

Programme Specifications

Premaster's in Computing – PMIT

Version 5.0 October 2026

Progression Degrees

MSc Applied Data Science & Analytics
MSc Applied Computer Science
MSc Computer Science - Cyber Security
MSc Computer Science - Big Data & AI
MSc Data Science – Business Analytics
MSc Data Science – Digital Health

Foundation Overview

Duration	1 Semesters (14 teaching weeks)
Occurrence	October, April
Total teaching hours face to face	312
Total study hours	616
Language	English

Premaster's Modules

	Modules	Codes
1	Academic English for Postgraduate Study	PG01
2	Advanced Maths	PG08
3	Principles of Programming and Software Engineering	PG06
4	German language and culture	GL01/GL02*

*German conversation – optional after progression

Name of Module/ Modultitel: Academic English for Postgraduate Study					
Course Information / Kursinformationen	Frequency of delivery / Häufigkeit des Angebots	Length / Dauer	Language / Sprache	ECTS points / ECTS-Punkte	Study hours / Studentische Arbeitsbelastung
PG01 Academic English for Postgraduate Study	Twice annually	1 Semester	English		Total study hours: 280 Taught hours: 156 Self-study: 124
Module Leader / Modulverantwortliche(r)/ Lehrende	Credits / Leistungspunkte	Assessment / Prüfungsform		Teaching mode and methods / Lehr- und Lernformen	Contribution to University Entrance Exam
Dr Brett Mills		1. Report 40% 2. Presentation 30% 3. Exam 30%		Lectures, Seminars, Tutorials, Group work	
Module Description/ Constructive Alignment					
This module enables students to develop their academic literacy and communication skills in preparation for post-graduate study at master's degree level and to understand the institutional culture, practices, norms and expectations of German higher education in an international academic context. It enables students to develop academic research and communication skills using contemporary resources and raises students' English to the required level for post-graduate entry. It also provides students with an understanding of a range of research methodologies and a solid grounding for research skills required in post-graduate study. By encouraging students to share this knowledge in an open class forum (small group tutorial presentations), the module develops and encourages the use of presentation skills in academic and professional contexts. At the end of this Module, students will have developed transferable skills for effective and professional communication to support their ongoing study as well as providing a basis to foster career and life-building skills. The module utilises several practical activities to allow candidates to develop these essential skills. Assignments for each of the four skills of academic reading, writing, speaking and listening are included to confirm that students meet the appropriate levels of academic English proficiency.					
Intended Learning Outcomes – Ability to act /transferrable skills / Handlungskompetenz					
Upon completion of this module students will be able to: • Demonstrate an ability to communicate qualitative and quantitative information effectively, both orally and in writing, at an appropriate level; • Evidence the importance of self-study and reliance. This involves cultivating and developing a responsibility within each student to take responsibility for their own learning, initiative, effective time-management and self-discipline within the academic and professional environments;					

Intended Learning Outcomes - Knowledge and subject specific understanding / Fachkompetenz
Upon completion of this module students will be able to: • Demonstrate an ability to structure and produce long-form academic writing on a topic relevant to the student's discipline, including planning, writing and editing; • Develop and practice academic writing skills at the sentence, paragraph and discourse levels in appropriate written forms; • Be able to construct arguments with supporting evidence to establish a position on a topic; • Interpret, summarise and evaluate arguments, assumptions, data and concepts to make justified decisions or draw justified conclusions.
Intended Learning Outcomes – Application and generation of knowledge / Methodenkompetenz
Upon completion of this module students will be able to: • Search for, select and evaluate sources of information for research, and use appropriate citation and bibliography conventions, making full use of library and e-learning search (catalogue and bibliographic) resources; • Demonstrate an ability to understand and identify the key themes of a lecture, using appropriate comprehension, notetaking and summary writing skills; • Select, read, digest, summarise and synthesise information material in a variety of forms, both qualitative and quantitative (text, numerical data and diagrammatic) and in an appropriate manner to identify and determine key facts/themes and relevance; • Analyse and incorporate appropriate academic sources and data into academic writing; • Understand the principles and conventions of academic discourse including using sources correctly and avoiding plagiarism and the misuse of technologies such as AI; • Proficiently use techniques and technology in the collation, interpretation and presentation of data in oral and written formats; • Build examination techniques and skills.
Intended Learning Outcomes – Communication and cooperation / Sozialkompetenz
Upon completion of this module students will be able to: • Work effectively both as a team member and independently; • Plan and deliver a formal academic presentation to a group of peers on a topic relevant to the student's discipline. •
Outline Content/ Lerninhalt
• Academic writing conventions - preparation for and production of academic written assignments in genres relevant to the discipline of study: argumentation, paragraph structure and cohesion, and introduction and practice of appropriate academic grammar and vocabulary to encourage greater linguistic accuracy. • Academic argumentation and planning – demonstrate the ability to construct and develop academic arguments and plan complex and long-form chains of thought over a prolonged period, preparing them for the demanding ideas and concepts inherent in post-graduate study and beyond. • Referencing & Plagiarism – introduction and practice of referencing techniques and tackling plagiarism and use of AI generated text through paraphrasing, reporting verbs and transition signals • Reading techniques - development of reading strategies including reading for different specific purposes, identifying main points and topic sentences, predicting content of reading passages; note-taking and summarising content and evaluating writers' purpose and stance • Presentations & Seminars - Preparation for and planning of academic presentations and participation in

seminars: fluency development in spoken academic language, development of verbal and non-verbal communication skills, use of visual aids and techniques of engaging with audience. Development therewith of interpersonal skills for successful groupwork

- **Listening and note-taking** - developing comprehension skills for listening to authentic lectures and other academic spoken formats. Introduction and development of academic notetaking and summary strategies and skills for listening to lectures
- **Effective Study Techniques** - development of the micro-skills needed for academic writing, including pre-writing, brainstorming, planning, text organisation, editing and rewriting; using drafts and formative peer and tutor feedback to feedforward; selecting and using research from multiple sources in writing; and developing referencing skills.
- **Self-reflection** – helps students to think about feedback provided on their own work and learning where individual improvements can be gained through further study

Name of Module/ Modultitel: <i>Advanced Maths</i>					
Course Information/ Kursinformatio nen	Frequency of delivery/ Häufigkeit des Angebots	Length/ Dauer	Language/ Sprache	ECTS points/ ECTS-Punkte	Study hours/ Studentische Arbeitsbelastung
PG08 Advanced Maths	Twice annually	1 Semester	English		Total study hours: 112 Taught hours: 52 Self-study: 60
Module Leader/ Modulverantw ortliche(r)/ Lehrende	Credits/ Leistungspunkte	Assessment/ Prüfungsform		Teaching mode and methods/ Lehr- und Lernformen	Contribution to University Entrance Exam
		1. Exam (90 minutes) 50% 2. Exam (90 minutes) 50%		Lectures, Seminars, Tutorials, Student- managed learning	
Module Description/ Constructive Alignment					
The Advanced Maths module provides students with the knowledge and skills needed to carry out complex mathematical tasks throughout their university studies. This amodule covers key mathematical concepts including algebra, calculus, linear and non-linear equations, probability, statistics, matrices, and vectors. It explores advanced topics such as trigonometric functions, polynomial division, integration, differentiation, differential equations, and numerical methods.					
Intended Learning Outcomes – Ability to act/ Transferable skills / Handlungskompetenz					
Upon completion of this module, students will be able to: work effectively with advanced number systems, equations and formulas. Students will also learn how to apply advanced mathematical principles throughout their other modules, considering a variety of real-world contexts.					
Intended Learning Outcomes - Knowledge and subject specific understanding / Fachkompetenz					
Upon completion of this module, students will be able to: Define principles of number theory, Non-linear equations, Laws of Logarithms, Trigonometric functions, Matrices and Vectors, Differential Equation and Numerical Methods.					
Intended Learning Outcomes – Application and generation of knowledge / Methodenkompetenz					
Upon completion of this module, students will be able to:					

- Apply their mathematical knowledge to solve problems in the areas of number theory, Non-linear equations, Laws of Logarithms, Trigonometric functions, Matrices and Vectors, Differential Equation and Numerical Methods

Intended Learning Outcomes – Communication and cooperation / Sozialkompetenz

Outline Content/ Lerninhalt

This module covers an introduction to the following:

- Algebra and Calculus
- Linear and Non-Linear equations
- Statistics
- Basic principles of probability
- Polynomial division
- Non-linear equations
- Laws of Logarithms
- Trigonometric functions
- Matrices and Vectors
- Integration and differentiation rules
- Differential Equation
- Numerical Methods

Name of Module/ Modultitel: <i>Principles of Programming and Software Engineering</i>					
Course Information/ Kursinformationen	Frequency of delivery/ Häufigkeit des Angebots	Length/ Dauer	Language/ Sprache	ECTS points/ ECTS-Punkte	Study hours/ Studentische Arbeitsbelastung
PG06 Principles of Programming and Software Engineering	Twice annually	1 Semester	English		Total study hours: 112 Taught hours: 52 Self-study: 60
Module Leader/ Modulverantwortliche(r)/ Lehrende	Credits/ Leistungspunkte	Assessment/ Prüfungsform		Teaching mode and methods/ Lehr- und Lernformen	Contribution to University Entrance Exam
Swati Jeevan		Exam (90 minutes) 50% Presentation (10 minutes) 50%		Lecture, Seminar, Student-Managed Learning	
Module Description/ Constructive Alignment					
This module has been designed to provide the basis for further programming and software engineering study programming and software engineering (a programming language), delve into more advanced topics, and conclude in a final project that integrates all learned skills. Successful completion of this module indicates that students have obtained a good understanding of, and ability to, apply the requisite conceptual programming knowledge and Software development skills. A diverse set of assessments will demonstrate problem-solving skills to consolidate links between knowledge gained in programming and software engineering theory and its practical, real-world contexts.					
Intended Learning Outcomes – Ability to act/ Transferable skills / Handlungskompetenz					
Upon completion of this module, students will be able to demonstrate their ability to apply programming techniques in technology, software engineering and environmental contexts that can serve them well in their future studies and careers.					
Intended Learning Outcomes - Knowledge and subject specific understanding / Fachkompetenz					

Upon completion of this module students will be able to: - Recall and describe the key concepts of programming and how it is used and contributes to both the engineering process and solving engineering problems - Demonstrate ability to be proficient in version control with Git, understand the software development lifecycle, and be able to design, implement, and test software solutions, culminating in a final project that integrates these skills.
Intended Learning Outcomes – Application and generation of knowledge / Methodenkompetenz
Upon completion of this module students will be able to: - Design and develop software using core programming principles and data structures. - Write and manage effective code with best practices in modular design and debugging. - Use Git for version control and collaborative development. - Apply web development and database knowledge to create functional applications. - Complete a final project that demonstrates integrated skills and practical application.
Intended Learning Outcomes – Communication and cooperation / Sozialkompetenz
- Communicate technical concepts and project progress clearly to team members and stakeholders. - Collaborate effectively in a team setting, utilizing version control systems to manage contributions and resolve conflicts. - Present project work professionally, demonstrating the ability to explain design decisions and technical solutions.
Outline Content/ Lerninhalt
- Introduction and Basics - Control Structures - Functions and Modules - Data Structures - Object-Oriented Programming (OOP) - Introduction to GIT - Software Development Lifecycle (SDLC) - Software Design Principles - Version Control Systems - Testing and Debugging - Web Development Basics - Databases and SQL - Software Engineering Tools and Practices - Final Project and Review
Recommended reading/ Empfehlungsliteratur
Miller, B. N., & Ranum, D. L. <i>Problem Solving with Algorithms and Data Structures using Python</i>. 3rd Edition. Luther College / Runestone Academy. 2024 https://runestone.academy/ns/books/published/pythonds3/index.html Hastings, T. <i>Software Engineering: Standing on the Shoulders of Giants</i>. 1st Edition (Python edition). Self-published 2026. https://www.swebook.org/

Halvorsen, H.-P. *Python for Software Development*. Self-published. 2026
<https://www.halvorsen.blog/documents/programming/python/resources/Python%20for%20Software%20Development.pdf>
W3Schools. (n.d.). *Python Tutorial*. W3Schools. <https://www.w3schools.com/python/>

Name of Module/ Modultitel: German Language and Culture 1					
Course Information / Kursinformationen	Frequency of delivery / Häufigkeit des Angebots	Length / Dauer	Language / Sprache	ECTS points / ECTS-Punkte	Study hours / Studentische Arbeitsbelastung
GL01 German language and culture 1	Twice annually	1 Semester	German		Total study hours: 112 Taught hours: 52 Self study: 60
Module Leader / Modulverantwortliche(r)/ Lehrende	Credits / Leistungspunkte	Assessment / Prüfungsform		Teaching mode and methods / Lehr- und Lernformen	Contribution to University Entrance Exam
Fiona Godden		1. Exam 100%		Lecture, Seminar, Group work, Role Play, Peer to peer learning	
Module Description/ Constructive Alignment					
The module is designed for students with little or no prior knowledge of German and provides an introduction to the language. Teaching is based on interactive language development tasks, including group work and role play, and incorporates the study of texts, speaking activities and listening comprehension exercises. Students are expected to consolidate their learning outside class by learning vocabulary and language structures, as well as by engaging with German through reading, watching, speaking and listening activities. Students will also develop the ability to use a range of learning resources across different media, such as reference grammars and bilingual dictionaries, to support their progress. These skills will help students advance more efficiently in accredited German courses as part of their future studies. The course is taught in German.					
Intended Learning Outcomes – Ability to act/ Transferable skills / Handlungskompetenz					
Upon completion of this module students will be able to:					
• Understand and use familiar, everyday German expressions and very simple sentences for basic needs; • Comprehend key information in slow, clear speech related to personal details, family and daily life; • Read and understand short, simple texts such as signs, forms and basic messages; • Write simple texts, including notes, forms, and short messages or postcards; • Introduce oneself and others using simple language; • Ask and answer basic questions about personal information (e.g. name, origin, address); • Participate in short, simple conversations when the other person speaks slowly and clearly; • Use basic grammar structures and essential everyday vocabulary to communicate in predictable situations.					
Intended Learning Outcomes - Knowledge and subject specific understanding /Fachkompetenz					
Upon completion of this module students will be able to:					
• Demonstrate a basic understanding of the German language system, including simple grammatical structures, sentence patterns and essential vocabulary for everyday communication; • Recognise and use familiar everyday expressions and very basic phrases related to personal information, immediate needs and common daily situations; • Understand simple spoken language on familiar topics when delivered slowly and clearly, including basic questions, instructions and short statements; • Identify and interpret key information in short, simple written texts, such as signs, forms and basic messages;					

• Produce simple spoken and written language, using memorised phrases and basic sentence structures to communicate personal information and immediate needs; • Apply a limited range of vocabulary and formulaic expressions appropriately in predictable everyday contexts; • Demonstrate awareness of basic pronunciation, spelling and structure of the German language; • Show an introductory understanding of common communicative functions, such as introducing oneself, asking and answering simple questions, and responding in routine situations.
Intended Learning Outcomes – Application and generation of knowledge / Methodenkompetenz Upon completion of this module students will be able to: • Apply basic learning strategies to understand and organise the German language system, including simple grammatical structures and sentence patterns; • Use memorisation and repetition techniques to acquire and retain essential vocabulary and everyday expressions; • Apply listening strategies (e.g. identifying key words, focusing on context) to understand simple spoken German in slow, clear speech; • Use reading strategies (e.g. scanning for key information, recognising familiar words) to interpret short, simple texts such as signs and forms; • Use guided speaking and writing techniques (e.g. sentence models, substitution patterns) to produce simple language for familiar situations; • Select and apply basic vocabulary learning and usage strategies to communicate in predictable everyday contexts; • Apply self-monitoring strategies to improve pronunciation, spelling and sentence formation; • Use simple communication strategies (e.g. asking for repetition, using gestures, paraphrasing) to manage interactions and overcome gaps in language knowledge.
Intended Learning Outcomes – Communication and cooperation / Sozialkompetenz Upon completion of this module students will be able to: • Participate in basic social interactions, such as greeting others, introducing themselves and saying goodbye in simple, appropriate ways; • Ask and answer simple questions about personal information (e.g. name, origin, daily life) in a cooperative exchange; • Engage in very short, simple conversations on familiar topics, relying on repetition, clarification and support from others; • Respond appropriately in routine communicative situations, such as going to the gym, talking about food or talking about friend and family; • Demonstrate basic conversational turn-taking, including listening, responding and using simple strategies (e.g. asking for repetition or help); • Use polite forms and simple social conventions, such as “please”, “thank you”, and basic forms of address; • Cooperate with others in simple communicative tasks by sharing basic information and reacting to others’ input; • Show awareness of the social and cultural context of communication, including simple norms of interaction in German-speaking environments.
Outline Content/ Lerninhalt • Language Skills and Grammar • Introductions and Personal Information • People, Family and Possessions • Daily Life and Free Time • Food, Shopping and Social Situations • Time, Schedules and Experiences
Recommended reading/ Empfehlungsliteratur Unterwegs A1.1, Cornelsen. 2025

