Descriptor Templates MSc dissertations: Dissertation Grade Descriptors

Marking is guided using the following criteria:

Understanding and Depth of Academic Content

B	*The report shows good understanding of the principal objectives of the project. The student was able to master the underlying theoretical techniques and mathematical models, correctly apply straightforward numerical algorithms, or perform an adequate statistical data analysis, as appropriate to the nature of the project. However, some errors occur where the student has missed or misunderstood some aspect of the underlying theory, models or algorithms, or has made an error in the application of an algorithm or the statistical data analysis.*

Better		**Worse**	
A3	*The student achieved the principal objectives of the project and described advanced aspects of the given topic in the process. The student mastered advanced theoretical concepts or mathematical models, correctly applied elaborate numerical algorithms, or performed a sound statistical data analysis. Errors are few and mostly minor.*	**C**	*The report presents evidence of some understanding of the principal objectives of the project, and of the underlying techniques. However, theoretical discussions are incomplete or erroneous in several places, mathematical models, numerical algorithms or statistical techniques have either been misunderstood, applied wrongly or were not appropriate for the problem.*
A2	*The student demonstrated a deep scientific understanding of the given topic that evidences full understanding of the material. The student mastered complex theoretical concepts or mathematical models, correctly applied highly involved numerical algorithms, or performed a rigorous statistical data analysis, making only a few minor mistakes.*	**D**	*The report evidences little understanding of the principal objectives of the project and of the underlying techniques. Theoretical discussions are incomplete or erroneous in many places. Mathematical models, numerical algorithms, or statistical techniques have been grossly misunderstood and wrongly applied, or were not adequate for the problem.*
A1	*The report shows exceptional analytical and problem-solving skills. The student demonstrated the ability to engage with a complex topic in a rigorous scientific fashion. Sections of the work are of near-publishable quality.*	**E-H**	*The report fails to show any evidence of understanding of the given scientific problem. Theoretical discussions are either absent or incorrect, or the mathematical models, numerical algorithms or statistical techniques have been completely misunderstood or very poorly applied, or were wholly unsuitable for the problem.*

Originality of Approach

B	*The student followed the most obvious research direction or solution approach, showing little initiative to explore different directions or present alternative approaches. The report is mostly derived from the background material, containing only a few minor original theoretical contributions. The mathematical models, numerical algorithms, or statistical techniques used in the project are standard and straightforward, with only a few minor modifications.*

Better		**Worse**	
A3	*The student came up with a few ideas to explore different research directions or alternative solution approaches. The student achieved some improvement over the background material by deriving new theoretical results or methodological constructions, extending or modifying existing models or algorithms, or applying new statistical techniques that are close to techniques covered in the syllabus. However, most original contributions are minor.*	**C**	*The student presented only minor variations of the most obvious research direction or solution approach. The report is mostly a collection of background material. No original theoretical results are provided and the mathematical models, numerical algorithms, or statistical techniques are straightforward and used without any modification.*
A2	*The student was very creative, coming up with several ideas for different research directions or alternative solution approaches. The student made a significant contribution to the given topic, deriving several original theoretical contributions, or extensions or modifications of existing models or algorithms, or applying new statistical techniques that are outside the syllabus.*	**D**	*The student stuck to the most obvious research direction or solution approach and the report replicates existing results which can be found in the literature without much reflection. The used mathematical models, numerical algorithms, or statistical techniques are very simple and known from the syllabus.*
A1	*The report shows an exceptional degree of originality, both in the results obtained and the route taken. The student obtained a considerable number of original theoretical results or methodological constructions, derived new models and algorithms, or applied new statistical techniques from the recent literature. The student came up with unforeseen research directions or solution approaches.*	**E-H**	*The reports lacks any evidence of originality, both in the results obtained and the route taken. The student presented existing results from a narrow section of the background material that are possibly restricted to those suggested to them and only the research direction or solution approach set out in the project description was followed.*

Amount of Work Done

B	*The student addressed most of the questions raised in the project description to an adequate level of detail. The report gives a satisfactory explanation of the background material needed to understand the given topic. Depending on the nature of the project, the report includes theoretical results, for example, worked examples or details of existing proofs, the implementation of mathematical models and numerical algorithms, a statistical or numerical analysis, or the collection and cleaning of data.*

Better		**Worse**	
A3	*The amount of work done represents a solid attempt to address the topic of the project. The report gives a detailed explanation of background material. Work done is evidenced through theoretical contributions, the implementation of intricate models and algorithms, a comprehensive statistical or numerical analysis, or the copious collection and cleaning of data.*	**C**	*The report contains an explanation of the background material needed to understand the topic of the project, but the presentation of the main part of the project is incomplete. Work done is evidenced through a few theoretical contributions, the implementation of simplistic models and algorithms, a preliminary statistical or numerical analysis, or a half-hearted collection and cleaning of data.*

A2	*All questions raised in the project description are addressed. The report gives a detailed explanation of the background material needed to understand the topic. Work done is evidenced through several theoretical contributions, the implementation of extensive models and algorithms, a substantial statistical or numerical analysis, or the thorough collection and cleaning of data.*	**D**	*Only few of the questions raised in the project description are addressed in the report. An explanation is given of some of the background material needed to understand the topic; however, many essential parts are missing. Work done is evidenced through very few and minor theoretical contributions, the implementation of trivial models and algorithms, a coarse statistical or numerical analysis, or a haphazard collection and cleaning of data.*
A1	*The report goes beyond the questions raised in the project description. A complete explanation is given of the background material needed to understand the topic. Work done is evidenced through numerous theoretical contributions, the implementation of very large and complex models and algorithms, an all-embracing statistical or numerical analysis, or an exhaustive and elaborate collection and cleaning of data.*	**E-H**	*None of the questions raised in the project description are addressed in the report. The report contains no theoretical contributions, implementations of models and algorithms are incomplete at best or missing altogether, the statistical or numerical analysis is lacking in almost all aspects, or no collection and cleaning of data was undertaken at all.*

Logic of Argument

B	*The report presents most of the main steps in the mathematical, statistical, or computational reasoning that underlies the project, although there may be some logical gaps, or important details missing.*

Better		**Worse**	
A3	*The report describes the main steps in the mathematical, statistical, or computational argument that underlies the project; however, there are some minor logical gaps, or missing details, in the reasoning.*	**C**	*The project describes most of the main steps in the mathematical, statistical, or computational argument that underlies the project. However, there are serious logical gaps or mistakes, or important details may be missing from the reasoning.*
A2	*The report describes all of the main steps in the mathematical, statistical, or computational argument that underlies the project, with only few logical gaps or missing details.*	**D**	*The project describes only few of the main steps of the mathematical, statistical, or computational argument that underlies the project. There are numerous serious logical mistakes or instances of incomplete reasoning.*
A1	*The report clearly describes the main steps in the mathematical, statistical, or computational argument underlying the project. It is easy to follow the argument, and there are no gaps in the reasoning.*	**E-H**	*It is very difficult, or even impossible, to understand the logic of the mathematical, statistical, or computational argument in the report, or even what the report is about. Every part of the reasoning contains serious mistakes or logical gaps.*

Background and References

B	*The report cites relevant sources, which include some background items and precursor results for the research presented in the report. There are instances where a citation is lacking, the relevance of cited work is unclear, or the embedding into the field of research is missing. A small number of references may be wrongly formatted or missing vital information.*

Better		**Worse**	
A3	*All sections of the report are adequately supported by references to relevant background and precursor items. References are chosen mostly from the scientific literature and may include books, published articles, or arXiv preprints. The bibliography contains minor mistakes.*	**C**	*Only few key references are cited appropriately, with many essential citations missing or not being clearly relevant to the argument. A number of items in the bibliography, which references numerous non-scientific sources, are incomplete, incorrect, or inconsistently formatted.*
A2	*Great care and consistency is shown in selecting the most appropriate references for embedding the project in the field of research, and for supporting scientific claims made in the report. References are chosen exclusively from the scientific literature.*	**D**	*Key references are missing almost completely. The bibliography, which consists predominantly of non-scientific sources, may be highly erroneous.*
A1	*The referencing shows that the students comprehensive reading of the literature has considerably benefited the quality of results obtained, or the strength of conclusions drawn. The bibliography is presented professionally.*	**E-H**	*The report shows minimal regard for the literature and the role that citations play in supporting scientific reasoning.*

Validity, Analysis, and Assessment of Results

B	*There is satisfactory evidence that the findings presented in the report are derived from the background material and the existing data, and that they are correct overall. However, minor inconsistencies and mistakes do appear. There is some discussion of the validity and plausibility of the results. Any conclusions drawn from the analysis are mostly well founded and reasonable, although they may be too narrow or speculative at times. The choice of models and algorithms for the analysis is adequate. Where data is used, it is by and large verified and visualised properly.*

Better		**Worse**	
A3	*The presentation of the findings of the project, and the discussion of the validity of results is convincing and reliable. Conclusions are well founded and demonstrate awareness of the broader scientific aims of the project. However, minor inconsistencies may occur. The choice of models and algorithms for the analysis is mostly appropriate, although not a perfect fit. Where data is used, it is properly*	**C**	*Several key findings of the project are missing from the report. Any discussion or validation of results predominantly relates to the specific objectives of the project and touches on broader issues only in a superficial manner, or in a manner that is not warranted by the results presented. The choice of models and algorithms for the analysis is unsatisfactory. Where data is used, it is verified half-heartedly and*

	verified and visualised.		*visualised unsuitably.*
A2	*The findings of the project are discussed in detail and validated in a manner that is fully supported by the results presented in the report. Conclusions drawn from the analysis are well-motivated; the embedding into the scientific context of the project is near-flawless. The choice of models and algorithms for the analysis is appropriate. Where data is used, it is carefully verified and informatively visualised.*	**D**	*There is almost no discussion or validation of the results, which may be highly erroneous. The scarce findings presented in the report connect only weakly to the objectives of the project, and to a broader scientific enquiry. The choice of models and algorithms for the analysis is poor. Where data is used, it is verified only haphazardly and visualised confusingly.*
A1	*The discussion of the findings of the project and the validation of results is exemplary and provides deep mathematical, statistical or computational insight. A number of important questions for future research in the field are identified. The choice of models and algorithms is pertinent to the analysis and a perfect fit for the problem at hand. Where data is used, it is thoroughly verified and very informatively visualised.*	**E-H**	*The results are highly erroneous or otherwise deficient in a manner that should have been easily avoidable given the approach taken in the project. Any discussion and validation is extremely sparse, or almost entirely wrong. The choice of models and algorithms for the analysis is very poor. Where data is used, no effort is made to verify and visualise it.*

Clarity of Statement of Objective

B	*The report sets out the principal objectives of the project in a manner that can mostly be understood by a researcher within a different area of expertise. Some appreciation of related key questions in the respective field of research is evident; a reasonable attempt is made to show how these relate to the objectives of the project.*

Better		**Worse**	
A3	*The report presents strong motivation for the objectives of the project within the context of the wider field of research. The potential for broader scientific impact is identified and addressed in the report.*	**C**	*The objectives of the project are presented in a tenuous, superficial, or overly technical manner. Some discussion is attempted of the relationship with a broader scientific enquiry.*
A2	*The rationale behind the objectives of the project is conveyed in an authoritative manner, with clear reference to the state of the art in the field of research. Specific implications for the field are discussed in some detail, and in an accessible fashion.*	**D**	*The objectives of the project are difficult to infer from the report. The relevance thereof to the wider field of research is obscure to the non-specialist reader, due for instance to the lack of essential background information or questionable reasoning.*
A1	*The report provides compelling evidence that the objectives of the project, if realised successfully, would advance the field of research in a significant and highly original direction.*	**E-H**	*The objectives of the project cannot be discerned from the report. No credible connection is made between these and the wider field of research.*

Style and Clarity of Writing

B	*The report is laid out competently. Figures and tables are presented legibly, and in line with where they are referenced; captions are informative. Mathematical formulae are unambiguous and typeset properly. The writing is clear, with few grammatical or spelling errors, although certain stylistic tics - such as terseness or hyperbole - are distracting. Mathematical notation is well-defined and used in a consistent manner, with few exceptions; cross-references are mostly accurate.*

Better		**Worse**	
A3	*The report is laid out clearly throughout. Figures, tables, and mathematical formulae are supported through well-chosen labels, captions, or clarifying remarks. Mathematical notation is near-flawless. The writing is of high quality; instances of awkward phrasing, or lapses in grammar or spelling, are rare.*	**C**	*The report suffers from deficiencies in presentation and style that may include poorly positioned or overloaded figures; illegible mathematical formulae; misleading cross-references; or inconsistent notation. Lapses in phrasing, grammar, or spelling are sufficiently severe as to not convey the intended meaning.*
A2	*Considerable thought has been given to the presentation of figures, tables, and mathematical formulae to communicate the key scientific points effectively. The writing is rigorous, yet flows naturally; there are no lapses in phrasing, grammar, or spelling.*	**D**	*Serious deficiencies in presentation and style, such as missing, duplicated, or unreferenced figures, tables, or mathematical formulae; deficient or undefined notation; uninformative figure captions; or a profusion of typographical errors, severely hamper understanding.*
A1	*The report evidences exceptional attention to detail in the presentation of figures, tables, and mathematical formulae. The writing shows creative flair whilst being scientifically accurate, resulting in a report that is enjoyable to read throughout.*	**E-H**	*Severe deficiencies in presentation or style entirely confuse any meaning. Essential components of the report, such as figures, are entirely absent, or presented in a manner such that their relevance to the content cannot be determined.*

Clarity and Economy of Argument

B	*The overall structure of the report is appropriate to its content; the relevance of specific sections to the argument is signposted. While the balance between sections is good overall, the length of some of them may not be commensurate with their importance. Some effort is required on the part of the reader to follow the argument.*

Better		**Worse**	
A3	*The relevance of any included material to the overall content is clear. Occasional effort is required by the reader to understand the argument in full, such as due to concepts being used without proper introduction.*	**C**	*Deficiencies in structure or clarity are actively confusing, such as due to material that is of limited relevance to the content as a whole, or ordered in such a way that significant parts of the argument become clear only at a later stage, or after re-reading.*
	The content of the report is accurate, and articulated with care; the reader can		*The structure of the report, or the clarity thereof, is inadequate to such an extent*

A2	*follow the argument with ease, with little effort required to understand the content and the underlying concepts.*	**D**	*that the principal aims, results, and conclusions of the report can only be determined through a considerable amount of effort.*
A1	*All aspects of the presentation are aimed at enhancing the content of the report to the highest possible degree. The only mental effort required by the reader is to contemplate the scientific ramifications of the argument.*	**E-H**	*Deficiencies in the structure of the report, or in the clarity of argument, are such that it is extremely difficult to discern any meaning.*

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