Seminar 6: Research Methods and Professional Practice – e-Portfolio Preparation - Preparation

Professional Skills Matrix:

Competency	Essex Graduate	Skill	Skill Level	Evidence
Professional	**Literacy, Communication, Language Skills**	Express information effectively to technical and non-technical audiences	Proficient	Various modules (e.g. NISM, PDFCYL & IRM) of the cyber security course at the UoE have trained my way of expression and the adaptation to the audiences.
		Create documents to aid your communication (reports, diagrams, legal descriptions, plans, manuals and charts)	Proficient	The creation of supporting representations was an important aspect of presentations created within the framework of modules (THF, PDFCYL and RMPP). But these capabilities have also been expanded in reports (NISM and IRM). Statistical evaluation capabilities using spreadsheet programs have been expanded within the framework of the RMPP module.
	Commercial Awareness	Keep current with tools of the industry, as well as emerging technology	Proficient	Insights into the application of current industry tools, such as the penetration testing tools from Kali Linux, were gained in the NIMS module. In addition, possibilities and practices of micro services and the container visualization software Docker were acquired as part of the SSA module.
		Seek opportunities to improve and share knowledge of tools and technology that may improve productivity	Trained	Various communication platforms for technical developments relating to cyber security were encountered during the course of study. This includes IEEE and Red Hat.
		Participate in scientific and professional organisations	Aware	The first scientific papers relating to cyber security were created as part of the course at the UoE and serve as the basis for the planned Capstone Project. These competencies were built on previous university studies and scientific work in the fields of physics and geography.

		Emphasise quality, customer satisfaction and fair application of policies.	Proficient	Deeper insights into customer satisfaction and correspondingly appropriate application of policies were obtained from a human perspective in the THM module and from a legal perspective in the PDFCYL module.
		Demonstrate familiriaty with codes of conduct for the Computing field.	Proficient	Various codes of conduct in the computing context were examined in depth. These include legal frameworks such as GDPR and UKRIO, as well as ethical principles such as the regulations of ACM and the UX designs.
	Subject understanding, research, critical thinking, time management	Critically analyse complex ideas in concepts in the field of Computer Science	Trained	Complex investigations into computer science concepts were carried out in technology-oriented modules such as SSD and SSA, but also in NISM.
		Recognise inconsistencies and gaps in information, and search for additional information when needed…	Proficient	The ability to find knowledge gaps in subject areas and to conduct research based on these was a central part of the scientific work in the physical and geographical area. The application of these competencies in the field of computer science was pursued in the RMPP but also in depth in the NIMS module.
		Explore complex real-world problems in a Computing context	Trained	A direct reference to real problems in the computing context was developed in the modules and the associated assessments NIMS, IRM, SSD, SSA, LCYS.
Legal and Ethical	**Ethical Awareness**	Comply with the letter and spirit of applicable laws	Proficient	The outstanding importance of laws was developed using the example of the importance of the GDPR and reinforced using analyzes of various case studies. On this basis, in addition to the legal consideration, ethical principles were also reflected in depth.
		Maintain privacy and confidentiality of company, co-worker and customer information	Trained	This principle was also highlighted in various modules based on the GDPR.
Social (inc. Teamwork)	**Cultural Awareness**	Act in the best interest of the community at large - Social (Community)	Trained	In the THF and RMPP modules in particular, the consequence of responsibility to act in the interest of the general public was studied in depth.

		Responsibility		
	Teamwork, Leadership and Resilience, Time Management	Collaborate effectively in diverse teams to achieve team goals	Expert	Effective cooperation in diverse teams, even with problems from fluctuating team members, was trained in the international area in the NIMS, IRM, SSD and SSA modules. These were always with a successful outcome.
		Meeting team objectives using teamwork skills	Proficient	The ability to work in a team and active participation was demonstrated in various modules (NIMS, IRM, SSD and SSA). In particular, the ability to contribute one's own skills was proven here.
		Demonstrate skills in leadership and team building	Proficient	Team leadership skills were collected in private training seminars and consolidated and expanded through practical application in projects.
		Give and receive constructive feedback	Proficient	Constructive feedback was received throughout the course of the UoE's cyber security studies and within collaborative settings. Appropriate feedback has been provided where possible.
	Creativity, Entrepreneurial, Problem solving, Initiative, Decision Making	Create, discuss and deliver strategies for sustainability for all stakeholders (company, community and environment)	Trained	In the IRM module in particular, sustainability strategies for stakeholders were developed and discussed.
		Able to make a decision on a complex matter/scenario using multiple sources of information	Proficient	This capability has been especially enhanced in the NIMS, IRM and RMPP modules.
Technical (Data Science)	**IT and Digital, Numeracy**	*Technical skills relevant to your degree programme:*		
		SQL for database	Trained	Initial experience was gained in the LCYS module. Further development of

		querying		skills was gained within the SSD module.
		Python Programming	Trained	Python programming skills were developed in the LCYS, SSD and SSA modules.
		Java	Aware	Fundamental knowledge in dealing with Java was acquired before the start of the course as part of a crash course.
		Python	Trained	The use of Python applications and their modification was trained as part of penetration testing. In addition, applications were developed as part of the SSD and SSA module.
		noSQL	Aware	General knowledge about noSQL databases was gained through own research.
		Scripting Language (Python)	Trained	Using the programming language Python was learned through CODIO exercises and textbooks.
		Statistical Language (R)	Proficient	The use of the statistical language was learned and consolidated as part of geography studies using RStudio.
		Gits - repository development and maintenance	Proficient	The creation, management and maintenance of gits was learned during the course of the modules of the cyber security study of the UoE.
		Use of conferenceing technologies and Moodle (VLE)	Proficient	A variety of conference technologies such as Webex, Zoom and Big Blue Button were used in seminars and team meetings and their possibilities were used extensively and thus learned.
		Use of Word Processing tools and Spreadsheets	Expert	Word processing tools, mainly Word Office, were used to create all assessments and thus in-depth skills were developed based on the previous level of knowledge. Spreadsheet programs were used as part of the RMPP module.
		Effective use of e-library resources	Expert	The effective use and application of e-library resources was central to the complete cyber security course at UoE.
Subject Application	**Global Citizen, Teamwork, Leadership, Emotional Intelligence**	Take into account other people's perspectives	Proficient	The consideration of other perspectives could be learned and proven especially in the context of numerous collaborative discussions.
		Work constructively with differences in viewpoints	Proficient	The constructive work and application of different points of view through collaborative discussions was also trained as a competence. In addition, the modules NIMS, THF, PDFCYL and RMPP have significantly shaped the ability to take different perspectives in the context of cyber security.

		Actively participate in a range of community activities as an informed citizen	Proficient	A continuous contribution of one's own opinion in the context of various collaborative discussions and the sharing of one's own knowledge can be observed throughout the course of study.
	Decision Making, Initiative, Emotional Intelligence, Ethical Awareness	Develop, articulate and clarify your personal values and ethics	Proficient	A development of my own personal values and ethical values in relation to information technology was developed, consolidated and regularly reflected on during the course of my studies.

Adapted from BCS guidelines and Essex graduate

Skill Level Key

Aware	General understanding and basic knowledge
Trained	Able to apply knowledge, able to work independently under certain conditions
Proficient	Broad and in-depth knowledge, able to work independently with very little supervision
Expert	Seen as a subject matter expert, able to lead and train others.

SWOT Analysis for coding skills in Python:

	Helpful **to achieving the objective**	**Hamper** **achieving the objective**
Internal origin (attributes of the system)	Strengths 1. Advanced research skills 2. Ability to learn independently 3. Basic knowledge already existing	Weaknesses/Areas for further development 1. In-depth knowledge missing 2. Lack of application skills
External origin (attributes of the environment)	Opportunities 1. Books and tutorials 2. Self-selected training projects 3. Capstone project	Threats 1. Learning wrong application methods 2. Time frame

Reflection on the Cyber security MSc course at the University of Essex:

The master's degree in cyber security at the University of Essex has provided comprehensive insights into the wide range of topics of cyber security and its requirements in a constantly technologically evolving world. I was positively surprised by the variety and multidimensionality under which security in cyberspace must be considered and taken into account. Not only was I able to develop technical and theoretical skills, such as general use of programming languages such as Python and creating a secure SQL database, I was also able to test practical, application-related skills. This includes, among other things, the creation of a secure communication application in the context of the SSD module and a secure smart home application in the SSA module.

Furthermore Risk Management, which is essential in relation to the professionalism of a consultant, but also has to be taken into account by programmers and penetration testers and thus covers a comprehensive range of different professions, was learned and discussed while considering legal and ethical aspects. Here I consider the psychological and human influence in cyber security to be a factor to be emphasized. The technical cyberspace space, which needs to be protected in the context of cyber security, is not detached from people. On the contrary, this space was created by people and it is their interaction in this space that creates opportunities, but also threats and thus the necessity of cyber security. A constant consideration of the human component could be recognized repetitive in the individual modules, but was examined in more detail in the THF module.

Finally I recognise the NISM module, in which I was confronted with penetration testing for the first time, to be particularly developing for me and my personal and potentially professional future. I consider this module as an initial moment, which on the one hand brought me closer to the technical possibilities of white hat hacking, but on the other hand also laid the foundation for immense gains in competence in the further modules. This module was accompanied by a large number of personal challenges. As part of the module and penetration testing, I worked with the Linux operating system (Kali Linux) for the first time. I got to know a variety of tools and tested working with them on the basis of UI as well as coding. The final assessment made a significant contribution to improving my preparation and presentation skills. But complications in the project team also strengthened my skills in terms of time management, flexibility and teamwork. It can be seen retrospectively that this knowledge and gains in competence could only be so great because the teamwork in this module was characterized by many challenges. Three out of five team members left the team during the project and communication with some members was also difficult. On the other hand, the remaining team, possibly because of these circumstances, cooperated extremely productively and helpfully with each other, so that a very satisfactory end product could be produced in the end.

First reflections on these occurrences in the module have led me to a critical view of teamwork. However, a renewed reflection on what happened leads me to the realization that it is not always the team size but the participants in the project and the team dynamics that are decisive for a successful project. If the team had not shrunk so much over the course of the project, the same good end results might have been achieved, but my personal development of skills would not have been as strong as it was due to the circumstances.

The negative emotions felt through the unequal participation of the team members and also reinforced by a certain increase in the stress factor may have been understandable in retrospect, but were unnecessary and unelected. The opportunities that the circumstances offered me can only be fully understood in retrospect. It must also be taken into account that external and internal factors influencing teams in professional practice are part of normality. Experiencing such events in a protected environment, as offered by the module, enabled me to gain experience and skills that I can transfer to similar future events in a professional context.

In the future, it should therefore be regularly reflected on whether initially negative events or experiences should also be evaluated as such in the long term. In addition to the occurrences and occurrences to be assessed as risks, the resulting opportunities should also be taken into account. Even more, instead of explicitly looking for risks, these should be identified, but the associated opportunities should be intensively analyzed and highlighted. In order to be able to increase this reflection competence and the associated value of the results in the future, I regularly reflect on projects, assessments and other events that should be highlighted. These reflections should be repeated at different intervals, since insights sometimes only develop over a certain period of time.