**Personal Development Record (PDR) for Industrial Placement Year**

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| **Student name (first name, family name)**: | *Haosong He* | |
| **Student number:** | 159470514 | |
| **Name of employer supervisor:** | Martin Rottmann | |
| **Employer:** | Bernd Härtlein | |
| **Start & finish date of placement:** | 01/10/2016 | 16/03/2017 |
| **Unit code:** | EE20062 | |
| **Unit title & number of credits:** | Industrial Placement – 60 Credits | |
| **Degree programme:** | MEng(Hons) Electrical and Electronic Engineering | |

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| **Unit description:** |
| **Aims:** To consolidate and complement the theoretical content of engineering knowledge with experience of industrial, research or business practice whilst encouraging self-development and employability skills. |
| **Learning outcomes:** On successful completion of this unit the student will be able to demonstrate an enhanced understanding of the nature, process and challenges of industrial, research or business practice whilst developing their technical and interpersonal skills. |
| **Skills:** Ability to apply skills learnt at university and the development of new skills particular to the individual placement. |

**Introduction**

This document is based on the UK Standard for Professional Engineering Competence (UK-SPEC) which sets out the competence and commitment required by the engineering institutions to become a Chartered Engineer (CEng).

The PDR is just one form which you will gradually complete and build up over the placement period. This will enable you to record competence and identify areas for development in order to make the most of your placement.

It is your responsibility to complete and regularly review the PDR as the placement progresses. Your work supervisor will be sent a blank copy at the start of your placement so they will be aware of the process. You and/or your supervisor can contact your Academic Supervisor or Placement Officer at university to discuss the form if you need advice.

Use the competence examples to structure and set objectives with your work supervisor in the first month of your placement. Review the competence list and arrange regular meetings (every 3 months recommended) with your work supervisor to identify gaps. It is your responsibility to schedule these meetings which will enable you to outline a plan to achieve missing competence by the end of your placement.

This PDR is an essential part of your personal career management. It is important that you start to actively take responsibility for your own learning and development.

**Competence and Commitments**

Professional competence combines knowledge, understanding, skills and values. It’s about more than just being able to perform a specific task; it’s being able to do it correctly, safely, effectively and consistently.

Chartered Engineers are characterised by their ability to develop appropriate solutions to engineering problems, using new or existing technologies, through innovation, creativity and change. They might develop and apply new technologies, promote advanced designs and design methods, introduce new and more efficient production techniques, marketing and construction concepts, or pioneer new engineering services and management methods. Chartered Engineers are engaged in technical and commercial leadership and possess effective interpersonal skills.

The Engineering Council UK SPEC has been developed to capture professional competence. To see the levels of competence required to be a chartered engineer (CEng) or to identify more advanced level competence view the UK SPEC: [www.engc.org.uk](http://www.engc.org.uk)

**The Engineering Institutions**

IChemE/IET/IMechE/ICE/IStructE have similar competence and commitments based on UK-SPEC. For further information on degree specific competence examples that might help you relate your placement learning to your degree, explore the chartership guidelines on their websites:

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| Institution of Chemical Engineers (IChemE) | [www.getchartered.org/](http://www.getchartered.org/) ([www.icheme.org/](http://www.icheme.org/)) |
| Institution of Civil Engineers (ICE) | [www.ice.org.uk](http://www.ice.org.uk) |
| Institution of Engineering and Technology (IET) | [www.theiet.org](http://www.theiet.org) |
| Institution of Mechanical Engineers (IMechE) | [www.imeche.org/membership-registration/professional-development-and-cpd /](http://www.imeche.org/membership-registration/professional-development-and-cpd%20/) ([www.imeche.org](http://www.imeche.org)) |
| Institution of Structural Engineers | <https://www.istructe.org/> |

**Take responsibility for your own learning and development**

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| **Brief overview of the company/employer and department you are placed in (100 words max):** |
| MEN is a German microelectronic company which is located in Nürnberg. Since its founding in 1982, MEN Mikro Elektronik GmbH has been developing and producing fail-safe computer modules and computer systems for extreme environmental conditions in industrial and safety-critical embedded applications. the development department is mainly split internally into three sections: the hardware(HW) development section, software(SW) development section and integrated circuit(IC) section. The HW development section is mainly focused on the embedded COTS boards circuit design and test, which is also where I am allocated. |

**Personal competence statements to record throughout your placement year:**

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| **A. Knowledge and understanding** |
| **Use engineering knowledge and understanding to apply technical and practical skills.** |
| **1.** **Review and select appropriate techniques, procedures and methods to undertake tasks.**  Describe one of these examples:   * an example of work you did that went well, the choices you made and the outcome * or something in your work that you were involved in which didn’t quite work and explain why * or a technique, procedure or method you improved upon and explain why. Include skills such as LEAN. |
| The project I work on is about oscilloscope signal data processing. This project contains two technical parts. The first part is about signal data processing which is based on Octave, the second part is about user interface design which is based on QT Creator.  For the first part, the required technical and practical skills contain C language and Octave(Matlab) programming. This part went quite well because I had learnt C language and Matlab programming in my second year. I worked with my project supervisor Simon. He helped me clarify the specifications of required user functions and gave me many helpful suggestions on Matlab programming. I learnt to put different data information into a struct to simplify the scripts. I also learnt to write each user function as a dependent function script and call each function from the main script which also helped user interface better interact with Octave.  For the second part, the required technical and practical skills contain C++ language and QT Creator. This part is the one I am still working on and it is also the hard part to me because I never used QT creator before but luckily, transferring from C language to C++ language is easier than I thought. I searched many references and looked through various QT forums and finally started to know about how to use QT creator. I worked with my head supervisor Martin. Each time I showed him the interface prototype, he would tell me the functions which I need to add or improve and he also taught me how to make a interface more user-friendly. |
| **2.** **Use appropriate scientific, technical or engineering principles.**  Describe one of these examples:   * how a piece of equipment, system or mechanism works * or market research, product or process research and development * or analysis of data to improve engineering products, systems and services * or use of ‘first principles’ to develop computational models |
| Oscilloscope signal data processing program is aimed to solve a practical engineering problem which commonly exists in the most signals testing experiments. Normally oscilloscopes have no more than four channels. However, for engineers, it is normal to test more than four sets of signals during the experiment so it is not possible to draw all the signals in one diagram because for each measurement, the time base is different. Therefore, this project is to design a program to adjust signals time base and plot all the signal’s time-amplitude diagram.  The basic working flow contains three steps. Firstly, engineers will import the data files from oscilloscope to computer via the Ethernet. Secondly, they can import the selected data files on the interface and set the specific parameters they want. Finally, they clicked plot button then they can acquire the corrected diagram. The wholes steps are super easy and engineers do not need to know how Octave works so it can be used for any engineers.  At this stage, this program is designed for MEN engineers. However, this program can be widely used in other engineering aspect for correcting oscilloscope errors. Moreover, the whole processes will be finished on the user interface and engineers do not need to know any Octave knowledge, therefore, even more users can use this program. Therefore, market prospect of this product is promising. |

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| **B. Design and development of processes, systems, services and products** |
| **Contribute to the design, development, manufacture, construction, commissioning, operation or maintenance of products, equipment, processes, systems or services.** |
| **2. Identify, organise and use resources effectively to complete tasks, with consideration for cost, quality, safety, security, environmental and social impact.**  Describe how you make decisions about:   * what information, scholarly resources, material, component, tests, people or plant to use * or how to introduce a new method of working or what precautions you took * or how you have contributed to best practice methods of continuous improvement and quality management. Learning from feedback to make improvements. |
| In QT programming, one main widget contains many small group widgets which are in the different class. Therefore, the problem will occur when trying to call the content of one widget e.g. QLineedit from another class by using 'ui->lineedit->text()' because the UI is private. One of the method to solve this problem is to establish the connection between two different class widgets by building cross class signal and slot. Once the push button is clicked, it will emit the signal from one class and send it to the slot which is in another class. Therefore, the cross class signal can be sent successfully. |

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| **C. Responsibility, management or leadership** |
| **Accept and exercise personal responsibility.** |
| **1. Work reliably and effectively without close supervision, to the appropriate codes of practice.**  Describe one of these examples:   * an experience or instance where you have had to accept personal responsibility for seeing a process through to completion within agreed targets. * or how you identified and agreed what had to be done and to what standards on a typical project * or managing/leading a team based project or task. |
| My project is mainly about programming so debug is one of the most important part of my project since it needs to ensure the whole program can be ran correctly under any situation. Therefore, I need to consider all the possible user operations because any unexpected operation can lead to program generates wrong .m file and cause incorrect output. Therefore, thoroughly test is very important process in this design. For my program design, generating Octave command is a linear process which means once user finished importing a data file and the command will be written into the Octave .m file accordingly. Therefore, the advantage of this design is the generating .m file progress is simple. However, the biggest disadvantage of this linear design is that once user needs to modify his previous command, the old command cannot be replaced and the modified command will be added the last line of the .m file. Therefore, the solution is using finding and replacing method. However, another problem will happen when user wants to disable all signals from a certain measurement by only clicking one button instead of deleting them one by one. To solve this problem, I introduced a 'flag signal' in each measurement. The flag signal in each measurement is unique. Therefore, program can modify the flag signal and Octave can run the different command by reading in the different flag signals. |
| **2. Record, allocate or supervise technical or other tasks.**   * Your evidence could include a description of the following: Minutes of meetings; site notes and instructions; Variation Orders; programmes of work; specifications, drawing and reports; appraisals. |
| *Use the examples above to help you write your description in no more than 400 words. If you have not completed this competence by the 1st March 2017 submission date then outline how you plan to achieve it before the placement ends.* |

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| **D. Communication and inter-personal skills** |
| **Use effective communication and interpersonal skills.** |
| **1. Use oral, written and electronic methods for the communication in English of technical and other information.**  Describe when you have:   * contributed to discussions; given a presentation; read and synthesised information; or written different types of documents: letters; reports; drawings; emails; minutes, including of progress meetings; appraisals; work instructions; and other task planning and organising documents. |
| Oscilloscope signal data processing is an individual project for me but I also need to communicate with my supervisors to ask for technical help and show them the newest updates of my project. I will have a short time project update meeting with my supervisor at least once a week. I will generally report my work to them and show them the improvement on my project and ask them if there is any unsatisfying part. After each update meeting, I will make an improvement list. I will list the bullet improvement points and try to solve these problems in the next several days. Also, if there is any technical problem I find hard to solve I will also ask them for help and normally, they can give me a general clue, if not, they will ask other department head director and they will find the colleague knows about the relative problem and help me solve it. |
| **2. Work effectively with colleagues, clients, suppliers or the public.**  Describe how this has occurred in you role:   * Knowing your own strengths and weaknesses. Evidence of personal and social skills. Discussion or negotiations with customers and suppliers * or gaining confidence and flexibility in working towards collective goals * or articulating ideas, gaining agreement from others * or awareness of equality and diversity. |
| I am willing to get along well with every colleague but honestly, I am not an out-going person therefore, in the beginning of my placement, I am mostly communicating with my project supervisor and the colleagues in my office. But in the following months, I am trying to have better communication with other colleagues and start to report updates of my work to my head supervisor so that my head supervisor can know about my daily work.  MEN is not a big company but it has business connections with UK, France, US and China. Therefore, the diversity of company is quite important. All my colleagues are very friendly, though some of them their English are not very fluent but we are getting well with each other. Two other interns in my office Adam and Felix, we become good friends and they even helped me with programming even though we are not in the same team. All these things make me really enjoy working in this company. |

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| **E. Professional commitment** |
| **Make a personal commitment to an appropriate code of professional conduct, recognising obligations to society, the profession and the environment.** |
| **1. Comply with the Code of Conduct of your Institution or professional affiliation (ICE/IChemE/IMechE/IET or other professional organisations used by your industry).** Ensure that you have read and understood your institution’s Code of Conduct   * Describe a typical ethical challenge within you industry for society, the profession or the environment: |
| MEN is focus on the control embed system design. The driverless car is getting much more popular in recent year. Developing the intelligent car control system is the key part of autonomous vehicle project. A typical ethical challenge of driverless car is when there is a pedestrian suddenly popping up on the road, you should tell the car hit that pedestrian or taking a sharp turn and this can hurt the passengers on the car. It seems reasonable to tell the car to follow the minimum damage rule, but passengers may refuse to take this driverless car because they all want themselves always to be safe. For this reason, nowadays, it is still not easy to design an algorithm to balance the ethical values and personal self-interest. |
| **2. Work effectively with colleagues, clients, suppliers or the public.**  Describe one of these examples:   * evidence of applying current safety requirements, such as risk assessment and other examples of good practice * or formal safety instruction relating to your workplace (such as a CSCS safety test in the UK), or an update on statutory regulations. In the UK an example would be COSHH requirements * or identifying health & safety issues and potential problems. |
| The project I am working on is software development. Therefore, it is quite unlike to have the health and safety issues, but I worked with my colleagues on programming. |
| **3. Undertake engineering work in a way that contributes to sustainable development. Acting responsibly, to progress environmental, social and economic outcomes.**  Give an example of:   * methodical assessment of risk in specific projects and actions taken to minimise risk to society or the environment * or corporate or community activities |
| MEN also focus on the embed system design for the aircrafts. The aircrafts control systems have much higher standards than vehicles. Each system has three identical control systems work synchronously. Once one of the systems failed, the pilot can still make right decision with the other two systems. It is unlikely that more than one system fails at the same time so it can efficiently minimise risk to society. |

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| **F. Additional Competence examples - optional** |
| **An opportunity to add any objectives you or your employer would like to achieve or competence examples and skills relevant to you not included previously. These can be personal objectives you would like to achieve.** |
| Description: |
| *Write your description here expanding the box as necessary (up to 400 words)* |
| Description: |
| *Write your description here expanding the box as necessary (up to 400 words)* |

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| **Employer’s comments and signature:**  *Please ensure that your competence examples are agreed and signed off by your employer supervisor before submitting.* |