	Create CAN signal simulations to stimulate all Cluster Instrument's functionality and animations. This can be used as a DEMO presentation of a new Full display cluster to activated and display all available functions (digital speed, cruise control, navigation indication, lane assist, etc...) Configure communications between Cluster Instrument, Head-up Display and external devices (steering wheel). Students will gain also knowledge about development processes (V Model), embedded C programming, signal generation.	ANSI C, Embedded C Microcontrollers, Hardware (memory & communication types) Analytic view, Basic debugging knowledge English (medium level)	ANSI C, microcontrollers
106	Unitary Testing with Tessa	My goal of this project will be to make experience of Unitary testing using newly introduced Tessa tool. All the activities will start with training of a Tessa tool and after that concrete work of discovering of Tessa tool and its capabilities to perform Unitary tests.	Black box / what box testing techniques is a big advantage. For the rest I would like to same some one who is curious to discover a new tool for SW testing	ANSI C
107	Acquisition and Reporting of Statistical Date using new wireless security management for Daimler customer	Unitary test development for functional testing, and system integration tests. - Understand a code sequence and develop relevant test cases to ensure a predictable behavior in any project circumstances. - Run the test cases and generate test reports. - Ensure quality level expected by our customers.	C, Java knowledge helps	ANSI C, microcontrollers, Java

Nr. crt.	Title	Description	Technical knowledge required	Tests
108	Enhance debug capability for CAN bus communication	<p>Existent debug tools does not offer a native and user friendly way to visualize the message RAM structures defined at the level of the new MCAN peripheral. This hinders the debug activities necessary during the development and integration processes.</p> <p>The goal is to create a viewer for the message RAM structures as an add-on that will be integrated in the current used debug tool. The add-on will set itself up after the initialization of the MCAN peripheral and will offer the possibility to watch and change the content of the message buffers and filters.</p>	Batch file scripting Microcontrollers knowledge	Any available test
109	Non Volatile Memory Management and Engine Control Unit Reprogramming	<p>Learn about the Non Volatile Memory and Reprogramming routines by implementing updates according to customer requirements.</p> <ul style="list-style-type: none"> - Write code and integrate in project specific environment - Develop relevant test cases and run the test scenarios - Document the test session - Ensure the quality level required by the customer 	C, Java knowledge helps	ANSI C, microcontrollers, Java
110	ST micro Controller Evaluation Board	<p>Design and practical realization of a microcontroller evaluations board :</p> <p>Focus on three controller package. Power supply rail monitoring Run and controller variant detection Thermal management PCB Layout design Schematic design</p> <p>At the end of the project a study for increasing the efficiency must be realized.</p>	uController HW topologies. Eagle Schematic & layout.	Microcontrollers, hardware

Nr. crt.	Title	Description	Technical knowledge required	Tests
111	Process based project development – The Theremin	<p>The project consists in developing and producing of a Theremin following the automotive development process used in Continental.</p> <p>A Theremin is an electronical musical instrument developed in 1920. It's a completely analog instrument, and the interesting part about it is that the user does not touch it while playing.</p> <p>Every project starts with the analysis of requirements. After a clear understanding of what needs to be done, a schematic is developed and calculated. Full verification of the schematic will be done by Spice simulations. Once the schematic is complete, a layout is developed and PCB's are built. The developed device will be assembled and practically tested based on a test plan. Once all tests are completed and full requirements coverage is ensured, the product is released.</p>	EE/HW, Analog electronics, layout, simulation tools	Hardware
112	Improving the functionality of an existing product	<p>The project consists in finding and using alternative solutions for an existing product (e.g. General Purpose Actuator).</p> <p>In the first step the candidate has to observe and understand the functionality of the product.</p> <p>And in the second phase he will have to develop a new product with the same functionality but using alternative and better solutions.</p> <p>..</p>	CAD, FEA, Strength of Material, Machine components	Mechanics
113	Fixation methods of a aluminum housing with a plastic cover.	<p>The project consists in finding and using different methods of fixing the two (aluminum and plastic) components in terms of technical, economic and assembly aspects.</p>	CAD, FEA, Strength of Material, Machine components	Mechanics
114	Design and development of Engine Control Units	<p>Design and development of Engine Control Units based on engineering requirements.</p> <p>Create in CAD- Creo the 3D parts , assemblies and drawings.</p> <p>Acknowledgement of design to quality .design to cost and design to manufacturing principles .</p>	Thermal management , physical thermal processes.	Mechanics.

Nr. crt.	Title	Description	Technical knowledge required	Tests
115	Power inverter	<p>Design and practical realization of a power inverter following automotive design rules</p> <p>12V DC to 400V AC sine wave output and 100W output power.</p> <p>Output power monitoring Fault detection Thermal management</p> <p>At the end of the project a study for increasing the efficiency must be realized.</p>	<p>EE/HW, Analog electronics, layout, simulation tools Power converters topologies. Programming in C for uC.</p>	ANSI C, microcontrollers, hardware
116	Graphical User Interface for editing unitary module test files	<p>Design and implement a GUI Graphical User Interface for editing unitary module test files to facilitate the filling in and analysis of test cases.</p> <p>The tools will be capable to align the test vectors, prefill the data for test cases, offer support regarding data type of data and generate the test file according with the mandatory syntax.</p>	<ul style="list-style-type: none"> • Technical University in the field of Automation, Computer Science, Electronics and Communication. • Programming in C, Java or other for graphical interface. 	C, Java
117	Automatic test bench testing for generic Driver Request functionality	<p>Investigate the methods for automatic test bench testing and implement it for the generic Driver Request functionality.</p> <p>Assure validation of a software integration for this functionality by running a generic set of test cases where the inputs interface does not have to be influenced manually.</p>	Matlab/Simulink	Matlab

Nr. crt.	Title	Description	Technical knowledge required	Tests
118	C Coding and Matlab/Simulink modeling for Heating Ventilation Air Conditioning	<p>Implement, redesign and optimize of existing generic software modules for Heating Ventilation Air Conditioning functionality in Matlab/ Simulink, System Design Automation (SDA) specific toolbox.</p> <p>Coding and testing of the designed modules. Testbench testing on project Engine Control Unit (ECU)</p> <p>The Heating Ventilation Air Conditioning functionality consists in:</p> <ul style="list-style-type: none"> › Acquisition of compressor pressure, evaporator temperature, heaters › Diagnosis of compressor pressure, evaporator temperature, heaters › Control of Air Conditioning Compressor 	<ul style="list-style-type: none"> • Technical University in the field of Automation, Computer Science, Electronics and Communication. • Knowledge of controlling • Knowledge of Matlab package, especial Simulink • C programing 	Matlab, ANSI C
119	Standardisation of Humans interaction with production process	<p>For our production equipment in order to assure the best quality of the product there is a process called Standard Work Diagrams.</p> <p>By performing this process we will assure a balanced production line with effect on the Human Machine interface and line output. How is this to be achieved? By measuring and monitoring the movements of the operator in relationship with the industrial machine, and balancing the time needed for operator to perform it's task and the time needed by machine to perform the automatic operations.</p> <p>We intend to use LEAN methods like MUDA, MURA, VSM, VSD in order to achieve our goal.</p> <p>For this above topics we want to start a project based summer practice for a specific project and perform the workshops and implementation process in the production line.</p>	Office, Windows, production process tools.	IT

Nr. crt.	Title	Description	Technical knowledge required	Tests
120	Portable Oscilloscope	<p>HW details:</p> <ul style="list-style-type: none"> - 7" Display with touch panel - Pico scope (or other USB oscilloscope) - Raspberry Pi (or Beagle Bone) <p>SW details</p> <ul style="list-style-type: none"> - Development of driver and control of display and USB oscilloscope in: <ul style="list-style-type: none"> o ANSI C (with Visual Studio and IAR/ MULTI compiler) - Development of GUI in o Android (on Raspberry Pi) 	<p>Must have:</p> <ul style="list-style-type: none"> - experience with HW schematics/layout and using measurement test equipment - experience in SW low level programming (C) <p>Optional:</p> <ul style="list-style-type: none"> - experience in Android is a plus 	ANSI C, microcontrollers, hardware
121	PFMEA standardization	<p>For our production equipment in order to assure the best quality of the product there is a process called Product Failure Mode Analyses performed.</p> <p>By analyzing the possible failure modes of equipment you will decrease the chance to produce non conformal parts and thee fore to reduce the risk of having vehicles with components not working correctly.</p> <p>We intend to have a project to standardize our methods for risk analyzes and our method for process failure analyze.</p> <p>For this reason we propose a project based work package for summer practice to reach our goal, and to increase the potential for students to gather relevant knowledge.</p>	Office, Windows, production process tools.	IT
122	Image processing for projectors	<p>Projected images need also video preprocessing. Row video data must be adapted to fit various projection technologies (e.g DLP, TFT) for specific surfaces.</p> <p>Output: Demonstrators for automotive projection systems.</p>	General electronics/mechanics/physics	Matlab, hardware

Nr. crt.	Title	Description	Technical knowledge required	Tests
123	Time of flight technology benchmark	<p>Time of flight (TOF) describes a variety of methods that measure the time that it takes for an object, particle or acoustic, electromagnetic or other wave to travel a distance through a medium. This measurement can be used for a time standard (such as an atomic fountain), as a way to measure velocity or path length through a given medium, or as a way to learn about the particle or medium (such as composition or flow rate). The traveling object may be detected directly (e.g., ion detector in mass spectrometry) or indirectly (e.g., light scattered from an object in laser Doppler velocimetry).</p> <p>Output: Bench-mark of demonstrators from the market. Row data processing</p>	General electronics/physics	Matlab, hardware
124	Image processing for driver monitoring	<p>Driver monitoring becomes critical in Autonomous Driving. Available images from a sensor need to be processed for the car to driver critical messages.</p> <p>Output: Demonstrators with different functions (e.g driver attention)</p>	Programing skills /electronics	C++, Matlab, hardware
125	Ultrasonic Haptic Feedback	<p>Ultrasonic haptic feedback is a promising means of providing tactile sensations in mid-air without encumbering the user with an actuator. However, controlled and rigorous HCI research is needed to understand the basic characteristics of perception of this new feedback medium, and so how best to utilize ultrasonic haptic in an interface.</p> <p>Output: A demonstrator shall be build.</p>	General electronics/mechanics/physics	hardware

Nr. crt.	Title	Description	Technical knowledge required	Tests
126	Electrostatic Haptic Feedback	<p>The purpose is to study the feasibility of “Electrostatic Vibration” aka “TeslaTouch”, for enhancing touch interfaces with tactile sensations. The technology is based on the electro vibration phenomenon and does not use any moving parts. The technology provides a wide range of tactile sensations to fingers sliding across surfaces of any shape and size, from small mobile displays to curved or wall-sized screens.</p> <p>Output: Feasibility study, conclusions and demonstrators (available or custom made).</p>	General electronics/mechanics/physics	hardware
127	Quality Assurance in Mechanical projects	<ul style="list-style-type: none"> - Create documentation related to the Quality of the product - Moderate milestones meetings - Audit process compliance - Support Project Team Members with the Procedures, Method and Tools - Reporting quality status 	Mechanical basic, management basic, international standards basic, good communication and moderation skills	Any available test
128	eHorizon MQTT Application for Data Management	<p>Aim of the project is to develop an application to enable the user to transfer data bi-directionally through the internet to eHorizon device using the MQTT protocol over WLAN and GSM. The student must implement a user-friendly application which will enable the transfer of large size data remotely to the embedded devices running in vehicles. Application will be developed in QT environment and C++ programming language.</p> <p>Student will gain: Improved C++ programming skills Chance to learn and apply design patterns Good knowledge of high-end communication protocols, libraries and tools used in automotive industry. Experience working on top projects for famous automotive clients.</p>	<ul style="list-style-type: none"> • Technical university student • 3rd or 4th year student is a plus • Medium C++, Java programming skills • Medium OOP knowledge • Basic microcontroller understanding is a plus • Any experience using GUI (QT, Windows Forms or similar) is a plus • Willing to work intensively to improve technical skills and C++ programming knowledge 	C++ (preferred) or Java

Nr. crt.	Title	Description	Technical knowledge required	Tests
129	ECU-Electronic Control Unit Thermal Management	<p>The student will gain knowledge of ADAS sensors, and thermal management</p> <p>Basic knowledge in main mechanical technologies: plastic, die-cast, sheet-metal and bezique thermal transfer phenomena</p> <p>The student will improve CATIA knowledge:</p> <ul style="list-style-type: none"> -get familiar with the CATIA working way in ADAS -Electronic components structure -Thermal dissipation by: conduction, radiation and convection 	Catia, design guidelines for different technologies	Mechanics
130	eHorizon Automated Tester Application	<p>Aim of the project is to develop an application to enable fast CAN and Diagnosis automated integration testing on the eHorizon project. Developed application will to be easily configurable and flexible, as it will allow the translation of written test cases into test configurations. The application will be developed in C++ programming language and integrated in Jenkins framework.</p> <p>Student will gain:</p> <ul style="list-style-type: none"> Improved C++ programming skills. Chance to learn and apply design patterns Good knowledge of automotive communication protocols, libraries and tools used in automotive industry. Experience working on top projects for famous automotive clients. Insight in test automation for automotive software. 	<ul style="list-style-type: none"> • Technical university student • 3rd or 4th year student is a plus • Medium C++, Java programming skills • Medium OOP knowledge • Basic microcontroller understanding is a plus • Willing to work intensively to improve technical skills and C++ programming knowledge 	C++ (preferred) or Java